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Artificial Intelligence in Public Sector Organization: A Systematic Literature Review

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Abstract- To gain benefits in the provision of public services, public organization managers have increased their adoption of artificial intelligence (AI) systems. However, research on AI is still scarce, and the progress of this technology in the public sector, as well as the implementation and outcomes of these strategies, needs to be systematized. Artificial Intelligence (AI) technology refers to any device that senses its environment and takes steps to maximize its chances of success in some objectives. This technology includes machine learning, rule-based systems, natural language processing, and speech recognition. The research method used in this study is a Systematic Literature Review that examines artificial intelligence technology in the public sector organization. The data analysis in this study collected several keywords and selected 9 journal articles from the last 5 years. The implications of this research found that the policy and ethical implications of using AI penetrate all layers of technology implementation, and these solutions can generate value for government functions. However, it is recommended to have prior debate with the community regarding the use of AI in the public sector. It is shown that the policy and ethical implications of using AI penetrate all layers of technology implementation, and its solutions can generate value for government functions. Artificial Intelligence (AI) has the potential to significantly transform the operations of public organizations, leading to increased efficiency, accuracy, and cost savings.

Keywords- Artificial Intelligence, Sector Public Organization, Systematic Literature Review.

I. INTRODUCTION

One of the impacts of Industry 4.0 technological development is the emergence of Artificial Intelligence (AI). AI represents a real breakthrough in business management and will have a significant impact on the way employees work, especially in the HR and workforce departments (Abdeldayem & Aldulaimi, 2020). Artificial Intelligence technology has a different impact on human resource management.

Where mobility is one of the basic human needs in all time periods and was fundamental to the functioning of society in the past and present (Mete Yazan & Brandao Moniz, 2021). Also, the current industrial phase focuses on interconnectivity and automation (Shaik & Komandur, 2022).

For example, designing training and development plans for each employee from the background process, based on big data or real-time analysis of workforce practices. Artificial intelligence refers to technology used to perform tasks that require a certain level of intelligence to complete.

Previously, AI only existed in the imagination of science fiction writers and film producers, but now AI has become a daily fact of life in modern technology society. Currently, most definitions state that AI solves complex cognitive problems related to human intelligence or that AI helps as many people as possible through smartphones or healthcare, or even recognizes problems and creates solutions for technology, humanity, and society. During the creation of AI, human beings have learned a lot

about what it means to be human, how human intelligence is structured, and how humans learn and gain experience (Goralski & Tan, 2020). In other words, a tool trained to do what humans can do.

The practical and effective use of artificial intelligence leads to an increase in human resource management work task achievements, both in the field of workforce, performance evaluation and measurement, human resource planning, employee training needs, job evaluation, or even forecasting labor market needs and indicators. Artificial intelligence can complement humans to reduce decision-making based on personal beliefs (Bullock, 2019). In Bullock's research (2019), a comparison was made between humans and AI in solving a problem. The results showed that AI dominated in problems that required a high level of analysis ability with low levels of uncertainty and complexity, while humans dominated in problems that had higher uncertainty and complexity levels and relatively lower analysis ability. Despite this, according to Bullock (2019), with deeper learning processes, artificial intelligence is expected to be able to solve tasks and problems with higher levels of uncertainty.

Artificial Intelligence (AI) technology refers to any device that senses its environment and takes steps to maximize its chances of success in several goals. Such technology includes machine learning, rule-based systems, natural language processing, and speech recognition. After a series of ups and downs in popularity, AI technology is now experiencing increased diffusion. In line with the emergence of the concept of Web 3.0, the Internet of Things (IoT), open innovation and big data and openness (Sun & Medaglia, 2019), AI has recently gained momentum as a set of technologies that potentially disrupt many industries such as finance, automotive, retail, travel, and media.

Artificial intelligence (AI) can also be defined as a system's ability to process data correctly, learn from that data, and use that learning to achieve specific goals and tasks through flexible adaptation (Haenlein & Kaplan, 2019). With advances in big data and computing power (e.g., natural language processing, computer vision, and speech recognition), AI has the potential to not only enrich our lives in many ways (e.g., innovations like image recognition, smart treatment, and self-driving cars) but also has the power to transform businesses.

