

How Big Data Contributes to Government Public Service Innovation in Indonesia?

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Abstract

In realizing good governance, the government must develop public service innovations through Big Data, which are considered capable of making available services more effective and efficient. But behind this potential, the contribution of Big Data technology in the government field is also considered to be still lacking in improving public services, so this study aims to find out more about the contribution of Big Data technology in influencing government public service innovation. Furthermore, this study uses qualitative research methods with an exploratory-oriented literature study approach that attempts to analyze research problems from reading sources, which are then interpreted to reach deeper insights so that they are easy to understand. This study finds that big data in the innovation of current government public services can contribute in several aspects. First, Big data can function as a public security application where governments can use Big Data to track potential fraud and various risks in real-time for later action. Second, Big data as an e-government development process, which in this aspect will be seen from the reality of the lifestyle of today's people who are very dependent on smartphones with internet connections to carry out various productive activities. Third, Big data can be used as an instrument for formulating public policies for the government in determining which policy priorities must be realized, whether infrastructure, security, education, and others. Therefore, Big Data can be said to have high expectations to be able to innovate better government public services.

Keywords: Big Data, Innovation, Public Service, Government

Introduction

Public service innovation is a strategic policy issue because its services will significantly impact increasing public confidence in government performance [1]. Public service innovation is not only about discovery but can also be understood in a new contextual

approach that has a significant impact on the quality of services available (Fitria et al., 2019). Public service innovation currently has a vital role in improving services to society (Putra et al., 2017). Because the performance of a public service provider will be determined by the quality of services provided (Mulyadi & Erlin, 2016). However, currently there are still many phenomena of service delivery that are still far from the expectations of the community, and almost as a whole, people do not understand how the services they should receive [5]. The emergence of public service innovations is one of Indonesia's government bureaucratic reform movements, which are still convoluted in providing services to the community [6]. For this reason, one of the technologies currently being developed and applied in various fields is big data technology [7].

The new era of Big Data impacts the development of social data that is digitally captured and increasingly accessible [8]. Big Data is one part of the action, implementation, and new tools to improve the government's provision of services [9]. According to (Clarke & Margetts (2014), Big Data can offer great potential as a means to improve public services in today's digital era. Big Data technology can impact the advancement of existing service innovation, where the government can create services that are integrated with specific segments so that services can be more effective and efficient [11].

Accessibility of data is the key to Big Data technology [7]. The utilization of big data will make responding to public needs more efficient and effective [10]. Also, the use of big data will help the government improve the services available (Rethemeyer, 2016). One of the key sources of Big Data is data generated by cellular usage [13]. There are several promising contributions to exploiting big data. First, The government can utilize it to better understand citizen behavior and identify the strengths and shortcomings of policies in service delivery [10]. Second, Big data is the first step in better public management practices (Rethemeyer, 2016). Third, Big data offers personalized services that allow businesses to provide more personal and customer interests [13]. Fourth, Big data impacts the role of public sector organizations in the functional areas in the future (Reis et al., 2019; Sousa et al., 2019). Fifth, Big data provides the government with an opportunity to innovate in the integration of public services into society (Rahmanto et al., 2021). Sixth, Big data has a favorable impact on the quality of investigations conducted by government agencies [17]. Several responses to the use of big data suggest that each group will benefit significantly in various fields [7].

Public service innovation is a breakthrough in service, either directly or indirectly, to benefit society through original creative ideas or other adaptations and modifications (Fitria et al., 2019). Public service innovation has three criteria, namely have the impact and benefits of change initiatives, can provide solutions to problems, and must be sustainable [18]. The implementation of existing service innovations must be supported by human resources, adequate facilities, infrastructure, and socialization to be carried out to the community (Putra & Usman, 2017).

There are several types of service innovation programs that have been implemented in Indonesia: First, through the Population and Civil Registration program by simplifying service requirements and procedures as well as establishing Service Standards using several online-based applications, namely JITSI Applications, Only Office, WhatAct, and Dear Diary [5]. Second, through the Farmers' complaint application in Batu City, which has a positive impact on a closer relationship between the government and farmers, so that when farmers have problems related to agriculture, farmers can submit complaints through the application [19]. Second, through the Farmers' complaint application in Batu City, which has a positive impact on a closer relationship between the government and farmers, so that when farmers have

problems related to agriculture, farmers can submit complaints through the application (Putri, 2018). This indicates that the government must continue to improve public services that need to be adapted to existing technological developments [1].

