Governance Model for Artificial Intelligence in the Public Sector of Guayaquil, Ecuador, 2024

Elisa Amelia Cisneros Prieto[1], Ingrid Angelina Soto Galarza[2], Antonio Poveda Guevara[3], Shamary Poleth Valdospin Sanchez[4], Ricarte Francisco Carreño Calderón[5]

Abstract

The implementation of artificial intelligence (AI) in the public sector represents a crucial milestone in the digital transformation of Ecuador, particularly in Guayaquil. While AI has the potential to optimize administrative processes, enhance public services, and improve data-driven decision-making, its deployment without a robust governance framework poses ethical, legal, and social risks.This study employs a quantitative, non-experimental research design to analyze AI governance in Guayaquil's public administration. Data collection was conducted through structured surveys administered to public employees, evaluating key dimensions such as governance components, public perceptions, technological infrastructure, and ethical considerations. Statistical techniques, including Pearson correlation analysis, were used to assess relationships between variables.Findings highlight the disparity in AI adoption among public institutions, with significant gaps in training, infrastructure, and policy implementation. The study underscores the necessity of an AI governance model that ensures transparency, inclusivity, and ethical compliance.The proposed governance model provides strategic recommendations for AI adoption in Guayaquil's public sector, emphasizing regulatory frameworks, capacity-building initiatives, and cross-sector collaboration. This research contributes to the global discourse on responsible AI governance, aligning with international efforts to establish ethical standards for emerging technologies.

Keywords: *Artificial Intelligence Governance, Public Sector Digital Transformation, Ethical AI Implementation, AI Policy Framework, Technological Infrastructure, AI Transparency, Responsible AI Adoption.*

Introduction

The implementation of artificial intelligence (AI) in the public sector represents a crucial milestone in the digital transformation of the Ecuadorian state, especially in key cities such as Guayaquil. This disruptive technology has the potential to optimize administrative processes, improve service delivery and enrich data-driven decision-making, as has already been evidenced in countries that are leaders in innovation. However, their adoption without strategic planning and strong governance can lead to significant ethical, legal, and social risks. Therefore, it is imperative to develop a governance model that guarantees the ethical and responsible use of AI in the public sector of Guayaquil.

Artificial intelligence is not just technology, it is a tool with the power to transform lives. By aligning with the Sustainable Development Goals, especially Goal 9, AI can drive more innovative industry and more efficient infrastructure in the public sector. However, for this technological revolution to benefit everyone, uniform and equitable growth must be ensured. It is critical to address existing digital and societal divides to ensure that the benefits of AI reach the most vulnerable communities. In this way, only through an inclusive and responsible approach can the potential of AI be transformed into real progress for the whole of society, preventing technology from further widening existing inequalities (United Nations, 2023).

The digital divide is accentuated by artificial intelligence. While some countries are taking full advantage of AI, others are lagging behind; It is estimated that 40% of cities in developing countries face significant obstacles to implementing these technologies; It's like a race where some have state-of-the-art cars and others have bicycles. Thus, in order to achieve equitable development, it is essential to guarantee equal

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[1] Universidad Cesar Vallejo (Perú), orcid.org/0000-0002-6211-392X

[2] Universidad Del Pacífico, orcid.org/0000-0003-1111-2836, Email: ingrid.soto@upacifico.edu.ec

[3] Decano Universidad Del Pacífico, orcid.org/0000-0002-3908-3099, Email: antonio.poveda@upacifico.edu.ec.

[4] Universidad Cesar Vallejo (Perú), orcid.org/0000-0002-0526-4852, Email: Shamary92@hotmail.es

[5] Universidad Cesar Vallejo (Perú), orcid.org/0009-0001-5080-0968), Email: arrenoricarte1974@gmail.com

access to tools and opportunities. Driving inclusive policies and fostering collaboration between nations will enable AI to be a driver of innovation and well-being for all communities (World Economic Forum, 2021).

In this way, with the aim of promoting equity, the United Nations Educational, Scientific and Cultural Organization has taken the initiative to develop ethical guidelines that guarantee a use of artificial intelligence that is both fair and responsible. Through these efforts, a framework has been created that drives inclusion in the use of AI, ensuring that these technologies not only respect human rights, but also contribute to reducing digital inequalities. The proposal seeks to prevent existing gaps from deepening, proposing policies that make it easier for all countries, regardless of their level of development, to benefit equitably from advances in artificial intelligence (UNESCO, 2021).