II. LITERATURE REVIEW

According to (Wang et al., 2021), "Artificial intelligence (AI) is an activity dedicated to creating intelligent machines, and intelligence is the quality that enables an entity to function properly and with foresight in their environment. In computer science, AI refers to artificial intelligence, the intelligence exhibited by machines, which is different from natural intelligence exhibited by humans and other creatures. Computing defines AI research as the study of "intelligent agents": any device that perceives its environment and takes actions that maximize its chances of successfully achieving its goals."

Kaplan and Haenlein, in Abdeldayem and Aldulaimi (2020), define AI as the ability of systems to accurately interpret external data, to learn from that data, and to use that learning to achieve specific goals and tasks through flexible adaptation. In everyday language, the term "artificial intelligence" applies when machines mimic "cognitive" functions associated with human thinking, such as "learning" and "problem-solving."

The increasing demand for efficiency and personalized public services has led governments at all levels in countries around the world to continue investing in new AI-based technologies (Sousa et al., 2019). For example, in early 2017, China released a three-year plan for AI development (2018-2020). Under this plan, local governments at all levels in China have subsequently issued similar AI development plans, with the goal of having the AI-related industry invest 10 trillion yuan by 2030. Similarly, Europe has spent up to 700 million euros on AI for robotics and public-private partnerships (Demlehner et al., 2021). IDC also predicts that US government investment in cognitive technology and AI will grow at a CAGR of 54.3% from 2018 to 2021.

AI research in Indonesia started in 1987, when BPPT used it for a multi-language translation system project sponsored by the Japanese government. From this research, several other projects were born, including the Universal Networking Language (UNL), ASEAN-MT, and others. In addition to AI research projects, commercialization has also been done by creating a product that can quickly create meeting minutes by recording all forms of conversation, called "Perisalah". The research then continued

towards speech-to-speech by integrating speech recognition technology, machine translation, and text-to-speech synthesis.

Currently, the Indonesian government, represented by the Minister of Research and Technology (Menristek)/National Research and Innovation Agency (BRIN), Bambang PS Brodjonegoro, is about to issue a National Artificial Intelligence Strategy, reinforced by a Presidential Regulation on Indonesia's strategy in using artificial intelligence in all aspects, including the development of AI talent, ethics and policy studies, AI infrastructure and data, AI industrial research and innovation, as well as priority programs and quick win AI implementation, which is planned to be issued in 2020 (Ririh et al., 2020). Regulations governing artificial intelligence are expected to simplify the direction of the ministry or agency policies that will apply artificial intelligence. This technological improvement is an important thing that must be owned by every officer, because having good competence will certainly improve their performance (Amirullah et al., 2020).

AI research in the public sector remains limited, although there are some exceptions. AI can generate benefits such as greater efficiency and faster service delivery, and possibly more rational decision-making. However, there are many challenges in adopting and implementing AI in the public sector. For example, AI algorithms can unintentionally create bias, reinforce historical discrimination, support certain political orientations, or reinforce unwanted practices. The main areas of AI application in government primarily include public services, economic affairs, and environmental protection (Sousa et al., 2019). There are studies on trust in AI, AI governance, the relationship between AI and policy or bureaucracy (Sallu et al., 2023). In general, AI research needs to be in-depth, particularly on AI and value creation in the public sector.

Existing studies have suggested that the use of AI may have a positive impact on value creation in the public sector. In the same way that the goal of private companies (for profit) is to create private value (economic), the goal of government agencies is to create public value. Moore (1995) in (Desouza et al., 2020) argued that public value should not be evaluated from the perspective of individual consumer economic markets, but should be evaluated in the scope of political will of citizens and collective decision-making of democratic institutions. Based on Moore's statement on the nature of public value, Kelly, Mulgan, and Muers (2002) in (Demlehner et al., 2021) identified that citizen values are in three categories: service, outcome, and trust. This classification provides a useful way to conceptualize the dimensions of public value in terms of solving internal management-level problems (service), creating public value at the social level (outcome), and enhancing citizen-government interactions at the political level (trust).

