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

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ABSTRACT

This paper presents the results of a survey whose objective was to analyze the feasibility of using artificial intelligence (AI) in government accounting, to promote accountability and public transparency practices in public institutions in the state of Maranhão. The survey was applied in 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 and quantitative analysis of the responses demonstrated that the use of AI to promote accountability and public transparency is extremely feasible, 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 investment of financial resources by organizations. 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 indicate that the use of AI in public accounting is still a challenge to be overcome by managers, but that it promises to increase efficiency in administrative activities.

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

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INTRODUCTION

The Brazilian Accounting Standard applied to the Public Sector (NBC T 16.1), approved by 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 Accounting Principles and the accounting standards are applied to the control of the assets of public sector entities.

It is well known that information technology (IT) streamlines and facilitates work routines in addition to meeting expectations regarding results, having great relevance to professionals in the accounting area, such as, for example, the creation of accounting information systems and ERPs (Enterprise Resource Planning) that have improved the work of accountants, since most of the activities performed by them were done manually (Corazzim, 2017). At the same time, new concepts have emerged in accounting, such as accountability and public transparency, which are not only closely linked to government accounting, but are also very important to both public managers and citizens in general. They are considered fundamental for society to exercise social control over public sector spending, increasing the population's trust in government institutions and providing increasingly efficient management of public resources.

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

Lopez, Santos, and Pinheiro (2014) argue that the tools made available by Artificial Intelligence for use in accounting help in the efficient and accurate analysis of a significant amount of data, identifying patterns and processing various types of information necessary for good performance of Accounting and, therefore, of the accounting professional. With each passing day, the demands and the quality of the information that must be made available by public managers on their transparency portals are increasing. Much of this information needs to be made available in real-time, in addition to other requirements. Thus, it is believed that artificial intelligence technologies can foster this process of disclosing accounting information within the scope of Public Administration, improving the accuracy

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

The data available on the Public Transparency Radar website, maintained by ATRICON - Brazilian Association of Audit Courts, which results 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, medium and minimum levels of 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 with the gold seal, and ten with the silver seal. This indicates the low level of transparency in the state. This data is alarming and demonstrates the size of the problem that managers and public accountants in the state of Maranhão have to face.

Given this reality, it is understood that the technology used to obtain information and generate data includes the use of Artificial Intelligence, given the complexity and size of the data to be consolidated. From then on, a gap is seen for the state of Maranhão that motivates investigating the research question: Is it viable 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, to understand the state of the local public administration and especially the use of AI in public agencies of the State, seeking to understand in what technological conditions these agencies find themselves and their intention to comply with 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- Study the relevance that the concepts of accountability and transparency have in Public Administration;

2- Understand the meaning of adopting AI;

3- And, identify the situation of the State of Maranhão regarding the use of technology.

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The research is justified in the thought Lopez, Santos, and Pinheiro (2014) argue that the tools made available by Artificial Intelligence for use in accounting help in the efficient and accurate analysis of a significant amount of data, identifying patterns and processing 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 public bodies with the availability that technology offers through AI, human and physical institutional conditions that enable public administration to maintain its accounting record system more efficiently given the complexity of its operations resulting from an entire Strategic Planning and its budgetary availability.

The research approach is qualitative and quantitative, bibliographical, and descriptive with the use of content analysis and the application of an unstructured questionnaire to collect information from public servants of the three branches of government. It is understood that the topic proposed here is highly relevant both for public accountants and for society in general, which will benefit from greater efficiency in public spending and will be able to exercise due social control more fully, directly affecting the implementation of public policies. It was also observed that there is insufficient academic discussion on the topic, 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 public managers must be accountable to citizens and oversight bodies. Accounting and tax information are important sources available to managers for decision-making (BRASIL, 2000).

Studies by Monteiro, Pereira, and Pereira (2014, p.37) indicate 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) needed to adapt to keep up with the changes and demands of society, to provide 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 to render accounts”, or even the “capacity to be transparent” (Araújo, 2002). Cumbe and Inácio (2018), in turn, argue that the

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definition of accountability is quite flexible and often difficult to understand, with understandings that change according to current 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 an ongoing process.