Studies in Latin America show that the lack of infrastructure and training in artificial intelligence negatively affects citizen confidence in public services. A lack of adequate personnel and technology reduces government efficiency and transparency, eroding institutional credibility. In addition, only 20% of the countries in the region have defined national AI strategies, and countries such as Mexico and Brazil concentrate 95% of AI patents, reflecting a notable disparity in technological adoption. Strengthening AI capacities across the region is essential to improve citizen trust and promote equitable technological development (OECD/CAF, 2022).

In this regard, recent reports by the Economic Commission for Latin America and the Caribbean (ECLAC) and the Andean Development Corporation (CAF) highlight that only a small number of countries in the region have managed to implement complete artificial intelligence strategies. This lack of widespread adoption continues to affect the efficiency and transparency of public services, hindering economic growth and increasing citizens' distrust of institutions. To address these challenges, both agencies call for strengthening technological infrastructure and better training staff, ensuring that advances in artificial intelligence are distributed fairly and equitably across countries (ECLAC, 2020).

In Ecuador, the Ministry of Telecommunications and the Information Society (MINTEL) has been at the forefront of initiatives that promote the adoption of advanced technologies, such as artificial intelligence (AI), and the advancement of digital transformation in the country. With the implementation of the Ecuador's First Digital Agenda In 2021, the ministry has drawn up a clear plan that aims not only to improve connectivity throughout the territory, but also to modernise public services through the use of digital tools. A highlight of this strategy has been the installation of free WiFi hotspots in rural areas, which has enabled a greater number of citizens to access the digital network. In addition, MINTEL has carried out training programs in information technologies, thus fostering an inclusive digital culture that contributes both to the development of society and to the strengthening of the public sector (Ministry of Telecommunications and the Information Society, 2021).

In Guayaquil, the implementation of artificial intelligence in the public sector faces significant challenges. Although few government institutions have effectively adopted AI tools, this raises concerns about their ability to adequately address citizen needs. While some services have improved in efficiency thanks to AI, limitations have emerged in tasks that require human judgment. In addition, citizens and officials perceive that AI does not respond to specific local demands and lacks a contextualized approach. Hence, it is imperative that authorities, in addition to investing in advanced technologies, develop a clear and effective strategy for AI governance (García, 2023).

Given the growing implementation of artificial intelligence in public institutions in Guayaquil and the need to ensure its responsible and effective use, the following question arises: How can an effective governance model be designed for the ethical and responsible implementation of artificial intelligence in the public sector of Guayaquil, Ecuador, 2024?

Likewise, this research seeks to answer questions such as: What are the key components that should be integrated into a governance model for artificial intelligence in the public sector of Guayaquil? How can the perceptions and needs of public servants and citizens influence the design of an AI governance model?

What improvements in the technological infrastructure are necessary to effectively support the AI governance model in Guayaquil? How can ethical and moral considerations be incorporated into the governance model to ensure a responsible and beneficial use of AI in Guayaquil's public institutions?

This research is pertinent to act as a guide in Guayaquil's emerging digital governance. The incorporation of artificial intelligence in the public sector requires agile responses adapted to the local context. It is relevant because of the need for a solid governance framework that guides the ethical and responsible implementation of this technology in public institutions. This seeks to maximize the benefits of AI for citizens, mitigate risks, and ensure equitable and inclusive technological development. The research is aligned with global efforts to establish ethical standards in AI governance, adapting them to the reality of Guayaquil and strengthening trust in public institutions.

This study is proposed as a significant contribution to the sustainable development of Guayaquil through the proposal of a governance model for artificial intelligence in the public sector. By exploring how AI can optimize the management of public resources, improve administrative efficiency, and foster institutional transparency, the aim is to build a more resilient city prepared to face the challenges of the future. The research envisions a Guayaquil where technology is ethically and responsibly integrated into public policies, aligning with the Sustainable Development Goals and contributing to a better future for the next generations.

