Article

e-ISSN 2448-0320

ARTIFICIAL INTELLIGENCE USED IN AUDITTING PUBLIC RESOURCES INTENDED FOR SCHOOL FOOD[1]

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Abstract

The implementation of Artificial Intelligence (AI) in public auditing is crucial to modernizing administrative processes, especially in the fight against corruption. AI allows you to efficiently analyze large data sets, identifying patterns and anomalies that often escape human detection. The research addresses the efficiency and benefits of AI tools, such as Operação Serenata de Amor (OSA), Tender Analysis, Notices (ALICE), Querido Diário, Argus Tool, Guided Risk Assessment per Assistant (GRAA), EY Blockchain Analyzer and PwC Cash.ai, in the audit of public resources allocated to school meals. Corruption in this context, identified by the Comptroller General of the Union (CGU), reveals significant diversion of resources. The literature review highlights the effectiveness of AI in reducing human errors, ensuring an objective and consistent approach to auditing. Tools, such as OSA, ALICE, Querido Diário, Argus, GRAA, EY Blockchain Analyzer and PwC Cash.ai, play crucial roles in the audit, contributing to transparency, fraud prevention and effectiveness in the management of resources destined for school meals. In conclusion, the implementation of AI in the audit of public resources, especially school meals, brings numerous benefits, promoting a more responsible and transparent administration of public resources.

Keywords: Artificial intelligence, Public audit, Public resources, School feeding, Data analysis.

How to cite

SALES, Renata Silva; MELO JUNIOR, Wilson de Souza; SANTOS, Ana Gleice da Silva; PRADO, Charles Bezerra. Artificial intelligence used in auditting public resources intended for school food. **Educação em Análise**, Londrina, v. 10, p. 1-17, 2025. DOI: 10.5433/1984-7939.2025.v10.49741.

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INTELIGÊNCIA ARTIFICIAL UTILIZADA NA AUDITORIA DE RECURSOS PÚBLICO DESTINADOS PARA ALIMENTAÇÃO ESCOLAR

Resumo: A implementação da Inteligência Artificial (IA) na auditoria pública é crucial para modernizar os processos administrativos, especialmente no combate à corrupção. A IA permite analisar eficientemente grandes conjuntos de dados, identificando padrões e anomalias que frequentemente escapam à detecção humana. A pesquisa aborda a eficiência e benefícios das ferramentas de IA, como Operação Serenata de Amor (OSA), Análise de Licitações, Editais (ALICE), Querido Diário, Ferramenta *Argus*, Guided Risk Assessment per Assistant (GRAA), *EY Blockchain Analyzer* e *PwC Cash.ai*, na auditoria de recursos públicos destinados à alimentação escolar. A corrupção nesse contexto, identificada pela Controladoria-Geral da União (CGU), revela desvios significativos de recursos. A revisão da literatura destaca a eficácia da IA na redução de erros humanos, garantindo uma abordagem objetiva e consistente na auditoria. As ferramentas, como OSA, ALICE, Querido Diário, *Argus*, GRAA, *EY Blockchain Analyzer* e *PwC Cash.ai*, desempenham papéis cruciais na auditoria, contribuindo para transparência, prevenção de fraudes e eficácia na gestão de recursos destinados à alimentação escolar. Em conclusão, a implementação da IA na auditoria de recursos públicos, especialmente na alimentação escolar, traz inúmeros benefícios, promovendo uma administração mais responsável e transparente dos recursos públicos.

Palavras-chave: Inteligência artificial, Auditoria pública, Recursos públicos, Alimentação escolar, Análise de dados.