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

For Bairral, Silva, and Alves (2015), public transparency begins to expand beyond the legal/fiscal line and begins to address other aspects of public management (performance, personnel, internal controls, etc.). This expansion brings new requirements for public accountability, via control bodies, which begin to assess whether public information is effectively accessible to citizens, whether via fiscal 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 using a pyramid and described starting from the base: access to information must be guaranteed, the quality of information must be assured, thus allowing the transparency necessary to comply with 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, learn from this same data, and use this learning to mimic specific tasks or processes similar to human knowledge. It is divided into two categories: narrow (or weak) AI, which is designed to perform a specific task, and general (or strong) AI, which has a broad cognitive capacity similar to that of humans (Russell & Norvig, 2013). Studies by Violante and Andrade (2022) considered AI relevant, namely in factors such as faster information processing and cost reduction, improving production factors, in improving 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 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, were excluded from the scope of this work.

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Once this propaedeutic phase, which addressed the theoretical aspects involved in the topic, was investigated how the integration of artificial intelligence (AI) in the public sector is occurring, investigating the challenges of this technology in promoting government accountability and transparency. Recent studies discuss how AI can optimize administrative efficiency, prevent bad practices, and democratize access to information. Below, you can check the state of the art that supported this research, through the analysis of the proposed framework, which summarizes the contributions and main results obtained by three scientific articles that explore these themes, highlighting approaches applied in Brazil, Spain, and Mexico.

Article/Author	Contribution	Key Findings
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** Explores how AI can transform public administration in Brazil, highlighting opportunities to enhance efficiency and transparency in services. Analyzes ethical, legal, and technological barriers hindering integration.	Effective AI implementation requires substantial investments in technological infrastructure and public servant training. Proposes the creation of a robust legal framework and ethical policies to ensure responsible AI adoption. Suggests benchmarking with international practices to improve governance and Brazilian legislation.
ARTIFICIAL INTELLIGENCE FOR PUBLIC TRANSPARENCY: The Early Warning System (SALER) of the Generalitat Valenciana Author: Alfonso Puncel Chornet	**SALER: Early Warning System** Describes the development of the SALER System, which uses AI to detect administrative misconduct, such as fraud and corruption, in advance. Emphasizes the importance of prevention and transparency in public management.	SALER employs sophisticated algorithms to generate real-time alerts, aiding in risk anticipation. The article highlights the need for multidisciplinary collaboration and stresses the importance of maintaining human oversight to prevent reliance on unchecked automated decisions. It also underscores that transparent disclosure of algorithms strengthens public trust in the system.
Transparency and Artificial Intelligence: A New Perspective Author: Mauricio Rivera Eisenmann	**AI for Transparency in Mexico** 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 public information access process, making it more inclusive, especially for individuals without specialized knowledge. The study also addresses cultural and bureaucratic resistance to change, emphasizing the need for a new transparency culture among public servants.

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

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METHODOLOGICAL PROCEDURES

The main purpose of this study is to investigate, analyze, and describe information regarding the perception of professionals working with public accounting and information technology, within the scope of the State Public Administration, on the use of artificial intelligence (AI) in the process of disclosing accounting information, to promote accountability and public transparency, also verifying the existence of an adequate technological structure and human resources necessary for the implementation of AI and finally identifying the possible application of any of these intelligences at the state level.

To prepare the reader for the topic, 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 public manager's duty to render accounts - accountability - and the need to disclose accounting information of federated entities for public transparency.

The aim was to discover what the literature indicates as the practical use of AI in accountability and public transparency processes. Then, through the application of questionnaires addressed to 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 disclosing accounting information that needs to be made available.

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

To collect the primary data, a questionnaire was applied to professionals who work in the area of public accounting and information technology within the agencies of the State of Maranhão. This research is classified, in terms of approach, as qualitative and quantitative; in terms of its nature, it is basic and in terms of its objectives, it is exploratory. In terms of technical procedures, this is characterized as bibliographical research and also a field study, since it uses questionnaires to collect the data necessary to carry out the study.