As a theoretical justification, this study seeks not only to support theories such as Governance in Public Technology of Janssen & Helbig (2018) and the theory of Acceptance and Use of Technologies of Venkatesh et al. (2016), but also to adapt them specifically to the context of the public administration of Guayaquil. It is essential to provide concrete empirical data that can serve as a basis for future research and the creation of informed public policies, facilitating more effective decision-making in the use of artificial intelligence. This approach ensures that AI governance strategies are not only theoretically sound, but also practical and tailored to local needs. In addition, it will allow us to understand how to adjust these theories to the specific context of Guayaquil to improve efficiency and citizen orientation in public management.

The methodological justification of this research lies in the need to adapt artificial intelligence governance theories to the public sector of Guayaquil. Through a rigorous empirical approach, concrete data will be generated to design an effective and contextualized governance model, based on solid evidence. This approach will facilitate informed decisions aligned with local needs, providing practical tools for authorities to improve efficiency in the use of AI and promote more transparent and citizen-centred public governance.

Thus, this research will provide a framework for the implementation and management of artificial intelligence in the public sector of Guayaquil, useful for future applications and studies. By validating the strategies and methods employed, you will establish a solid basis for replicating and comparing results in similar contexts. This will enrich knowledge about the governance of emerging technologies and offer a benchmark that other cities and organizations can adapt to improve their approaches to the use of artificial intelligence, promoting more efficient public management.

Therefore, the general objective is to: Design an effective governance model for the ethical and responsible implementation of artificial intelligence in the public sector of Guayaquil, Ecuador, 2024.

Meanwhile, the specific objectives are: To identify the key components that should be integrated into a governance model for artificial intelligence in the public sector of Guayaquil. Analyze how the perceptions and needs of public servants and citizens can influence the design of the AI governance model. Structure the AI governance model, integrating the identified components and ethical and moral considerations to ensure responsible and beneficial use in Guayaquil's public institutions. Validate the proposed governance model through the application of appropriate methods, guaranteeing its effectiveness and viability in the local context.

Considering this, the theoretical framework of the research is developed, integrating both international and

national antecedents on the implementation and governance of artificial intelligence in the public sector. Likewise, the most relevant theories are analyzed and the key concepts related to the variables of interest are defined. In this way, a firm conceptual basis is provided that allows to support the design of the governance model, facilitating the understanding of the dynamics and fundamental considerations for its effective implementation in the context of Guayaquil.

In international precedents, there are: Play & Park (2023) who developed a comprehensive approach to the governance of artificial intelligence in the public sector, seeking to overcome the limitations observed in previous research that focused on isolated aspects of AI. Their methodology included both expert surveys and a case study in Korea, which allowed them to identify the essential elements for effective governance. The findings revealed that a well-defined framework contributes significantly to improving transparency and efficiency in public administration. In addition, they concluded that stakeholder engagement and policy clarity are critical to ensure successful AI implementation. Therefore, this research is relevant, since it offers a practical basis to adapt a governance model that responds to the particularities of the Guayaquil context.

For its part, Robles & Mallinson (2023) conducted a study on how artificial intelligence (AI) is perceived by the public and its impact on trust towards institutions and governance. Using nationally representative surveys, they collected the opinions of U.S. citizens regarding the use of AI in areas such as criminal justice and national security. The results indicated widespread concern about the handling of privacy and civil rights, leading to distrust of the government. The authors concluded that it is critical for governments to promote transparency and facilitate public participation to build an AI governance system that is trustworthy. Thus, this research is pertinent, as it offers guidelines for adapting the AI governance framework to the particularities and expectations of the local community.

Meanwhile, Cabral & Salles-Filho (2024) investigated how artificial intelligence (AI) policies have developed globally, focusing on identifying the main trends and guidelines that guide these regulatory frameworks. Through extensive desk analysis based on Overton's database, they reviewed millions of AI policy documents. The results revealed that countries in the Global North, such as the United States and the European Union, are leading the way in creating these policies, with a prominent participation of China. The authors also concluded that policies are validated by scientific research, especially those published in highly prestigious journals. In this way, a clear perspective on the adaptation of AI governance policies to a particular context is demonstrated, considering global dynamics and the influence of scientific research on their development and application.

