BIG DATA IN THE PUBLIC SECTOR : SYSTEMATIC LITERATURE REVIEW AND BIBLIOMETRIC ANALYSIS

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Article Info	Abstrak
	This research aims to study and analyze systematically and in depth how Big Data is implemented in the public sector. The research method uses a systematic literature review and bibliometric analysis. The stages in the literature review using the PRISMA technique are identification, screening, equity and inclusion. Bibliometric Analysis is used to see research trends and their relationship with other studies. Search articles using a database of internationally reputed journals such as elsevier, springer, francis and taylor and wiley published from 2015 to 2021. Processing of bibliometric analysis using the Vos Viewer device. Based on the Publish and Perish search, 473 articles related to the research theme were generated. The results show that the application of big data in the public sector can improve the performance of government employees, increase efficiency and optimization of the bureaucracy and big data in the smallholder agricultural sector can answer the challenges of food production.

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1. INTRODUCTION

The emergence of the global megatrend phenomenon in 2045 has forced the Indonesian people to transform all forms of resources they have in dealing with it. According to the National Planning Agency (Bapenas), one of the emerging megatrends is the industrial revolution, "In this phase, the internet of things (IOT), big data, automation, robotics, algorithmic computing, to artificial intelligence have the consequences of increasing demands for accountability. , transparency and agile of government organizations. (PPN/Bappenas, 2019).

The emergence of the term big data in the industrial revolution cannot be separated from its very strategic role in decision making, especially those involving the interests of many people (Elgendy, 2016). Big data will make stakeholders have a broad and scientific perspective in making a policy, using the term absorbing "public aspirations" (Hong, 2019). So that the use of big data in the public sector will make the bureaucracy cheaper and more efficient (Klievink, 2016).

In Indonesia, several studies with the theme of big data were carried out, among others, by Ariraya Sulistya Sedaya who examined the use of big data in public institutions (Sedayu, 2021). Then Dzaky Naufal Hakim who researched the Study of the Use of Big Data in Public Policy Formulation in the Health Sector (Hakim, 2021). Next by Emyana Ruth Eritha Sirait who researched the Implementation of Big Data Technology in Indonesian Government Institutions (Sirait, 2016).

Currently, big data technology has been widely used in various sectors, including health care, manufacturing, energy, transportation, the environment, and many other fields (F. Cena, 2017). In Indonesia, the use of big data in the public sector includes, among others, in the transportation sector in terms of knowing the public's response to the opening of new routes, in the health sector with the application of care and protection, in the field of law enforcement, creating applications

that can facilitate services to the community in terms of complaints from Kamtibmas. In the field of economics on tax reporting. In the field of urban planning, big data supports the realization of a smart city (Nur, 2021). Its implementation in DKI Jakarta is Mobile First, System and Data-Driven Technology, Digital Xperience, and Smart Collaboration (Atmojo, 2021).

Sirat (2016) in his research related to the challenges in adopting Big Data technology in Indonesia, it can be concluded 5 things, including data availability, government data standardization, data privacy, HR competence, and supporting infrastructure. In addition, there are also some concerns in the use of big data such as sampling that does not represent the population so that it will produce biased results (Ash, 2016).

The Indonesian government is also faced with complexity, security, risks to privacy as well as the technology and human resources needed to manage big data. As research by Jacques (2016), institutions/companies that invest in big data are generally more productive than other companies (Bughin, 2016).

This article aims to examine the implementation of big data in the public sector by analyzing various research results in articles that are relevant to the research theme. The research question is whether the application of big data carried out by government agencies is able to present the state in the midst of society with all kinds of conveniences.

