THE USE OF ARTIFICIAL INTELLIGENCE IN GOVERNMENT ACCOUNTING TO INCREASE ACCOUNTABILITY AND PUBLIC TRANSPARENCY: A LOOK AT PUBLIC INSTITUTIONS IN THE STATE OF MARANHÃO

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Antônio Felipe Araújo Ribeiro[1] and Maria Eugênia Rodrigues Araújo[2].

ABSTRACT

This paper presents the result of a research whose objective was to analyze the feasibility of the use of artificial intelligence (AI) in government accounting, in order to foster the practices of accountability and public transparency in public institutions in the State of Maranhão. The survey was applied in the six state organizations (Executive, Legislative and Judiciary Branches, Public Defender's Office, Court of Auditors and Public Prosecutor's Office), through a Google form, aimed at professionals who work in the areas of public accounting and information technology. A total of 68 responses were obtained. The qualitative-quantitative analysis of the responses showed that the use of AI for the purpose of promoting accountability and public transparency is extremely viable, as well as that there is already an incipient use of it at the state level. It showed, however, that there are many challenges to be overcome, such as: the lack of adequate technical knowledge on the part of accounting professionals, insufficient IT professionals and the need for organizations to invest financial resources. On the other hand, the study proves that more than half of the interviewees already effectively use technology in their work activities, even if unofficially. From this perspective, the results signal that the use of AI in public accounting is still a challenge to be overcome by managers, but that it promises a gain in efficiency in administrative activity.

Keywords: Artificial Intelligence (AI). Government Accounting. Accountability. Transparency. State of Maranhão.

[1] Federal University of Maranhão
Email: antoniofeliperibeiro@gmail.com
[2] Doctor and Professor
Federal University of Maranhão
Email: eugenia.maria@ufma.br

INTRODUCTION

The Brazilian Standard of Accounting applied to the Public Sector (NBC T 16.1), approved by the Resolution of the Federal Accounting Council (CFC) No. 1,128/2008, prescribes that Public Accounting is the field of accounting science, in which the information constituted, the Fundamental Principles of Accounting and the accounting standards are applied to the control of the assets of public sector entities.

It is clear that information technology (IT) streamlines and facilitates work routines in addition to meeting expectations with regard to results, having great relevance to the accounting professional, such as, for example, the creation of accounting information systems and ERP's (Enterprise Resource Plannign) that have improved the work of the accountant, since most of the activities performed by them were done manually (Corazzim, 2017).

At the same time, new concepts in accounting are emerging, such as accountability and public transparency, which are, in addition to being closely linked to government accounting, in full evidence, both for public managers and for citizens in general. It understands them as fundamental for society to be able to exercise social control over public sector spending, increasing the population's confidence in government institutions, providing an increasingly efficient management of public resources.

The authors Souza, Curi, Nuintin (2019), understand that in order to generate information that allows the monitoring of the application of public resources, managers must follow the principles of transparency and accountability. In this context, transparency consists of the disclosure and availability of information and accountability refers to the accountability of how much and how public resources are applied and consequent results generated.

Lopez, Santos and Pinheiro (2014) argue that the tools made available by Artificial Intelligence for use in accounting collaborate in the efficient and accurate analysis of a significant amount of data, identifying patterns and treating various types of information necessary for the good performance of Accounting and, therefore, of the accounting professional.

With each passing day, the demands are greater and the information that must be made available by public managers on their transparency portals is more qualitative. Much of this information needs to be made available in real time, in addition to other requirements. In this way, it is believed that artificial intelligence technologies can foster this process of disclosure of accounting information within the scope of the Public Administration, improving

the accuracy and analysis of this data, as well as assisting in the dissemination of clear and accurate information.

The data available on the Public Transparency Radar website, maintained by ATRICON - Association of Audit Courts of Brazil, which result from the verification carried out by the Institution in June 2023, it is possible to verify that of the 8,045 (eight thousand and forty-five) entities evaluated, only 241 reached the diamond level, 501 gold and 578 silver, which consist of the maximum levels, medium and minimum public transparency (ATRICON, 2023).