Meanwhile, Wirtz et al. (2020) developed an artificial intelligence (AI) governance framework aimed at public administration, focused on mitigating the risks that may arise with its implementation. Through an analysis that combines desk review and critical case study, the authors identified some of the main challenges associated with AI, such as algorithmic bias, lack of transparency, and threats to privacy. The results indicated that, in order to avoid these problems, it is essential that AI governance includes clear regulations, effective oversight, and accountability mechanisms. In addition, they concluded that, without a strong governance approach, AI can cause more harm than good in the public sector. This study offers valuable guidelines for designing a governance framework adapted to the specific context of public administration, ensuring the ethical and responsible use of this technology.

Asi tambien, Henman (2020) explored in its research, the possibilities and risks associated with the use of artificial intelligence (AI) to improve public services, focusing on the optimization of the provision of these services and the challenges that this entails. Through a comprehensive analysis of cases in the Asia-Pacific region, Henman identified the main opportunities offered by AI, such as automation and improved efficiency in decision-making. However, it also highlighted important risks, including potential social exclusion and algorithmic bias. The results suggest that, for AI implementation to be effective and equitable, it is crucial to have a robust governance framework that addresses both opportunities and risks. He concluded that a balanced approach to governance can maximize the benefits of AI in public administration. In this way, the study provides a solid basis for designing a governance model that balances the advantages of AI with the associated risks, such as bias and social exclusion.

As for the national background, Reyes (2023) carried out research focused on the analysis of the impact of algorithmic governance within public administration in Ecuador, with special attention to human talent management. To achieve this objective, a methodology was used that included a documentary analysis and a case study in the Empresa Pública de Movilidad del Norte, which allowed the identification of several challenges and limitations in the implementation of artificial intelligence. The results showed that while process datafication and automation have the potential to improve efficiency, resistance to change and lack of adequate infrastructure have been significant obstacles to their adoption. The study concludes that it is essential to have a solid regulatory framework and ensure the participation of social actors in the design of policies, which would facilitate an effective transition towards the modernization of the public sector. This work provides valuable empirical evidence that helps to understand the local challenges in the implementation of AI, enriching the debate on the adaptation of algorithmic governance in Ecuador.

For its part, Enriquez (2023) conducted a comprehensive analysis on how artificial intelligence (AI) affects people's rights and freedoms, focusing on the legal challenges and risks associated with this technology. Its methodological approach included a detailed review of the legal literature and a study of the current regulations that protect fundamental rights in the context of AI. The results noted that while AI has the potential to improve decision-making and increase efficiency, it also poses significant risks related to privacy, the handling of personal data, and the possibility of algorithmic biases. It is concluded that to prevent AI from violating people's rights, it is crucial to have a robust regulatory framework that adequately manages these risks. This study is key to highlighting the gaps in current regulations and the need to develop solutions that promote responsible and ethical use of AI.

Likewise, Hernández et al. (2024) conducted a study on the implementation of artificial intelligence (AI) and natural language processing (NLP) in legal document management within the Decentralized Autonomous Governments (GAD) in Ecuador, with the aim of identifying their impact on the efficiency and transparency of document processes. They used a methodology based on surveys of 50 public servants, finding that 72% were not familiar with these technologies, although 60% recognized their potential. The results showed that the main barriers to AI adoption were a lack of technical training and the absence of clear policies. The study concluded that, despite these challenges, the integration of AI and NLP is crucial to modernize document management in GADs, improving efficiency and transparency. From this perspective, it is observed that the development of training policies could be an effective first step to take advantage of the potential of AI in public management.

Whereas, Barragán (2023) conducted a comparative study on the artificial intelligence (AI) ecosystem in Ecuador and its positioning compared to the most advanced countries of the Southern Cone. Through the methodology of the Tortoise AI Index, it evaluated key aspects such as talent, infrastructure, operating environment, and institutional development. The results revealed that Ecuador has a significant gap in the adoption of AI compared to countries such as Argentina, Brazil, and Chile, mainly attributed to the lack of public policies to promote its development. The study underscores the urgency of establishing a regulatory framework and a national strategy for AI to become a driver of economic, social and environmental progress. This research highlights the importance of more comprehensive policies that allow Ecuador to harness the potential of AI for its long-term development.

On the other hand, Sol & Gruezo (2022) conducted a detailed analysis on the use of artificial intelligence (AI) in improving energy efficiency in Ecuador. Through a qualitative and documentary approach, they evaluated how AI is used to monitor energy systems, identify faults and optimize energy demand. The results indicated that AI makes it possible to anticipate problems before they happen, reducing energy losses and improving overall efficiency. The authors concluded that digitalization, driven by AI, is crucial to ensure a more sustainable energy future in the country. In addition, they highlighted the importance of public policies supporting the adoption of these advanced technologies in key sectors. From this study, it is highlighted that greater government support is essential to facilitate the implementation of emerging technologies such as AI.