The target audience for this study comprises professionals who work in the area discussed in this work. It was considered that civil servants who work with public accounting

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and information technology in the State Public Administration (Executive, Legislative and Judiciary Branches, Public Prosecutor's Office, Public Defender's Office and State Audit Court) would be in the best position to contribute to the research, since they have knowledge and experience that contribute to the success of the project.

ANALYSIS AND DISCUSSION

The research 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 summarize the ideas of the categories summarized in: Knowledge, Use and Mastery, 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 can be inferred that:

Of the employees surveyed, only 1 (1.5%) defined their level of knowledge about the use of AI as excellent, with 30 (44.1%) considering it good, 29 (42.6%) average, and 8 (11.8%) poor. Surprisingly, it was shown that 86.8% of professionals understand that knowledge of AI is important for the performance of their current role.

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

Another piece of data that reinforces this statement is that when asked about how important AI would be for the performance of their current role, 32.4% said it was very important and 54.4% considered 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% said they were somewhat familiar.

It is worth noting that 48.5% of The interviewees stated that they already use AI in two activities, independently, while only 5.9% reported using it through integrated systems of their respective institutions. On the other hand, 44.1% responded that they do not use AI at all.

It can be inferred from the data collected that despite the proven presence of AI in the daily lives of the interviewees, as well as the importance they consider the subject, the lack

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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 almost 90% of the interviewees believe that AI can detect patterns, anomalies, and lack of information in public data, indicating this condition to the public manager. In other words, 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 correcting that inconsistency. The result obtained is consistent 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 research showed more distributed results. When asked about the sufficiency of the technological structure available in their respective institutions, the results obtained were that 21.2% considered the structure available in their organization to be sufficient; 43.9% considered it insufficient and 34.8% did not know how to say.

Regarding the existence of teams or professionals capable of developing and maintaining AI systems in their organizations, only a tiny percentage (2.9%) stated that their institutions had enough 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 mainly by more attractive salaries than those paid by the public sector. These data demonstrate that the implementation of AI requires the necessary qualification and recruitment of professionals who are technically qualified to develop and maintain these technologies.

In addition, 92.6% of respondents state that AI can serve as a tool capable of facilitating the disclosure of information for accountability and public transparency, while 95.6% consider the cost of implementing it to be an investment.

When asked about the use of AI in their organizations, 52.9% of respondents reported that their entities do not yet use it, and 33.8% reported not knowing how to do so. However, 13.2% report that their institutions already use some form of AI, identifying the following: a) Robots for screening processes; b) robots for enforcing court orders; c) Jussara, which facilitates access to useful information and links from the State; d) GPT Chat linked to the StartGov system; and f) use of AI to classify documents according to their textual content.

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RESULTS

It is important to note, however, that the research concluded that, in the state of Maranhão, there is still no institutional use of AI systems in public accounting, especially regarding 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 possible to develop a tool similar to that highlighted 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, responsible for carrying out General Inspection of Services related to public transparency.

In Mexico, the National Transparency Platform already uses chatbots to promote public transparency and, consequently, accountability. The author Mauricio Rivera Eisenmann (2020), in an article entitled "Transparencia e Inteligencia Artificial: una nueva perspectiva".

The results of the research 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 initially, 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 The data show that AI can bring greater efficiency and reliability to processes, but its application is still in its infancy. The research revealed that accounting professionals, although they use AI in their daily lives, lack technical knowledge about its applications in public accounting. The need for investment 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 with Jussara and process screening robots, these are not directly related to use in public accounting or 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

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information, which can increase the efficiency and accuracy of government accounting. Additionally, 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.

The State of Maranhão must invest 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 this 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 in understanding 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. During the work, some limitations were encountered that made the path more tortuous, such as the lack of a broader bibliography on the subject and the difficulty in obtaining responses from the institutions surveyed, which, for unknown reasons, did not seem comfortable responding to the survey.

Given the above, it is considered that the results obtained were positive and the objectives achieved. Recognizing the limitations of this study, we suggest that future research use this same analysis system considering a larger sample, as well as extrapolation to the national and international scenario, 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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