In Maranhão, according to the same source, of the 251 entities evaluated, only two were classified with the diamond seal, nine, gold seal and ten with silver seal. Meaning, the low level of transparency in the state. These data are alarming and demonstrate the size of the problem that public managers and accountants in the State of Maranhão have to face.

In view of this reality, it is understood that the technology used to obtain information and generate data contemplates the domain of the use of Artificial Intelligence, given the complexity and dimension of data to be consolidated. From then on, there is a gap for the State of Maranhão that motivates the investigation of the research question: Is it feasible to use AI as a tool to promote accountability and public transparency? The search for an answer to this question requires research with public agencies in the three spheres of government, in order to know the state of equipment of the local public administration and especially the use of AI in public agencies of the State, seeking to understand in what technology conditions these agencies are and their intention to meet accountability and transparency. legal and social precepts essential for the development of public management.

In this perspective, the general objective is to analyze the application of artificial intelligence (AI) in government accounting at the state level, with a focus on accountability and public transparency.

To outline this general objective, the following specific objectives are presented:

1- To study the relevance that the concepts of accountability and transparency have in Public Administration;
2- Understand the meaning of adopting AI;
3- And, to identify the situation of the State of Maranhão in relation to the use of technology.

The research is justified in the thinking of Lopez, Santos and Pinheiro (2014), who maintain that the tools made available by Artificial Intelligence for use in accounting, collaborate in the efficient and accurate analysis of a significant amount of data, identifying

patterns and treating various types of information necessary for the good performance of Accounting and, therefore, of the accounting professional.

From the perspective of the arguments above, there is an urgent need to align in public agencies the availability that technology offers through AI, institutional human and physical conditions that enable the public administration to maintain its accounting recording system more efficient in the face of the complexity of its operations resulting from an entire Strategic Planning and its budget availability.

The approach of the research is quali-quanti, bibliographic, descriptive with the use of content analysis and application of an unstructured questionnaire for the collection of information with public servants of the three branches of the State.

It is understood that the theme proposed here has great relevance both for public accountants and for society in general, which will benefit from greater efficiency of public spending and will be able to exercise due social control more fully, directly implicating in the execution of public policies. It was also observed that there was an insufficiency of academic discussions on the subject, dealing with research that values originality and innovation.

THEORETICAL FRAMEWORK

The principle of transparency of public accounts contained in Complementary Law No. 101/00 and other legal provisions determines that the public manager has the duty to be accountable to citizens and control bodies. Accounting and tax information are important sources available to the manager for decision-making (BRASIL, 2000).

Studies by Monteiro, Pereira and Pereira (2014, p.37) point out that "the reforms demonstrate that the public sector needed to evolve to keep up with society's demand for greater control, transparency, efficiency and effectiveness in the management of public resources". From this perspective, Accounting Applied to the Public Sector (CASP) had to adapt to keep up with the changes and demands of society, in order to evidence the information necessary for social control and accountability.

The term accountability does not have a precise translation into Portuguese, meaning, in the closest literal translation, the "capacity for accountability", or even "capacity to be transparent" (Araújo, 2002). Cumbe and Inácio (2018), in turn, argue that the definition of accountability is quite moldable and often difficult to understand, with understandings that change according to the prevailing interests and the context in which it is inserted. In the same sense, Buta et al (2018) consider that the term should be understood through a three-dimensional concept that involves transparency, accountability, and accountability in a continuous process.

In this scenario, it is recognized that the term accountability encompasses a greater completeness of meanings, such as ethics, accountability, governance, among others, which, however, it was considered prudent not to address, in order to maintain the focus of the present study.

For Bairral, Silva and Alves (2015), public transparency begins to expand beyond the legal/fiscal line and starts to address other aspects of public management (performance, personnel, internal controls, etc.). This expansion brings new requirements for public accountability, via control bodies, which start to assess whether public information is effectively accessible to citizens, whether via tax reports, electronic transparency portals and annual management reports.

International research such as that of Papenfuss and Schaefer (2010) observes the issue of transparency through four stages, demonstrated through a pyramid and described from the base: access to information must be guaranteed, the quality of information must be ensured, thus allowing the transparency necessary for the fulfillment of public responsibility requirements and, therefore, achieve accountability.