INTELIGENCIA ARTIFICIAL UTILIZADA EN AUDITORÍA DE RECURSOS PÚBLICOS DESTINADOS A LA ALIMENTACIÓN ESCOLAR

Resumen: La implementación de la Inteligencia Artificial (IA) en la auditoría pública es crucial para modernizar los procesos administrativos, especialmente en la lucha contra la corrupción. La IA le permite analizar de manera eficiente grandes conjuntos de datos, identificando patrones y anomalías que a menudo escapan a la detección humana. La investigación aborda la eficiencia y los beneficios de las herramientas de IA, como Operação Serenata de Amor (OSA), Tender Analysis, Notices (ALICE), Querido Diário, Argus Tool, Guided Risk Assessment per Assistant (GRAA), EY Blockchain Analyzer y PwC Cash.ai, en la fiscalización de los recursos públicos destinados a la alimentación escolar. La corrupción en este contexto, identificada por la Contraloría General de la Unión (CGU), revela un importante desvío de recursos. La revisión de la literatura destaca la eficacia de la IA para reducir los errores humanos, garantizando un enfoque objetivo y coherente de la auditoría. Herramientas como OSA, ALICE, Querido Diário, Argus, GRAA, EY Blockchain Analyzer y PwC Cash.ai desempeñan papeles cruciales en la auditoría, contribuyendo a la transparencia, la prevención del fraude y la eficacia en la gestión de los recursos destinados a la alimentación escolar. En conclusión, la implementación de la IA en la auditoría de los recursos públicos, especialmente la alimentación escolar, aporta numerosos beneficios, promoviendo una administración más responsable y transparente de los recursos públicos.

Palabras clave: Inteligencia artificial, Auditoría pública, Recursos públicos, Alimentación escolar, Análisis de datos.

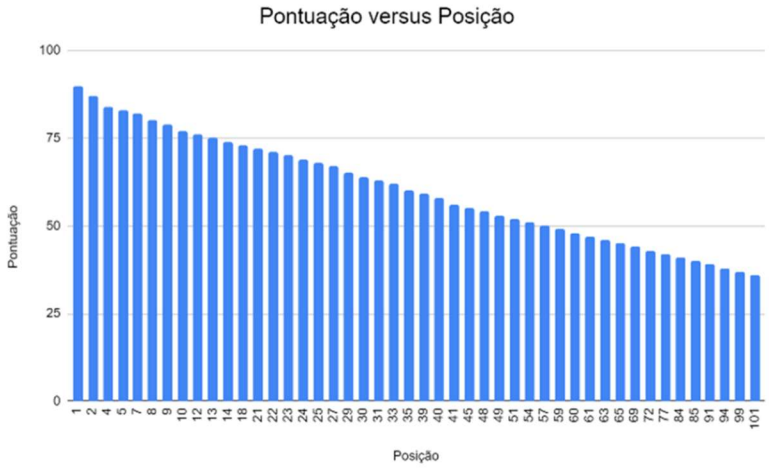
Introduction

Artificial intelligence (AI) plays a relevant role in the modernization of public auditing, bringing technological advances to administrative processes. As highlighted by Zemánková (2019), the application of AI in audits allows for an efficient analysis of extensive datasets, identifying patterns and anomalies that often escape human detection. This advancement gains particular relevance in the scenario of combating corruption, as evidenced by the Corruption Perception Index (CPI) from 2012 to 2022.

According to Transparency International Brazil (2023), during this period, Brazil experienced a notable drop, losing 5 points and falling 25 positions in the global ranking of 180 countries. This decline led the country from 69th to 94th position in the referred index, as illustrated in Figure 1. The 38 points obtained in 2022 reflect an unfavorable performance, placing Brazil below the global average (43 points), the regional average for Latin America and the Caribbean (43 points), the BRICS average (39 points), [1] and notably below the averages of the G20 countries (53 points) and the OECD (66 points)

The higher the ranking, the greater the perception of corruption and integrity of the country (Transparency International Brazil, 2023). This evolution, marked by the loss of points in the Corruption Perception Index, reveals substantial challenges in combating corruption. The demand for practical measures becomes evident in the face of the urgent need to reverse this unfavorable trajectory.

Figure 1 – The following graph describes the scores and positions of a sample of the first 100 out of 180 countries



Source: Fonseca (2023).

The research addresses the efficiency and benefits arising from the application of different artificial intelligence tools, such as “Operação Serenata de Amor” (OSA), “Analisador de Licitações, Contratos e Editais” (ALICE), “Querido Diário”, “Ferramenta Argus”, “Guided Risk Assessment per Assistant” (GRAA), “EY Blockchain Analyzer” and “PwC Cash.ai”. These tools play a fundamental role as instruments for monitoring and controlling financial resources.