Technological developments are currently becoming very popular so that the government must follow the application of more optimal technology. In general, artificial intelligence is a branch of computer science that automates operations that would normally need human intelligence [21]. According to Batty (2018), Artificial intelligence is a technology system that is widely used in a variety of industries, including government. The different benefits of deploying artificial intelligence in the public sector have been explained in various literature connected to technological breakthroughs (Dwivedi et al., 2019; Mas et al., 2019; Reis J et al., 2019). This is useful as a reference in providing more optimal services and has implications for all technology applications to find solutions for the government (Sousa et al., 2019).

Artificial intelligence is thought to be capable of solving a variety of human resource challenges through technology [25]. As a result, it has a positive impact on the speed and efficiency with which matters are resolved [26]. The great potential of AI in the public sector is that it can facilitate service management. Therefore, artificial intelligence technology can ease the social burden of providing government services accurately and assessing future policy options [27]. Big Data has the potential to power public sector organizations in the current situation. These new forms will allow the government to make public decision-making more quickly and effectively [28].

Based on this, big data is assumed to improve government services. In contrast to previous studies that discuss the use of big data in public affairs, this article focuses on the extent to which big data can contribute to the innovation of public services in government. Seeing the vast potential offered by big data technology, it is critical to understand how to leverage big data from a variety of perspectives to make it easier for individuals to access government services. As a result, this article will present an overview of the current state of public services as well as some of the contributions big data technology can bring to government public service innovation.

Method

This study uses a qualitative research method with an exploratory-oriented literature review approach. According to Aspers and Corte, qualitative research emphasizes the interpretation of analysis results in certain situations [29]. Then, Anggito & Setiawan, (2018), said that qualitative research aims to collect data related to a problem that you want to research and then interpret a phenomenon scientifically. Besides, Rahman (2016), also notes that the reason for using qualitative research is to test the research results contained in the previous literature.

Furthermore, explorative-oriented qualitative research can expand understanding in looking for new ideas about a phenomenon and articulating a research problem more fully [32]. Therefore, explorative-oriented qualitative research seeks to explore the meaning of information from a source, which is then interpreted in a descriptive narrative based on the researcher's perspective. In general, the data used in this research comes from national and international journals that discuss big data technology in the public sector and specifically related to the use of big data in government public services. In this research, data collection

techniques are documentation techniques in national and international journals, national and international proceedings, and several books relevant to the research subject.

To analyze the data that has been obtained, qualitative descriptive analysis is used by reducing data, present data, and draw conclusions [33]. In detail, the activity begins with reducing the data that has been collected to find the main points of the research substance. Next, the data that has been obtained is presented and then narrated in the research discussion. As the final stage, after the data is presented in an organized manner, the researcher concludes and answers the research questions asked. Therefore, this article can provide an understanding of the extent to which big data use contributes to government public service innovation.

Results And Discussions

Government public service innovation is very important in today's technological era, the need for technology-based services is very urgent and all countries are committed to developing application-based services. Countries that are not able to adapt to technology will be left behind, and one source of public service innovation is big data. Big data is thought to help improve the quality of government services [1]. The following will discuss the contribution of Big Data in government public service innovation:

Big Data as a Public Safety Application

In Indonesia, the use of Big data has been carried out by several government public service agencies. This can be seen from the health, education, and other general administrative services. Big data technology is a public safety administration application, and Big data is currently only seen dominantly used by the government in the health and education sectors (Anshari et al., 2018). Therefore, the use of big data must continue to be developed with various aspects and media so that the reach of public services becomes wider. Using big data analytics, the government employs big data to track fraud and other risks in real-time. The government can also make predictions about an event and the likelihood that crime will occur. In the health sector services, Big data can be used in hospitals to help patient care activities with fast and accurate information and facilitate the public to access the doctor's ordering system through online-based services. The following is an image of the correlation of big data and public safety:

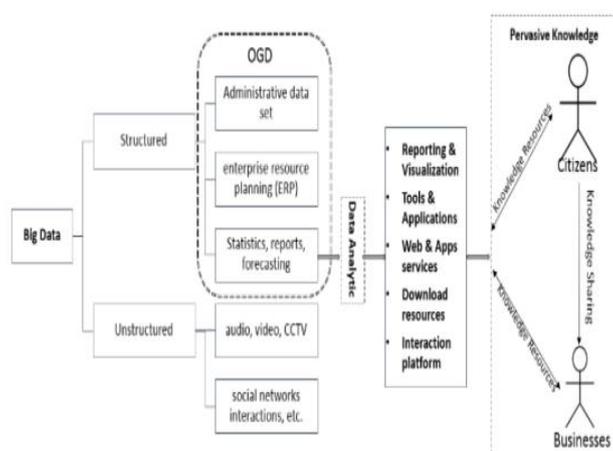


Figure 1. Big Data and Public Safety
Source: (Anshari et al., 2018).