For Haenlein and Kaplan (2019), AI is defined as the ability of a system to correctly interpret data, to learn from that same data, and to use that learning to mimic specific tasks or processes similar to human knowledge. It falls into two categories: narrow (or weak) AI, which is designed to perform a specific task, and general (or strong) AI, which possesses human-like broad cognitive ability (Russell & Norvig, 2013).

The studies by Violante and Andrade (2022) considered AI relevant, namely in factors such as faster information processing and cost reduction, in the improvement of production factors, in the improvement of data analysis, among others.

The issues raised by Sichman (2021), related to the inclusion of ethical principles, priorities, and choices in AI processes, as well as the need for the system to explain and justify its decisions and actions, responsiveness, and the transparency of the AI system itself, regarding the need to describe, inspect, and reproduce the mechanisms by which AI systems make decisions and learn to adapt to their environment and the governance of the data used and created.

After this propaedeutic phase, which addressed the theoretical aspects that the theme involves, it was investigated how the integration of artificial intelligence (AI) is occurring in the public sector, investigating the challenges of this technology in promoting accountability and government transparency. Recent studies discuss how AI can optimize administrative efficiency, prevent bad practices, and democratize access to information. Next, it is possible to check the state of the art that supported the present research, through the analysis of the

proposed table, which summarizes the contributions and the main results obtained by three scientific articles that explore these themes, highlighting approaches applied in Brazil, Spain and Mexico.

Article/Author	Contribution	Key Results
Artificial intelligence in Brazilian public management: challenges and opportunities for government efficiency Authors: Eduardo Silva Vasconcelos and Fernando Augusto dos Santos AI in Brazilian Public Management	It addresses how AI can transform public administration in Brazil, highlighting the opportunities to increase efficiency and transparency in services. It analyzes the ethical, legal and technological barriers that hinder this integration.	Effective implementation of AI requires substantial investments in technological infrastructure and training of public servants. It proposes the creation of a robust legal framework and ethical policies to ensure the responsible adoption of AI. It suggests benchmarking with international practices to improve Brazilian governance and legislation.
ARTIFICIAL INTELLIGENCE FOR PUBLIC TRANSPARENCY The Early Warning System (SALER) of the Generalitat Valenciana Author: Alfonso Puncel Chornet SALER: Early Warning System	It describes the development of the SALER System, which uses AI to detect bad administrative practices such as fraud and corruption in advance. It emphasizes the importance of prevention and transparency in public management.	SALER uses sophisticated algorithms to generate real-time alerts, contributing to the anticipation of risks. The article highlights the need for multidisciplinary collaboration and the importance of maintaining human oversight to avoid reliance on unverified automatic decisions. He points out that the transparent disclosure of algorithms strengthens trust in the system.
Transparency and Artificial Intelligence: a new perspective Author: Mauricio Rivera Eisenmann AI for Transparency in Mexico	It examines the use of AI-based chatbots to facilitate access to public information in Mexico, as a way to overcome the limitations of traditional mechanisms such as the National Transparency Platform.	Chatbots can simplify and democratize the process of accessing information, making it more inclusive for the general population, especially for those who do not have specific training. The study also addresses cultural and bureaucratic resistance to change, emphasizing the need for a new culture of transparency among public servants.

The present research differs from the aforementioned ones in that it explores the use of artificial intelligence in state-level institutions, under the focus of accountability and public transparency practices.

METHODOLOGICAL PROCEDURES

The central purpose of this study is to investigate, analyze and describe the information related to the perception of professionals who work with public accounting and information technology, within the scope of the State Public Administration, about the use of artificial intelligence (AI) in the process of disclosure of accounting information, for the purpose of promoting accountability and public transparency, also verifying the existence of

an adequate technological structure and human resources necessary for the implementation of AI and identifying, finally, the possible application of any of these intelligences at the state level.

To prepare the reader for the theme, it was necessary to demonstrate, through a theoretical approach, the relationship between public accounting, responsible for recording, controlling and demonstrating the execution of the acts and facts of the public entity, with the duty of accountability of the public manager - accountability - and the need to disclose accounting information of the federated entities for the purposes of public transparency.