The benefits of adopting such tools allow for: I) optimizing and improving the process of monitoring public funds to ensure their effective and transparent use; II) increasing efficiency in the detection of irregularities by analyzing large amounts of data quickly and accurately; and III) identifying patterns, anomalies, and discrepancies that may indicate irregularities or potential problems.

According to Meira (2019), the integration of artificial intelligence into auditing not only reduces the influence of human errors, ensuring a more objective and consistent approach, but also provides a remarkable ability for some tools to provide real-time analysis. This feature enables an immediate response to critical situations, increasing the efficiency of the monitoring process. Furthermore, the flexibility inherent in artificial intelligence allows for adaptation to new standards and regulations, proving crucial in a dynamic environment such as public auditing.

Reference selection methods

The reference search was conducted using the search mechanisms of *Google Scholar, Researchgate, and Science Direct platforms*, with the following keywords: "artificial intelligence", "public audit", "public resources", "school feeding", "data analysis", "big data", and "audit". Initially, a total of 16 results were found.

These articles were analyzed and subsequently imported into the Mendeley environment to remove possible duplicates or articles unrelated to the research topic. After this initial screening stage, 10 articles were selected for analysis of titles, keywords, and reading of abstracts, of which six were chosen for a full reading of the article text.

For the filtering of articles, inclusion and exclusion criteria were established. Initially, the publication period of the last 5 years (between 2018 and 2023) was set, due to the rapid

technological advancement in the area. Complementing the search strategy, two languages were considered: English and Portuguese.

The choice of the English language was due to the relevance of the available literature in this language. The Portuguese language was considered due to the native language of the authors. In addition to scientific articles, other types of documents relevant to the research topic were also considered, such as books, magazines, and supplementary articles, even if they did not meet all the established selection criteria. This broad approach was adopted aiming at the comprehensiveness and richness of information that can significantly contribute to the study.

School meals

In 1950, school feeding began in Brazil on a voluntary basis and was promoted by the contributors of the Caixa Escolar, now known as the Parent-Teacher Association. According to Bezerra (2009), the first type of food offered in schools was the "school soup," which aimed to alleviate the hunger of children who went to school without having eaten beforehand.

In 1954, the National School Feeding Program (PNAE) was created, initially offering only one item, milk, donated by USAID – the United States Agency for International Development – distributed to the northeastern states of the country. Currently, the National School Feeding Program is recognized as the largest food assistance program in the Brazilian context (Belik; Chaim, 2009).

Since its establishment in 1955, the National School Feeding Program (PNAE) has covered a total of 5,570 municipalities, providing daily meals to millions of children. At the time of its creation, the age group served was 0 to 14 years old, and according to data from the 2004 National Household Sample Survey (PNAD), the program's participation rates were 97.3% for daycare centers, 92.3% for preschool, and 83.8% for elementary education.

In 2005, after half a century, the Program extended to nearly all Brazilian municipalities, reaching around 36.4 million children and adolescents enrolled in early childhood education and elementary education in the public school system (Belik; Chaim, 2009).

According to the School Feeding Observatory (OAE), the PNAE is responsible for serving around 41 million students. For many of these students, school is where they have their only or main meal of the day. This initiative is seen as one of the most important policies to ensure the Human Right to Adequate Food and Nutrition (Lopes, 2017)

Artificial intelligence used in public auditing

In light of the new global scenario of the fourth phase of industrialization, institutions, whether public or private, cannot ignore technological innovations. In this context, the Federal Court of Accounts (TCU) has been using automated audit tools, commonly known as "robots," to assist in its auditing activities. The technological systems adopted by the TCU aim to achieve greater efficiency and rationality in the external control of the Union, enhancing the oversight and management of public resources. These tools strengthen the capacity for monitoring and auditing, promoting a more transparent and effective public administration (Costa; Bastos, 2020).

Below, we will address seven examples of the use of AI as a tool to assist in the control of public procurement. The texts do not aim to detail how each tool operates, but rather to highlight the potential use in combating corruption.