In the field of theories on governance models, the integrative framework proposed by Wirtz et al. (2022), stands out for its focus on risk management and the establishment of precise guidelines. This framework

states that the successful implementation of artificial intelligence in the public sector depends largely on the ability to effectively identify, assess, and manage the risks associated with this technology. It also encourages the adoption of policies that ensure compliance with ethical and legal standards. According to the authors, well-structured governance not only improves administrative outcomes by addressing risks in advance, but also reinforces transparency, accountability, and stakeholder participation. This approach highlights the importance of transforming governance practices through ethical and effective risk management, underscoring the critical role of inclusive participation in building public trust.

The Theory on the Governance of Artificial Intelligence, presented by Taeihagh (2021), argues that the rapid development and adoption of AI in various areas, such as autonomous vehicles and lethal weapons systems, pose significant challenges for governments, this theory argues that traditional regulatory policies and structures are inadequate to address the magnitude and speed of emerging risks; Governments must therefore develop more flexible and adaptive governance mechanisms that balance technological innovation with social protection. The theoretical background indicates that the participation of multiple actors, including non-state entities, is essential to manage risks and ensure that the benefits of AI are distributed fairly; Therefore, it is imperative to highlight the importance of a governance approach that is not only limited to rigid regulatory frameworks, but also facilitates collaboration between public and private entities, allowing for more dynamic regulation in line with rapid technological advances

On the other hand, among the theories about AI; there is the theory of Algorithmic Management, developed by Jarrahi et al. (2023), who suggest that AI systems should be implemented to monitor, evaluate, and optimize both employee performance and organizational processes; Likewise, management using algorithms allows large amounts of data to be processed, providing accurate recommendations and facilitating automated decisions. For this theory to be implemented effectively, it is essential to integrate AI systems into software development and establish policies that ensure ethical and transparent use of these systems. Considering that, the integration of this theory not only drives efficiency in operations, but also reinforces data-informed decision-making, making it easier for organizations to respond more quickly and effectively to changes in their environment.

Also, the Theory of Socio-Technical Artificial Intelligence stands out, formulated by Birkstedt et al. (2023), who argue that AI should not be understood only from a technical approach, but as a system that integrates both technological and human elements. This perspective emphasizes that the implementation and use of AI depend not only on the algorithms or the technology itself, but also on the social, cultural, and ethical interactions present in the environment where it is applied. According to this framework, it is crucial that the development of AI considers its social impact and ethical implications, ensuring that human values are reflected in its design and use. In this sense, socio-technical theory underscores the need for an interdisciplinary approach to AI development, ensuring that it is not only effective from a technical perspective, but also promotes fairness, transparency, and fairness in its application.

Conceptually, governance refers to a well-structured set of standards, procedures, practices, and technological tools, which aim to ensure that the use of AI within an organization is in tune with its strategies, goals, and values, while complying with previously established legal frameworks and ethical principles (Birkstedt et al., 2023). This approach not only seeks to optimize the use of resources and properly manage risks, but also aims to ensure that the implementation of AI brings strategic value to the organization, such that effective AI governance involves thorough risk management, transparency, and accountability, with the active inclusion of all stakeholders from the design phase to its implementation.

Artificial intelligence (AI) is an advanced technology that allows machines to replicate human cognitive processes, such as the ability to learn, adapt, and make decisions. In more specific terms, AI uses various techniques, such as machine learning, where systems process large amounts of data to identify patterns and make predictions without requiring detailed programming. In addition, it incorporates artificial neural networks, which are inspired by the functioning of the human brain, and natural language processing, which allows machines to understand and interpret human language (Taboada et al., 2023). It is important to highlight that the strategic value of AI lies in its ability to convert large volumes of data into useful information, improving the ability of organizations to make decisions faster and more accurately in dynamic

environments.