We sought to discover what the literature points to as the practical use of AI in accountability and public transparency processes. Then, through the application of questionnaires aimed at professionals in the area of public accounting and information technology, from the highlighted segment, data was obtained that will demonstrate whether AI can contribute to this process of disclosure of accounting information that needs to be made available.

Thus, the present study adopts a predominantly qualitative approach where, according to Gonçalves et al. (2021), "allows us to explore and rescue the space of subjectivity, this necessary presence that escapes the directly observable". This is because "qualitative research takes into account that the points of view and practices in the field are different due to the diverse perspectives and social contexts related to them" (Fick, 2009, p. 24-25).

To collect the primary data, a questionnaire was applied to professionals working in the area of public accounting and information technology within the agencies of the State of Maranhão. The present research is classified, in terms of approach, as qualitative and quantitative; as to the nature, basic and as to the objectives, exploratory. Regarding the technical procedures, this is characterized as a bibliographic research and also a field study, as it uses questionnaires to collect the necessary data for the study.

The target audience of the present study comprises professionals who work in the area discussed in the present study. It was considered that civil servants who work with public accounting and information technology in the State Public Administration (Executive, Legislative and Judiciary Branches, Public Prosecutor's Office, Ombudsman's Office and State Court of Accounts), would have the best conditions to contribute to the research, since they have knowledge and experience that decisively contribute to the success of the project.

ANALYSIS AND DISCUSSION

The investigation carried out in this study is focused on Content Analysis in which the 34 questions of the questionnaire were divided into 28 categories and 8 codes, which synthesize the ideas of the categories summarized into: Knowledge, Use and Domain, Risks, Conditions of Use, Effects of AI, Contribution, Team Acceptance of using AI and Understanding of AI. After organizing the data, and analyzing the research findings, it is inferred that:

Of the civil servants surveyed, only 01 (1.5%) defined their level of knowledge about the use of AI as excellent, with 30 (44.1%) considering it good, 29 (42.6%) regular and 08 (11.8%) poor. It demonstrated, surprisingly, that 86.8% of professionals understand that knowledge of AI is important for the performance of their current function.

The analysis of the data revealed that 54.4% of those surveyed consider their knowledge of AI to be fair or poor. There is a clear disproportion between the importance given by professionals to the knowledge of AI and their level of knowledge on the subject. It can be inferred from the information that although the vast majority of the professionals interviewed consider knowledge on the subject important, more than half of this percentage do not actually have it.

Another piece of data that reinforces this statement is that when asked how important AI would be for the performance of their current function, 32.4% adduced that it is very important and 54.4% consider it important. However, when asked how familiar they were with the use of AI in public accounting, 39.7% said they were not familiar and 54.4% were unfamiliar.

It is noteworthy, however, that 48.5% of the interviewees adduced that they already use AI in two activities, independently, while only 5.9% reported its use through integrated systems of their respective institutions. On the other hand, 44.1% answered that they do not use AI at all.

It is inferred from the data collected that despite being proven to be present in the daily lives of the interviewees, as well as the importance that they consider on the subject, the absence of effective technical knowledge on the part of professionals working in the area of public accounting is evident.

Another important aspect revealed by the survey was that practically 90% of respondents consider that AI can detect patterns, anomalies and absence of information in public data, indicating this condition to the public manager. This means that the perception of the professionals in the sample is that AI can process an absurdly larger amount of data,

and can be programmed to indicate any existing non-conformity, facilitating the work of the public manager in remedying that inconsistency.

The result obtained is in line with the definition proposed by Haenlein & Kaplan (2019), who consider that AI can interpret data, learn from it, and use this ability to mimic specific tasks or processes similar to human knowledge.

Regarding the technological and human resources structure for the implementation of AI, the survey showed more distributed results. To question the sufficiency of the technological structure available in their respective institutions, the results obtained were that 21.2% consider the structure available in their agency sufficient; 43.9% consider it insufficient and 34.8% did not know how to inform.