Alice (Analysis of Tenders and Bids)

Launched by the CGU in 2015, Alice is a system that analyzes bidding notices, prices, and direct procurement, identifying irregularities. It generates customized reports on processes, costs, at-risk values, and potential fraud, using data from the Federal Government's Procurement Portal and the Official Federal Gazette.

Mônica (Integrated Monitoring for Procurement Control)

Mônica is a dashboard that monitors acquisitions made by the federal sphere, covering the Executive, Legislative, Judiciary, and the Federal Public Ministry. The information is categorized by administrative units, suppliers, and materials/services acquired. It allows for filtering specific data and conducting complementary analyses, with the option to export to Excel.

Adele (Electronic Bidding Dispute Analysis)

Adele tracks the dynamics of electronic prices, allowing for chronological analysis of bids and participant information from companies. It identifies fraud, restrictions on competitiveness, and collusion among bidders, helping to detect irregularities in procurement processes.

Sofia (System of Guidance on Facts and Figures for the Auditor)

Sofia assists TCU auditors in reviewing and verifying information in external control documents. It cross-references data from CNPJs and CPFs with applied assessments, contracts, and other relevant information, facilitating the identification of inconsistencies. It automates and streamlines access to various databases, improving auditors' productivity.

Carina (Crawler and Records Analyst at the National Press)

Carina extracts daily information about government audits published in the Official Federal Gazette, including contracts and procurement notices. It complements Alice's work by providing relevant information for quick analysis by external control. During the pandemic, it tracked contracts related to the fight against COVID-19.

Ágata (Text Analysis Generator with Learning)

Ágata is a solution that performs automated textual analysis using machine learning. During the pandemic, it monitored millions in contracts and procurement related to the health crisis, helping to identify and track relevant processes.

LabContas (Control Information Laboratory)

LabContas aggregates various databases from the Federal Public Administration, facilitating external control. It consolidates information on government accounts, corporate ownership structures, public procurement contracts, and processed civil servants. It functions as a "brain" for the tools Alice, Sofia, Mônica, Adele, Ágata, and Carina (Costa; Bastos, 2020).

The authors emphasize the importance of artificial intelligence in driving the digital transformation of public organizations, resulting in significant improvements in efficiency and effective outcomes. These advancements have generated financial benefits of R$ 1.31 billion in various actions and present growth potential with the proposal of a support module for data visualization and management information. According to Oliveira, Rocha, and Rezende (2022), audit systems using artificial intelligence demonstrate innovative potential in various sectors, especially in preventing fraud in government public procurement.

The technical report highlights the importance of AI by pointing out that its implementation led to the suspension of over R$ 9.7 billion in public procurement, solely by the CGU (Office of the Comptroller General). This success demonstrates the effectiveness of the tool in preventing fraud, generating substantial savings, and ensuring the proper use of public resources. The use of AI has proven crucial in strengthening government management, protecting societal interests, and promoting greater trust in the public procurement system (Gottselig, 2022).

Artificial intelligence used in private auditing

Artificial Intelligence (AI) systems in accounting software automate repetitive tasks, reducing human errors. By applying AI in data reconciliation and fraud detection, the accuracy of financial reports is enhanced.

AI identifies discrepancies in the data, improving the quality of financial information. Furthermore, it automates tasks and processes large volumes of data, increasing the efficiency of accounting processes and reducing errors (Oliveira; Santos; Amorim, 2023). Below, examples of AI developed by the private sector will be presented. These texts aim to demonstrate the potential use of AI in combating corruption.

Operação Serenata de Amor (OSA)

The *Operação Serenata de Amor* (OSA) is a civic technology project developed by civil society, meaning it is not a government project.

Privately run, it uses public data to conduct audits of public accounts. The project was financed through crowdfunding and relies on the participation of volunteers and support from private funders. The entire project structure is based on open-source technology, meaning the source code is publicly available in repositories such as GitHub.