III. METHODOLOGY

This research uses the Systematic Literature Review (SLR) methodology. Systematic Literature Review is a research method that uses processing to identify, assess, and interpret facts and evidence obtained from previous research conducted by researchers.

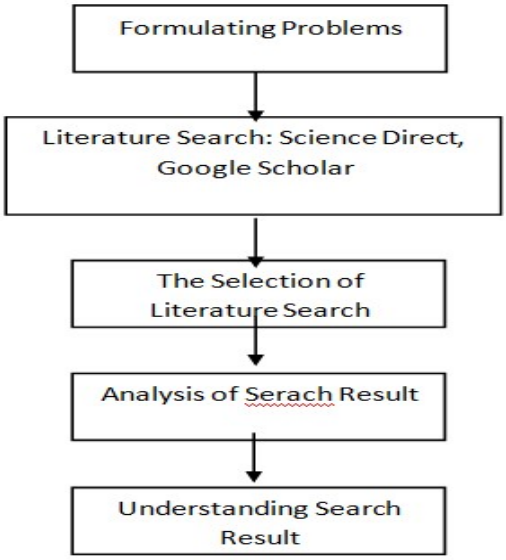

Figure 1. Systematic Literature Review (SLR) Research Method Procedure.

In this methodology, there are five stages, namely formulating problems, searching literature, sorting search results, analyzing data, and understanding research results. In the first stage, problem formulation consists of several research questions formulated based on the objectives of this literature review. The second stage is planning a literature search strategy designed according to the formulated research questions, consisting of identifying search keywords and searching literature from literature providers. The third stage is sorting the search results obtained based on predetermined

selection standards. The fourth stage is to analyze several literatures from the previously selected search results. The fifth stage is to understand the search results that have been summarized in the analysis stage.

1. Formulating Problems:
The aim of this literature review is to understand AI in public sector organizations. To achieve this, it is necessary to formulate a problem by formulating several research questions. Thus, from these statements, the research problem of this study is as follows: What is the contribution of AI technology to public sector organizations using a systematic literature review?

2. Literature Search:
In this stage, literature search is obtained from various sources such as national and international journals. The literature search uses several keywords based on journals or articles in the last 5 years, namely artificial intelligence, sector public organization, systematic literature review. The literature obtained is as follows:

Table 1. Data of Literature Review.

Keyword	Science Direct	Google Scholar
Artifical Intelligence	104.447	85.000
Sector Public Organization	96.336	33.600
Systematic Literature Review	275.619	324.000

From the search results, the next step is to filter the literature that is relevant for obtaining the literature to be used in this literature review.

3. The selection of Literature Search:
This selection is based on predetermined criteria, namely: papers or conference proceedings published within the time range of 2019-2023. Papers or conference proceedings are obtained from trusted journal sources. The papers or conference proceedings obtained from the search results should be able to address the problem based on the research question discussed in this study. Based on the literature obtained, filtering is done based on publication year and criteria in the literature search. Next, selection is made for journals or papers that are duplicates. As a result, from the literature search, several literature consisting of 10 journals have been found. The results of several literature found are used as a reference material in conducting the analysis

4. Analysis of Search Result:
This stage involves analyzing the results of literature search based on the previously established criteria. The analysis is conducted by summarizing the findings of the literature search that are related to the contributions of AI technology to public sector organizations.

5. Understanding Search Result:
The final stage encompasses all the previous stages. In this stage, it is necessary to understand the search that has been conducted in the previous stages. Therefore, in this stage, the results of the literature review on the contribution of AI technology to the public sector organization can be discussed. Based on the research questions, this literature review can be viewed from two perspectives, namely artificial intelligence and artificial intelligence in public sector organizations.

IV. RESULT AND DISCUSSION

A total of 9 papers have been selected and will be used as the main references. Next, they will be grouped based on the content discussed in the papers. The researcher will classify them into two types of sections, namely artificial intelligence and artificial intelligence in sector public organization.

Table 2. Search Results and Categorization.