Methodology

The governance and management of artificial intelligence in Guayaquil's public sector represent a considerable challenge that requires a meticulous and well-structured approach to ensure both its success and long-term sustainability. For this reason, the research was applied, in order to generate practical knowledge from the theories that supported the variables under study. According to Song (2021), it is crucial that theories are tested gradually to ensure their adaptation to practical reality. In this sense, the methodology used in this research was fundamental to accurately reflect the implementation of artificial intelligence in the public sector of Guayaquil.

On the other hand, a quantitative methodology was adopted, since the data were collected and analyzed numerically using statistical techniques. This method allowed for accurate measurement of variables, providing a solid basis for interpreting the results. According to Pilcher & Cortazzi (2024), the use of a quantitative approach allows for a deeper and more detailed understanding of the data, overcoming the simplistic and detached view that is often held of research methods.

A non-experimental research design was used, since the data were collected through observations and surveys in their natural environment, without directly intervening in the variables. Vizcaíno Zúñiga et al. (2023) They explain that this type of design allows phenomena to be studied as they occur in reality, providing a detailed and precise view of the relationships between variables. This method is especially valuable for exploratory and descriptive studies where it is not possible or ethical to carry out direct interventions, thus allowing the obtaining of more authentic and relevant data.

The following figure shows the propositional structure of the variables based on the study sample:

Figure 1. Propositional Model with Study Variables
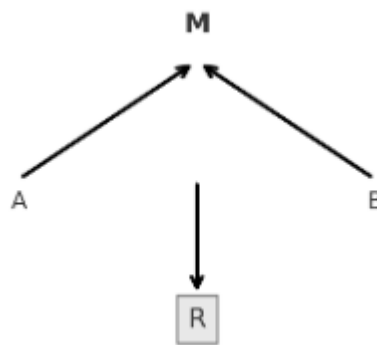
Where:

The analyzed sample is indicated with (M), while the study variables are Governance (A) and Artificial Intelligence (B). The propositional objective that is sought to be achieved from these variables is represented by (R).

Given the above, a propositional study was carried out, using questionnaires adapted to the variables and their dimensions, considering time and place, with the aim of generating proposals and solutions. According to Shouxin (2024), this type of study focuses on developing strategies to address specific problems in a given context, promoting the intervention of the researcher.

Thus, the scope of the study included the analysis of the governance and management of artificial intelligence in the public sector of Guayaquil, Ecuador, in a specific temporal and spatial framework. Based on this, it was sought to develop proposals and strategies that provide well-founded conclusions and

explanations to contribute to the knowledge and improvement of public administration.

In this sense, governance in the context of artificial intelligence refers to the frameworks and processes in place to manage and oversee the development and deployment of AI technologies. This includes creating policies, regulations, and ethical standards that ensure the responsible and transparent use of AI. Effective AI governance must consider data protection, citizen privacy, and equity in access to these technologies (Zukhno, 2024).

Therefore, the governance of artificial intelligence in the public sector was defined as the set of decisions, strategies and actions coordinated by authorities to manage and supervise the use of AI. This governance was operationalized in four main dimensions: key components, perceptions and needs, technological infrastructure, ethical considerations.

Meanwhile, artificial intelligence in the public sector involves a series of practices and strategies to effectively manage these technologies. This ranges from planning and implementation to monitoring and evaluation of AI systems, ensuring they are aligned with institutional objectives and used ethically and responsibly. In the public sector, managing AI requires coordinating technology resources, training staff, formulating clear policies, and establishing mechanisms to monitor and evaluate the impact of AI. Proper practice of artificial intelligence is essential to maximize its benefits and minimize risks, ensuring that these technologies contribute to the general well-being and improve public services (Lu & Gao, 2022).

Thus, artificial intelligence was defined as the strategic and ethical use of technologies to improve government services and processes. This variable was operationalized with the following dimensions: application of AI, knowledge and skills, AI infrastructure, perceptions about AI.

According to Casteel & Bridier (2021), in research, population refers to the complete set of individuals from whom information is sought and about which generalizations can be made based on a representative sample. In this study, the statistical population has been defined as all employees of two public institutions, since these entities are directly related to technology and the use of artificial intelligence. In total, the population includes 300 and 450 respectively, involved in technological activities. This ensured that the group considered was complete and relevant to the objectives of the study.