This allows anyone to access, download, review, and contribute to the project. Since its inception, OSA has benefited from the collaboration of programmers, data scientists, journalists, and sociologists. Among the tools developed are Rosie, a robot that analyzes data using mathematical models, and Jarbas, which presents the processed data in an accessible way, dismissing corruption suspicions. Collaborative participation is encouraged, and hundreds of individuals have contributed to the development and maintenance of the project's code (Dal Pozzo, 2020).

According to the *serenata.ia* website (Operação Serenata de Amor, 2022), in its five years of existence, the OSA project analyzed more than 3 million reimbursements, flagged over 17,700 identified suspicions, made more than 600 reports, canceled 134 reimbursements, and returned R$ 50,569.18 to public coffers. The OSA project has also highlighted some relevant data regarding reimbursement requests, such as a meal costing R$ 6,205 and the fueling of 30 tanks of gas totaling R$ 6,000 in one month.

According to Agência Brasil (Campus [...], 2017), around 1,500 reimbursement requests are made daily, totaling an average of 22,000 invoices per month. The manual analysis of reimbursements has become unfeasible due to the high volume of transactions.

Given this context, OSA aims to increase transparency and social participation in monitoring public spending, promoting social accountability and the responsible use of resources by parliamentarians. The project analyzes the spending of parliamentary indemnity funds through cross-referencing different databases, with the potential for application in other government areas (Dal Pozzo, 2020).

Thus, it can be observed that *Operação Serenata de Amor* (OSA) is an effective and innovative initiative in citizen auditing, using artificial intelligence to monitor parliamentary reimbursement expenses in Brazil. The tool seeks to enhance transparency and social control

over public spending, an effort that would be unfeasible solely with human resources due to the high volume of transactions, revealing questionable expenses and promoting the accountability of parliamentarians.

Querido Diário

The official platform of *Querido Diário* (QD), launched in 2021, aims to centralize municipal official gazettes to broaden access to information about public administration. *QD* is an open-source project, considered a digital public good.

Querido Diário is a project designed to facilitate access to information about Brazilian public administration, with a special focus on municipal levels. Its goal is to make municipal executive branch official gazettes more accessible and understandable to the general public. Inspired by the success of the *Operação Serenata de Amor*, the project merged two similar initiatives. Using Google's BERTimbau language model, the system involves curators and experts to retrieve information from official gazettes.

QD seeks to democratize municipal data, covering public policies, procurement notices, and obligations in accordance with Fiscal Responsibility Law No. 101 of May 4, 2000 (Brazil, 2000). The project has already been tested in several databases and currently covers 3,075 Brazilian municipalities, using "robots" as automated audit tools to collect data from the Official Gazettes in 600 cities. The project utilizes artificial intelligence to classify, contextualize, and expand information from documents, enabling open access in a publicly available format. The tool aims to provide open and free information for empirical analysis, offering insights into the actions of local governments (Querido Diário, 2021).

In a subsequent phase, the project aims to provide mechanisms and data to expose illicit practices in public administration, particularly those related to the exemption of public bidding procedures. It proposes the implementation of a search field in the Official Gazettes so that the public can monitor the use of public resources and identify irregularities (Querido Diário, 2021).

Argus

The Argus tool, developed by Deloitte, is specifically designed for audit purposes, offering support in control and auditing processes. According to Zemánková (2019), it uses

advanced machine learning and natural language processing techniques. Argus automatically extracts crucial accounting information from various types of electronic documents. Through learning from human interactions and applying advanced techniques, Argus is able to identify and extract relevant accounting information, enhancing the efficiency and accuracy of the auditing process.

Additionally, the tool can analyze large volumes of data, identifying anomalies or patterns that may suggest fraudulent activities or weaknesses in controls. The ability to process and analyze large amounts of data quickly makes Argus a valuable tool for improving the efficiency and accuracy of audits (Deloitte, 2018).

In general, Argus raises the standards of control and auditing processes by automating data extraction and providing valuable information to professionals involved in the audit. The Argus tool automatically extracts accounting information from electronic documents, freeing auditors to focus on strategic tasks and accelerating the auditing process. With its precision, it reduces human errors, ensuring the reliability of the information extracted (Zemánková, 2019).

Argus automatically identifies and categorizes risks, assisting in the prioritization of actions. By providing actionable insights and detailed reports, it allows for more accurate decision-making throughout the auditing process.