Category	Paper	Amount
Artifical Intelligence	(Ririh et al., 2020);(Sallu et al., 2023);(Demlehner et al.,2021); (Bullock, 2019) and (Desouza et al., 2020).	5
Artifical Intelligence in Sector Public Organization	(Abdeldayem & Aldulaimi, 2020); (Sun & Medaglia, 2019); (Sousa et al., 2019); and (Wang et al., 2021).	4

From the results of paper grouping based on the discussed content, the main review results will be obtained regarding the contribution of AI technology to the public sector organizations.

Economic studies emphasize the urgent need to embrace human resources regarding the impact of artificial intelligence and automation, as there is a significant impact on their facilities and jobs that support human resource digitization, and human resources must be fully prepared to support digital transformation in their facilities, otherwise they will be at risk of falling behind and seeing other departments. There is a great opportunity for human resources to align with facilities and add value by becoming more digital.

Research conducted by (Abdeldayem & Aldulaimi, 2020) found that AI plays a crucial role in shifting HR functions into the digital era. Without a doubt, the increased use of information technology in organizations has radically changed the types of businesses and skills we need in some activities, such as training, development, and organization, and it will become increasingly important to adapt to changes that occur within certain activities, and employees can be eliminated, especially owners of simple skills and routine jobs.

To obtain benefits in the provision of public services, public organization managers have increased the adoption of artificial intelligence (AI) systems. However, AI research is still scarce, and the progress of this technology in the public sector, as well as the implementation and results of these strategies, needs to be systematized. Research conducted by (Sousa et al., 2019) shows an increasing trend of interest in AI in the public sector, with India and the US being the most active countries. Public services, economic affairs, and environmental protection are the most studied government functions related to AI.

Artificial Neural Networks (ANN) technique is the most recurrent in the investigated studies and shown to be a technique that provides positive results in several application areas. A research framework for AI solutions for the public sector is presented, which shows the policies and implications

V. CONCLUSIONS

A research on AI solutions for the public sector is presented, where it is shown that the policy and ethical implications of using AI penetrate all layers of the technology's application, and the solution can generate value for government functions. However, it is recommended to engage in prior debate with the public about the use of AI in the public sector. The policy and ethical implications of using AI penetrate all layers of the technology's application, and the solution can generate value for government functions.

Although there is significant theoretical and empirical attention on creating public value in the public sector, the relationship between the use of artificial intelligence (AI) and value creation from a citizen's perspective is still not well understood. A study conducted by (Chen et al., 2023) based their research on Moore's public value management to test the relationship between the use of AI and value creation.

They conceptually categorized public service values into public and private values. They used procedural justice and trust in government as indicators of public value and, based on motivation theory. The results showed that the effective use of AI voice robots was significantly related to private values and procedural justice. However, the relationship between effective AI use and trust in government was not found to be significant. Interestingly, respondents showed that private values had a greater influence on overall value creation than public values. This contrasts with the general idea that value creation from a perspective.

Artificial Intelligence (AI) has the potential to significantly transform public organization operations, leading to increased efficiency, accuracy, and cost savings. Here are some ways AI can be used in the public sector:

1. Automating processes:
AI can automate mundane and repetitive tasks such as data entry, report generation, and record keeping, allowing public organizations to allocate their workforce to more complex and high-value tasks.

2. Predictive analytics:
AI algorithms can analyze large amounts of data to identify patterns, trends, and insights, helping public organizations make data-driven decisions.

3. Fraud detection:
AI can help detect fraudulent activities in the public sector, such as fraudulent claims or payments, by analyzing large datasets and identifying anomalous behavior.

4. Citizen services:
AI-powered chatbots can be used to provide 24/7 assistance to citizens, answering common questions and providing information about government programs and services.

5. Public safety:
AI can be used in public safety applications such as facial recognition and video analytics, helping law enforcement agencies to identify potential threats and prevent crime.

Overall, AI has the potential to improve the effectiveness and efficiency of public organizations in various areas, enhancing the delivery of services to citizens and achieving better outcomes for society. However, it is important to ensure that AI is implemented ethically, transparently, and with appropriate oversight to prevent unintended consequences and protect individual rights and freedoms

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