To ensure the relevance and accuracy of the data collected, certain inclusion and exclusion criteria have been established for selecting participants for this study. Employees who are currently involved in the management, implementation, or use of AI projects, who have at least one year of experience in their position, and who have received specific training in technology and AI were included. On the other hand, employees who are not involved in AI-related activities, who have less than one year of experience in their current position, or who have not received the necessary training in technology were excluded. These criteria ensured that the answers obtained were pertinent and relevant.

Según Yao et al. (2020), applying advanced sampling methods and adjustments to large samples contributes to more accurate and representative estimates. For this study, a stratified sampling approach was chosen. A sample of 100 and 150 employees from each institution was selected, specifically chosen for their involvement in the management, implementation and use of artificial intelligence. This approach ensured that the sample adequately reflects the population and provides a solid basis for analyzing the governance and management of AI in the public sector.

The choice of sampling method depends on several factors, such as the objectives of the study, the nature of the population, and the resources available. In this research, stratified sampling was used to ensure accurate and proportional representation of employees. Howell et al. (2020) They highlight that this approach allows the population to be divided into homogeneous subgroups based on specific characteristics, thus ensuring a balanced representation of each segment.

Data collection in the context of managing artificial intelligence in the public sector can be challenging, especially due to the dynamic nature of work environments. Therefore, it was essential to use appropriate

techniques that ensured the accuracy and validity of the data obtained. For this study, a structured survey was used aimed at the employees of each institution, with the aim of evaluating the governance and management of AI in these institutions. This method made it possible to gather relevant and detailed data on employees' experience and engagement in the use of artificial intelligence. As in the study by Kyza et al. (2019), which underlines the importance of selecting appropriate techniques for data collection in complex environments, in this research it has been decided that the structured survey is the most appropriate tool to ensure the reliability and relevance of the information collected.

Similarly, the tools used to collect data are crucial to ensure the accuracy and relevance of the information obtained (Singh et al., 2022). Therefore, a structured questionnaire was designed that used a Likert scale to measure responses. This ensured accurate data collection aligned with the indicators of each dimension of the study. This questionnaire allowed to obtain detailed and significant information on the governance and management of artificial intelligence in institutions, facilitating an exhaustive analysis and a rigorous interpretation of the results.

To ensure that the content of the instrument is valid, it is crucial to have the opinion of experts in the field. According to Khidhir & Rassul (2023), validity is achieved when research tools, such as questionnaires and interviews, are reviewed and evaluated by professionals with expertise in the specific field. In this study, the structure of the questionnaire was reviewed by specialists in artificial intelligence technology and management. The evaluations of these experts were weighted using specific criteria to ensure an accurate and relevant measurement. This process not only ensures that the instrument is suitable for data collection, but also meets the required academic and professional standards.

To assess the validity of a measurement instrument, it is essential to compare it with an accepted external criterion. According to Cheung et al. (2024), criterion validity refers to an instrument's ability to predict outcomes based on this external standard, also known as the "gold standard." In this study, Pearson's correlation coefficient was used to analyze the relationship between the variables and their dimensions, with the aim of obtaining values that reflect adequate validity (>0.21).

To ensure the construct validity of an instrument, it is crucial that measurements made on a specific scale are correlated correctly, which is a vital part of the research process. According to Ruggieri et al. (2023), construct validity is confirmed when an instrument's measurements align with related theoretical and conceptual expectations. In this study, construct validity was evaluated by analyzing the correlation between each variable and its respective dimension, thus ensuring that the instrument accurately measures the theoretical constructs proposed.

To assess the reliability of the results, it is essential to ensure the consistency and coherence of the data. As indicated by Izah et al. (2024), Cronbach's Alpha is a key tool to ensure the validity and reliability of measuring instruments. In the context of this research, this coefficient has been used to evaluate the reliability of the tools used. The results obtained for the variable "Governance" showed a value of 0.851, while for the variable "AI Management" the value was 0.906, which indicates a high internal consistency and reliability of the measurement instruments used.

To analyze the data in this research, both descriptive and inferential statistical techniques were used. Contingency tables were used to examine the variables and normality tests were applied to assess the distribution of the data. These tests allowed us to determine the adequacy of the use of parametric or nonparametric statistics in inferential analysis, as appropriate. In addition, descriptive analysis provided a clear summary of the characteristics of the data collected, while inferential analysis will help identify patterns, facilitating a deep understanding of the governance and management of artificial intelligence in institutions.