Its continuous learning ability consistently improves its efficiency. It contributes to building trust and transparency in audit processes, benefiting companies, auditors, and stakeholders. In summary, the Argus tool is essential for enhancing the efficiency, accuracy, and quality of audits, elevating excellence in this field (Zemánková, 2019).

Guided Risk Assessment Personal Assistant (GRAA)

The Guided Risk Assessment Personal Assistant (GRAA) is an application developed by Deloitte to assist auditors in control and auditing processes. GRAA focuses on innovation and the development of tools to transform the auditing profession. It helps auditors compare the selected risk strategies with other strategies in use, aiding in the assessment of strategy effectiveness. GRAA, an artificial intelligence tool developed by Deloitte, utilizes machine learning algorithms to analyze audit data, providing risk recommendations to auditors. In addition to identifying the most relevant risks, areas of greater exposure, and best auditing

practices, GRAA enables the visualization of this data through interactive graphs and personalized dashboards (Deloitte, 2018).

The benefits of GRAA include improving the efficiency and quality of audits by reducing the time and effort required for risk assessments. Its foundation in objective and consistent data enhances the confidence and credibility of audits, replacing subjective intuitions with concrete information (Deloitte, 2018).

The tool also facilitates communication and collaboration between auditors and clients, allowing the sharing of information and feedback in real time. Moreover, GRAA contributes to the innovation and transformation of the auditing profession by encouraging the use of new technologies and approaches. It is part of Deloitte's "Audit Powered by AI" suite, alongside tools such as Argus, Spotlight, and Illuminate, which analyze documents, extract financial information, and detect anomalies and fraud in transactions, respectively (Zemánková, 2019).

Ernst Young Blockchain Analyzer

Based on the work of Bonyuet (2020), it can be stated that blockchain has become one of the most discussed and promising technologies since its creation in 2008. Blockchain can be defined as a decentralized digital ledger, in which each participant maintains an identical copy of the transaction record. This innovative technology enables the capture of transactions between various parties in real-time, ensuring transparency, security, and immutability of data.

In this context, Ernst & Young (EY) developed the EY Blockchain Analyzer, a tool specifically designed to analyze and audit blockchain transactions. This tool contributes to transparency in blockchain transactions, providing auditors with greater visibility and insights into the blockchain ecosystem. The tool uses advanced analytics and artificial intelligence capabilities to analyze blockchain data, identify patterns, and detect anomalies or potential fraud (Bonyuet, 2020).

According to Zemánková (2019), the EY Blockchain Analyzer can assist auditors in verifying the accuracy and integrity of blockchain transactions, ensuring compliance with regulations and internal controls.

It allows auditors to track transactions, providing a comprehensive view of the entire transaction history on the blockchain. The tool also offers real-time monitoring and reporting capabilities, enabling auditors to promptly identify and address potential risks or control

weaknesses. Overall, the EY Blockchain Analyzer enhances control and auditing processes by providing auditors with the necessary tools and insights to effectively analyze and audit blockchain transactions (Zemánková, 2019).

The PwC Cash.ai

PwC Cash.ai is a specialized software that uses AI to replicate human cognitive processes for problem-solving and goal achievement, particularly in the field of accounting.

This software aims to assist in data storage, analysis, and financial forecasting, allowing companies to create accurate financial projections for strategic decision-making by analyzing financial data in real time (Oliveira; Santos; Amorim, 2023).

According to Zemánková (2019), PwC Cash.ai represents an innovative tool developed by PwC that employs artificial intelligence and machine learning to enhance control and auditing processes. Additionally, PwC Cash.ai plays a crucial role in detecting unusual transactions in the general ledger, expanding auditors' ability to identify potential risks or fraudulent activities. By automating reconciliation processes, the tool contributes to improving efficiency and accuracy in audits.

According to Oliveira, Santos, and Amorim (2023), the automation of repetitive tasks by AI can significantly improve financial operations, increasing productivity, profitability, and reducing costs for accounting firms. The implementation of systems such as PwC Cash.ai can reduce human errors, resulting in more accurate data and financial reports, saving time and enhancing efficiency in accounting processes.