2. RESEARCH METHODOLOGY

This study uses a systematic literature review (SLR) method. Machi and Mcevoy (2009, p. 4) say that a systematic literature review is a written document that presents logical argumentation cases based on a comprehensive understanding of the current state of knowledge in a particular topic (Machi, 2009). Systematic review is a research method to identify, evaluate and interpret all relevant research results related to certain research questions, certain topics, or phenomena of concern (Kitchenham, 2004)

Systematic literature review (SLR) was chosen to conduct this study with four stages, namely identification, screening, feasibility, and inclusion. Systematic Literature review begins with the identification stage, at this stage the researcher looks for articles/reading sources that intersect with the research theme. Search can be done with Google Scholar. Then the second stage is to re-filter articles/other reading materials according to some of the criteria that we have set, for example the year of publication is limited (2015 - 2021), Location Restrictions for example articles originating from abroad or domestically. Next is the third stage, which is feasibility: In the feasibility stage, manually filter articles that pass repeated checks by reading the title and abstract repeatedly to see problems, interventions, comparability, and results to get selected articles. At this point, all selected articles will be downloaded as full text. The last stage is the Inclusion Phase in this stage the selected articles are extracted and analyzed to obtain relevant information from the authors, research objectives, research scope, year of publication, country/region and research results.
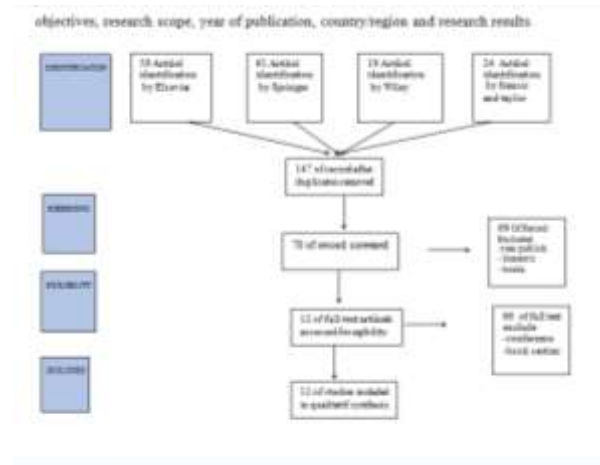
In addition, the research is strengthened by bibliometric analysis using Vosviewer which is useful for finding out various trending research topics, the development of the number of studies and their variety (T.Tupan, 2020). The use of these two methods aims to provide a comprehensive and in-depth summary of research/publication results in presenting quantitative and qualitative knowledge of the research object (Kirti Goyal, 2020). Sources of data in the form of articles analyzed in this study were obtained from the Scopus and Google Scholar databases. The research was conducted by searching for journal article data online using Publish and Perish, using the keyword, "Big data in the public sector" (topic research area). The year of publication of articles is limited from 2015 - 2021. The number of articles is limited to 500 articles. Of the 500 articles detected by Publish and Perish, the researchers selected and discarded 27 articles for several reasons, including conferences and books. The appropriate articles are downloaded using the RIS format and then imported into the Vos Viewer software which stores the reference data owned by the articles, makes groupings based on special categories, then retrieves the metadata contained in the article documents. Below are the results of an article search with Publish And Perish.

Based on the search results, there are 473 papers related to the research theme of Publish And Perish

3. FINDINGS AND DISCUSSION
a. Big Data Concept

Big data has always been synonymous with the field of computer science, but several studies have concluded that this term also intersects with other fields. Cai, L (2015) explains that big data is a term that is applied to a new generation of software, applications, systems, storage, and design, all designed to increase business value/ provide benefits from unstructured data. Big data is becoming an indispensable field of research that is expected to add great value to companies (Cai, 2015). Big data is a collection of data that has a large size and exceeds the capacity of the database software to manage and analyze it. Big Data emerges from the data transaction process, data interaction and continuous data observation (Manyika, 2011).