Figure 1 shows that the sources of these data channels can be structured. If unstructured data were to be used to establish a policy, the government would have to use all available data sources, including CCTV, fingerprints, GPS, social media, audio, car RFID data, and the identity of smartphone owners, and others. Furthermore, using open government data and big

data to respond to the requirements of all stakeholders, including government, residents, enterprises, and individuals, offers efficiency and effectiveness. Then, there are the interconnected benefits of open government data and big data in terms of business enhancement, public interest, and economic value. Furthermore, the government's data release will allow for easy access and reuse by anyone. For example, in traffic control, big data might be used by traffic cops to accurately and efficiently monitor transport. The police force collects a large amount of data from its cars' sensors and CCTV, which is then configured and redesigned from the major route structure in real time to minimize traffic congestion. The results of the big data analysis are then visualized and made public. This will surely assist folks in determining the best course of action. The scenario release above is meant as an OGD that provides public and corporate activities with customized and personalized information and services. Combining big data and OGD allows for the application of relevant information to citizens, allowing for the delivery of services that comprehend the context, forecast outcomes, and continue to learn from ever-increasing amounts of big data. All of these diagrams show that big data holds the promise of becoming the most effective approach to promote public security applications and the most strategic way to expedite investigations (Anshari et al., 2018).

Big Data as an e-Government Development Process

Big data has made a great promise in the field of e-Government growth. Big data then becomes a breakthrough for the public sector that takes advantage of specific data sources by enabling high-speed connectivity, research, and experiments to predict and find effective public policies. Significant data activity can occur in some ways, such as the possibility of expanding e-government via smartphones. People today rely heavily on smartphones with internet links to carry out online transactions and other operations anywhere. Therefore, In order to be successful, the e-Government development process must take Big Data into account. Conceptually, the basic concept of e-Government is how to provide services through electronic systems (e-service), such as the internet, cellphone and computer networks, and multimedia. Seeing the development of e-Government has become a capital for the Government to continue to develop electronic services (e-service) by utilizing Big Data technology.

The collaboration of various electronics and technology products will support the Government's efforts to adopt or implement better and more efficient services because one of the critical factors affecting service standards is performance [1]. Big data will help governments carry out monitoring and offer a more in-depth view of people's activities with the help of their mobile applications. Besides, the Government can predict the orientation of the public interest by offering programs that suit the community's needs and increasing public trust by reading reviews and compilations of several big data such as articles, journals, reports, comments, and conversations from various parties on social media. The data can then be analyzed for use as a need for public service innovation [13]. Thus, e-government that is capable of big data will encourage creativity in technology and can assist the Government in developing strategies to maximize e-government services that have added value in the future. Here is an overview of the relationship between e-government and big data:

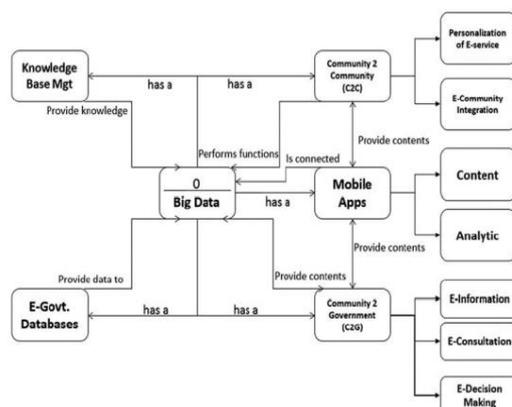


Figure 2. Big Data and e-Government
Source: [13].

Figure 2 shows that big data can be activated using an e-government platform. After the data is collected, some comments from social media can be used as a reference for public service providers to get an idea of what electronic services and programs are, which can then be introduced to the public space as a government development process. Another anticipated effect of e-government that supports big data is the government's increased awareness of the importance of reading constructive criticism from others in order to enhance public trust. The collection of many vital data, such as news, articles, journals, messages, discussions, and input from various social media types, can be evaluated to encourage better government public service innovation. Big data can help develop e-government by providing optimal services to the public. Apart from that, it also allows people to optimize the performance of their smartphones and smart devices. For example, when driving, they use smartphones while driving to assure the correct path to avoid congestion by adding GPS, cameras, and sensors that automatically deliver electronic traffic alerts to ensure road safety automatically. This allows public administrations to gain valuable insights for improving facilities and operations, especially in cities, as more data can contribute to better policy analysis.