PwC Cash.ai performs automatic reconciliations according to predefined processes, thus reducing the risk of errors and increasing the reliability of audit procedures. In summary, PwC Cash.ai uses the capabilities of artificial intelligence to optimize processes, providing auditors with precision and control efficiency in auditing (Zemánková, 2019).

Final considerations

The tools presented, such as Mônica, Adele, Sofia, Carina, Ágata, and LabContas, play pivotal roles in enhancing public sector monitoring and auditing. LabContas is particularly critical as it consolidates various databases from the Public Administration, facilitating external oversight. Its central function is to gather information, serving as a "brain" for tools like Alice,

Sofia, Mônica, Adele, Ágata, and Carina. By doing so, LabContas strengthens the capacity for monitoring and auditing, fostering greater transparency and efficiency in public management.

The Operação Serenata de Amor (OSA), ALICE, Querido Diário, Argus, GRAA, EY Blockchain Analyzer, and PwC Cash.ai play essential roles in auditing activities in general, offering a comprehensive approach to effective external control. OSA oversees reimbursements related to parliamentary activities, while ALICE identifies irregularities in public bidding processes. Querido Diário centralizes municipal official gazettes into one platform, enabling analyses of bidding exemptions and providing relevant data to the civil society. Argus automates accounting audit processes, GRAA assists in risk assessment, EY Blockchain Analyzer verifies blockchain transactions, and PwC Cash.ai uses artificial intelligence to enhance efficiency and accuracy in audits.

These tools, when applied to the context of public funds, particularly school feeding programs, have the potential to significantly contribute to the control of funds allocated for school nutrition. They provide transparency, fraud prevention, and effectiveness in managing these resources, ensuring that they are used efficiently and in accordance with their intended purposes. The combination of these technological solutions represents an innovative and accurate response to auditing and controlling public funds, promoting more responsible and transparent management of resources allocated to school feeding.

This article's contribution lies in highlighting the numerous benefits that the implementation of Artificial Intelligence (AI) can bring to public administration, specifically in the control and monitoring of funds allocated to school feeding programs. We recognize that the complexity and volume of data involved in managing public funds represent a significant challenge. For a human, the task of managing and analyzing vast amounts of information, exemplified by the hundreds of daily data points, becomes virtually unfeasible. AI emerges as an effective solution to overcome these limitations. By processing data efficiently, it not only alleviates the workload but also excels in identifying suspicions and automatically issuing alerts about potential irregularities. These tools not only perform essential functions in auditing school feeding funds but also prove to be a promising strategy for mitigating corruption in this sector.

By employing Artificial Intelligence, these tools automate not only the oversight processes but also the identification of irregularities and detection of suspicious patterns. This automation significantly contributes to promoting transparency and preventing improper practices. In conclusion, by adopting these technological innovations, not only are the processes optimized for efficiency, but a robust barrier is also created against potential corrupt practices,

consolidating a more transparent and ethical environment in the management of public resources allocated to school feeding.

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CRediT

Acknowledgments:	With appreciation, I express my thanks to Professor Wilson Melo for his encouragement of the students, his guidance and insights that proved fundamental in the initiation of this article. I also extend my thanks to Professor Ana Gleice, whose generosity in sharing her knowledge and skills contributed significantly to raising the quality of this work.
Funding	Not applicable
Conflict of interest:	The authors certify that they have no commercial or associative interest that represents a conflict of interest in relation to the manuscript.
Ethical approval:	Not applicable.
Authors' contributions:	Silva, R. S.; Melo Junior, W. S.: declare that they participated in the writing of the article, and state that they were responsible for the Conceptualization and Data Curation; Santos, A. G. S.; Prado, C. B.: declare that they contributed to the Formal Analysis, Investigation, Methodology, Writing - original draft; Supervision, Validation, Visualization, Writing - revision and editing.

Submitted: September 18, 2024
Accepted: November 27, 2024
Published: February 03, 2025

Section editor: João Fernando de Araújo
Production team member: Junior Peres de Araujo
Editorial assistant: Martinho Chingulo