Regarding the existence of teams or professionals able to develop and maintain AI systems in their organizations, only a tiny percentage (2.9%) stated that their institutions had sufficient human resources to implement AI systems. It is believed that this shortage is related to the exodus of these professionals to the private sector, driven, above all, by more attractive salaries than those paid by the public sector. These data demonstrate that the implementation of AI unequivocally involves the necessary qualification and recruitment of technically qualified professionals for the development and maintenance of these technologies.

It should be added that 92.6% of those surveyed adduce that AI can serve as a tool capable of facilitating the disclosure of information for accountability and public transparency purposes, while 95.6% consider the cost of its implementation as an investment.

Regarding the use of AI in their organizations, 52.9% of those surveyed reported that their entities do not yet use it, and 33.8% reported not knowing how to inform. However, 13.2% report that their institutions already use some form of AI, identifying the following: a) Process screening robots; b) robots for the fulfillment of judicial warrants; c) Jussara, which facilitates access to useful information and links from the State; d) Chat GPT linked to the StartGov system; and f) use of AI to classify documents according to their textual content.

RESULTS

It should be noted, however, that the research concluded that, in the State of Maranhão, there is still no institutional use of AI systems in public accounting, especially with regard to accountability and public transparency practices. Although not implemented at the state level, the data found in this study allow us to infer that it is indeed possible to develop a tool similar to the one evidenced in the work of Alfonso Puncel Chornet (2019), in an article entitled "Artificial intelligence for public transparency", which highlights the existence of an AI

in Spain, called SALER, in charge of carrying out the General Inspection of Services regarding public transparency.

In Mexico, the National Transparency Platform already uses chatbots to promote public transparency and, therefore, accountability. The author Mauricio Rivera Eisenmann (2020), in an article entitled "Transparency and Artificial Intelligence: a new perspective".

The results of the survey indicate that Artificial Intelligence (AI) can be a valuable tool to promote accountability and transparency in public management. This conclusion is based on two main points: the use, albeit initial, of AI in other countries for this purpose, and the ability of AI to process data, identify errors and patterns, and check accounting information, which can increase the efficiency and accuracy of government accounting.

FINAL CONSIDERATIONS

This study analyzed the potential of artificial intelligence (AI) to promote accountability and transparency in public accounting in the State of Maranhão. The results demonstrate that AI can bring greater efficiency and reliability to processes, but its application is still incipient. The survey revealed that accounting professionals, although they use AI in their daily lives, lack technical knowledge about its applications in public accounting. The need for investments in training and infrastructure was also identified, in addition to the lack of IT professionals to develop projects in the area.

It was also demonstrated that although Maranhão already has some institutionalized use of AI, as is the case of Jussara and process screening robots, these are not directly related to the use in public accounting or to accountability and transparency practices.

Despite the challenges, the research confirmed the feasibility of using AI to promote accountability and transparency in public management in Maranhão. This is based on AI's ability to process large volumes of data, identify errors and patterns, and check accounting information, which can increase the efficiency and accuracy of government accounting. In addition, international experiences demonstrate the success of AI in promoting public transparency, such as the SALER system in Spain and the use of chatbots in Mexico's National Transparency Platform.

It is crucial that the State of Maranhão invests in training and infrastructure so that AI can be used strategically in public management. It is also necessary to attract and retain qualified IT professionals to develop and maintain projects in the area. It is suggested that future research expand the sample and investigate the international scenario, comparing it with the Brazilian context

It is considered that the study helps to understand the use of AI in public accounting and contributes to the debate on accountability in Brazil. It is believed that this work can serve as a basis for the formulation of public policies that encourage the use of AI in public management, aiming at greater transparency and social control.

In the course of the work, some limitations were encountered that made the path more tortuous, such as the absence of a broader bibliography on the subject and difficulty in obtaining answers from the researched institutions, which, for unknown reasons, were not comfortable in responding to the research.

In view of the above, it is considered that the results obtained were positive and the objectives achieved. Recognizing the limitations of this study, it is suggested as future research the use of this same analysis system considering a larger sample, as well as extrapolation to the national and international scenario, in order to identify whether the results presented in this research can be related to the Brazilian context or to the term itself.

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