R. Karl Rethemeyer (2016) defines big data based on disciplines (Rethemeyer, 2016).

table 2. Big Data Definitions across Disciplines

Discipline	Author(s)	Definisition	Challanges
Management	George, Hass, and Pentland (2014)	"Big data is generated from an increasing plurality of sources, including Internet clicks, mobile transactions, user-generated content, and social media as well as purposefully generated content through sensor networks and business transactions such as sales queries and purchase transactions" (321)	• Face-to-face communication versus automated analysis of behavioral patterns • tated versus automatically detected preferences
Public policy	Pirog (2014)	New formats, quality, and availability of administrative data (volume, velocity)	data • No breakthroughs in quasiexperimental • research designs
Political science	Clark and Golder 2014	"Technological innovations such as machine learning have allowed researchers to gather either new types of data, such as social media data, or vast quantities of traditional data with less expense" (65)	• Big data ≠ better research designs or ≠ causal inference
Information and technology	den Hoven (2015)	BOLD—Big and Open Linked Data	• Ethical, cultural, technological challenges
	Boyd and Crawford -2012	"massive quantities of information produced by and about people, things, and their interactions" (Janssen and Van den Hoven 2015 , 662)	• Unresolved privacy intrusions
Computational social sciences	Lazer et al. (2009) Lazer et al. (2 014) Denning (1 990) Bryant, Katz, and Lazowska (2008)	Second-by-second picture of interactions over extended periods of time, providing information about both the structure and content of relationships" (Lazer et al. 2009 , 2)	• Acquisition and storage of data • Design and test of algorithms • Detecting patterns • Overpredication/estimation of online searches (Lazer at al. 2014) • False interpretation of signals

According to Bello-Orgaz, Jung and Camacho (2016), explain the things that become the identity of big data as follows: *Volume*;   *Velocity*;*Variety*   ; Ve*racity*;V*alue*; These values need to be extracted using appropriate big data. (Bello-Orgaz, 2016).

b.   Visualization Vos Viewer

Figure 1. Shows the results of the processed vos viewer in the form of networking visualization. This explains the relationship between one article and another. Relationships are marked with the same color as in the picture, it can be seen that the word big data relates to industry (red).
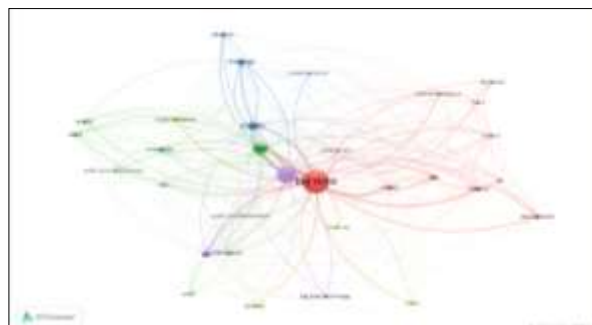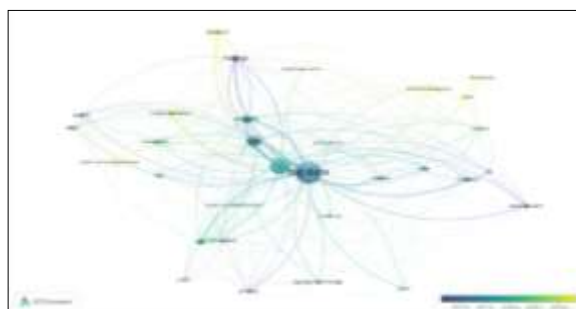

Figure 2. shows the trend of research topics that emerged from 2015 to 2021. Where the yellower the color of the connecting line, the younger the research year. It can be seen that artificial intelligence, blockchain and public sector organizations show current trending studies.

c.　Big Data Implementation in public sector

Some of the uses of big data in the public sector which were later published and became a study, among others, Noor Zaidi Sahid (2020) who examined the motivations of IT designers who use big data as the main source of data concluded that the application of big data in the public sector can improve the performance of employee. Sounman Hong's research (2019) examines policy making based on big data called the owl bus project. The findings show that the average number of passengers using the Owl Bus route is significantly greater than that of other daytime bus routes with the same characteristics.

Research by Bagas prakasa (2017) on the Implementation of Big Data in Bus Rapid Transit (BRT) Electronic Ticket Transaction Data shows that there is optimization in terms of fast data transmission speed and number of transactions. Andreas Kamilaris researched the application of big data in the agricultural sector. Big data is applied to overcome the challenges of increasingly large production by means of modern digital technology that monitors continuously with a large amount of data.

Digitalization has penetrated all areas of human life. The more the bigger and wider is the illustration of big data. This potential if not managed properly will become a setback and disorder. several studies show that the adoption of big data can improve employee performance Noor Zaidi Sahid (2020). Jacques (2016) explains that institutions/companies that invest in big data are generally more productive than other companies. big data can also facilitate electronic transactions Bagas prakasa (2017). In addition, there are also some weaknesses of big data as reported by Ash (2016), concerns in the use of big data such as taking samples that are not representative of the population so that it will produce biased results.

4.　REFERENCES

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