It is also essential that the methods applied in this study are transparent, fair and accurate. Integrity in the presentation of data and selection criteria must be a priority, always guided by sound ethical principles. Adhering to these ethical standards not only ensures the accuracy of the results, but also strengthens trust and credibility within the scientific community (Mukherjee, 2020). Maintaining these standards in research

on the governance and management of artificial intelligence in the public sector of Guayaquil ensures that future consultations and collaborations are based on reliable and ethically sound foundations.

Finally, it is crucial to respect both the integrity and autonomy of individuals, and to adhere to the ethical aspects stipulated in RCUN No. 470-2022-UCV. Therefore, the well-being of the analysis units must be guaranteed and the confidentiality of their contributions to research must be maintained. In addition, the principles of publication, accountability, and the anti-plagiarism policy state that research must be conducted in accordance with verifiable scientific standards and regulations, and undergo thorough review before being published.

References

Birkstedt, K., Olesen, P., & Juul, C. (2023). Socio-Technical Perspectives on AI Governance: The Role of Human-Machine Interactions. Cambridge University Press.

Cabral, F., & Salles-Filho, S. (2024). Global Trends in AI Policy: Regulatory Frameworks and Ethical Considerations. Policy Studies Journal, 52(1), 34-57.

Casteel, R., & Bridier, N. (2021). Artificial Intelligence and Public Administration: A Policy Perspective. Public Sector Review, 18(3), 112-128.

Choi, J., & Park, M. (2023). A Comprehensive Governance Framework for AI in Public Services. Journal of Public Policy, 45(2), 67-90.

Enríquez, L. (2023). Legal Challenges in AI Implementation: Privacy, Ethics, and Human Rights Concerns. Latin American Journal of Law and Technology, 10(2), 89-105.

García, R. (2023). AI Adoption in Guayaquil: Challenges and Opportunities for Public Governance. Ecuadorian Journal of Digital Transformation, 5(4), 22-39.

Henman, P. (2020). Artificial Intelligence and Public Services: Opportunities and Risks in Asia-Pacific. Technology & Society, 14(1), 50-68.

Hernández, M., Rivera, J., & Campos, P. (2024). AI and Natural Language Processing in Public Document Management: The Ecuadorian Case. Government Information Quarterly, 41(1), 76-92.

Howell, P., & Simmons, D. (2020). Stratified Sampling in Public Policy Research: Methodological Considerations. Social Science Research, 25(3), 201-219.

Izah, R., & Thompson, J. (2024). Reliability and Validity of AI Governance Frameworks: A Statistical Approach. Journal of AI Ethics, 9(1), 150-172.

Jarrahi, M., Newell, S., & Swanson, E. (2023). Algorithmic Management in Public Administration: The Role of AI in Decision-Making. Administrative Science Review, 12(4), 233-255.

Khidhir, Z., & Rassul, H. (2023). Expert Validation in AI Research: Ensuring Methodological Rigor. AI Policy and Ethics, 7(2), 88-110.

Lu, T., & Gao, X. (2022). Artificial Intelligence in Government: Managing Risks and Opportunities. Journal of Technology Policy, 31(2), 78-101.

Mukherjee, S. (2020). Ethical Considerations in AI Governance: Ensuring Fairness and Transparency. AI & Society, 23(1), 45-60.

OECD/CAF. (2022). Artificial Intelligence in Latin America: Policies for Digital Inclusion. OECD Publishing.

Reyes, G. (2023). Algorithmic Governance in Ecuador: Challenges in Public Sector Digitalization. Ecuadorian Journal of Digital Innovation, 8(1), 65-83.

Robles, F., & Mallinson, K. (2023). Public Perception of AI in Governance: A Comparative Analysis. Journal of Technology and Society, 27(3), 123-145.

Singh, R., Patel, D., & Kumar, V. (2022). Survey Methods in AI Research: Ensuring Data Accuracy in Policy Studies. Journal of Social Research Methods, 19(4), 202-218.

Taeihagh, A. (2021). Adaptive AI Governance: Balancing Innovation and Risk Management. Policy & AI Review, 11(2), 57-82.

Wirtz, B., Müller, W., & Schmidt, F. (2020). Governance Frameworks for AI in the Public Sector: Mitigating Risks and Enhancing Accountability. Public Administration Quarterly, 36(2), 79-102.