Big Data as an Instrument for Formulating Public Policies

The development of technology has become a significant necessity for human life in general, and there are almost no aspects of modern life apart from advances in information technology. It must be understood that public services based on the principles of transparency, accountability, accuracy, security, and easy access will be complicated to implement in daily tasks without adopting progress in technology in its application [35]. Today, evidence and knowledge are precious as a framework for developing public policies. The higher the quality of information used in the decision-making process, the higher the resulting strategy's consistency. However, the more data and information presented, the more complicated it will be, and the decision-making process itself will take time to make. Therefore, Big Data can play an essential role in pressing policy issues where the agenda-setting stages will determine which policy priorities must be realized, be it infrastructure, security, education, religion, etc. which must be treated as a priority policy [36]. The following is a sketch of the policy cycle and the role of big data:

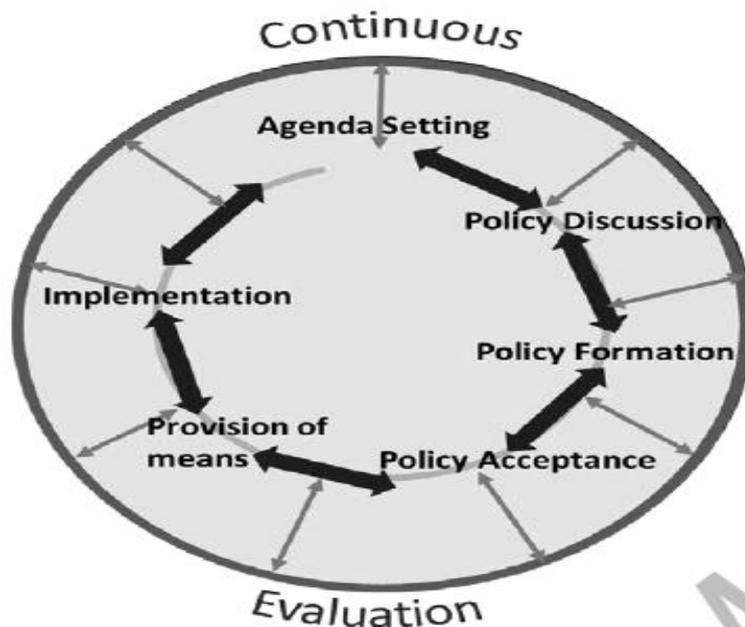


Figure 3. Policy Cycles That Require Big data
Source: [36].

Figure 3 is a policy cycle consisting of six stages of public policy. Initial steps begin with setting an agenda for defining the problem and drafting a public policy setting. The most significant concern of agenda-setting is the selection of issues that will be important to decision-makers. This will contribute to a more meaningful public discourse at the policy dialogue level and then discuss policy alternatives and conceptual policy grounds. As a result of policy discussions, actual policies will be produced and interpreted in the language of the legislative and administration, accompanied by proper law enforcement and the supply of the required resources and budgets. Another issue that has arisen in the public policy debate is how to cope with a large amount of unstructured data, such as that found on public blogs or tweets, or with the numerous online consultations available. Posts and comments acquired from social media platforms, weblogs, and other publicly accessible data studies can provide considerable input to public agencies and institutions. These organizations must use automated text analysis approaches, tools, and procedures to integrate these inputs into the policy-making process to be efficient.

Policy implementation can be affected by big data in two ways: First, defining problem zones can apply varying degrees of policy intensity. For example, Improved surveillance might focus mainly on danger spots, reducing crime at its source. Second, The introduction of a new policy may result in the generation of new evidence, which can subsequently be used to evaluate the policy's performance and to improve possible implementation methods by identifying problems with prior ones. As evidenced by the evaluation procedure, it is primarily the new component of the appraisal expected to have the most crucial impact at various policy cycle stages. The creation of policy execution data will generate unparalleled versatility in translating policy proposals into fully enforceable policies. A redistributive tax code, for example, may be checked in near real-time to see if it achieves the desired result or if it needs to be altered. Also, Big Data can improve the accuracy of several sources of essential information for policy implementation. For example, Census evidence is also at risk of being out of date as used in the policy development and implementation process. Census data, on the other hand, can be created nearly on a monthly basis, rather than only once or twice a decade, thanks to a combination of several databases. Demographic information, unemployment rates, and mobility trends may all be evaluated in real time, allowing for a much faster assessment of

whether a certain plan was successful. Integrating external data will be another positive step toward expanding current authoritative government records or strengthening cross-checking data validity systems.

Conclusion

Big data in today's government public service innovation can contribute in several aspects. First, Big Data can serve as a general security application where governments can use Big Data to track fraud and crime risk in real-time. Second, Big data provides great hope in the e-government development process. This can be seen from the reality of the lifestyle of today's people who rely heavily on smartphones with internet connections to carry out various productive activities. Third, Big data can be used as an instrument of public policy formulation for the government in determining policy priorities.

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