
IS HALF A WORD ENOUGH FOR A GOOD CONNOISSEUR? READABILITY OF MANAGEMENT REPORTS OF FEDERAL INSTITUTIONS

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ABSTRACT

This paper verify how the perspective of federal public institutions on having their accounts judged by the Brazilian Federal Court of Accounts (TCU) can impact the readability of Management Reports. For this, an extensive dataset of 3,720 reports from 930 institutions between the financial years 2016 and 2019 was meticulously analyzed. Readability was calculated using the Flesch index, and other tests were performed, such as tests of means, measures of relationship by correlation, calculation of multiple linear regression, and quantile regression. The results, considering Communication Theory, are robust: readability is different between institutions with judged accounts and over time. The metric worsens over time, and significant differences were found between the readability of the judged and non-judged reports, indicating a negative relationship between the readability of the reports and the achievement of their judgment by TCU. These findings support the need to explore the linguistic characteristics of corporate disclosures to assess the usability and quality of the reports disclosed and as a form of accountability to stakeholders.

Keywords: Readability. Management Reports. Enforcement. Judgment of accounts. Integrated Reporting.

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PRA BOM ENTENDEDOR, MEIA PALAVRA BASTA? LEGIBILIDADE DOS RELATÓRIOS DE GESTÃO DAS INSTITUIÇÕES FEDERAIS

RESUMO

O objetivo da pesquisa foi analisar como a perspectiva das instituições públicas federais sobre ter suas contas julgadas pelo Tribunal de Contas da União (TCU) pode impactar na legibilidade dos Relatórios de Gestão. Para isso, foram analisados 3.720 relatórios, emitidos por 930 instituições, entre os exercícios financeiros de 2016 a 2019. A legibilidade foi calculada a partir do índice de Flesch, e outros testes foram realizados, como testes de médias, medidas de relacionamento por correlação, cálculo de regressão linear múltipla e regressão quantílica. Os resultados, discutidos à luz da Teoria da Comunicação, apontam que a legibilidade é diferente entre instituições com contas julgadas e ao longo do tempo: a métrica piora com o tempo, e foram encontradas diferenças significativas entre a legibilidade dos relatórios julgados e não julgados, indicando relação negativa entre a legibilidade dos relatórios e a realização de seu julgamento pelo TCU. Os achados reforçam a necessidade de explorar as características lexicais das divulgações corporativas, como sendo uma forma de avaliação da usabilidade e qualidade dos relatórios divulgados como forma de prestação de contas com os interessados.

Palavras-Chave: Legibilidade. Relatórios de Gestão. *Enforcement*. Contas Julgadas. Relato Integrado.

1 INTRODUCTION

The accountability of Brazilian federal public institutions is a constitutionally established obligation. The Federal Court of Accounts (TCU) is given the responsibility for standardizing the process as well as making a judgment on the reports presented (Constitution of the Federative Republic of Brazil, 1988 – "*Constituição da República Federativa do Brasil de 1988*"; Law No. 8,443, 1992 – "*Lei nº 8.443, de 16 de julho de 1992*"). The main document of the process is the Management Report, in which managers report on the use of public resources throughout the year, delivered annually (Law No. 8,443, 1992; Normative Instruction - TCU No. 84, 2020 – "*Instrução Normativa - TCU nº 84, de 22 de abril de 2020*").

The Management Report functions as a state enforcement mechanism vis-à-vis its institutions, a measure to ensure that the law is obeyed (Oliveira, 2015). Furthermore, this mechanism is necessary to comply with fiscal rules (Law No. 101, 2000 – "*Lei Complementar n.º 101 de 04 de maio de 2000*"), and the TCU's judgment of the reports constitutes an important element for monitoring budgetary actions and their execution.

Not all organizations undergo the TCU's judgment: Normative Instruction No. 63 – "*Instrução Normativa - TCU nº 63, de 1º de setembro de 2010*") in force until 2020, provided that, annually, the Federal Court of Accounts would list the institutions to be judged, chosen by the body before the actual delivery of the Management report. In other words, all institutions must submit their reports to the TCU. However, previously, they already knew whether their accounts would be effectively judged by the court (Normative Instruction – TCU no. 63, 2010).

Since the 2018 financial year, TCU has adopted the Integrated Reporting (IR) approach as a structure for presenting the Management Report (Normative Decision – TCU no. 170, 2018 – "*Decisão Normativa – TCU nº 170, de 19 de setembro de 2018*") to increase transparency, credibility, and the usefulness of public accounts (Normative Instruction - TCU no. 84, 2020). The court points to the initiative as a modernization of control instruments, aiming to facilitate mechanisms that allow social control to operate (Normative Instruction - TCU no. 84, 2020).

Integrated Reporting is a reporting approach that aims to report financial and non-financial information connected to provide a holistic view of the institution (VRF, 2021). Despite emerging in the private sector, its framework also highlights its applicability to the public sector through adjustments (Caruana & Grech, 2019; VRF, 2021).

From the point of view of the impact of the application on organizations, previous literature (e.g., Cahan et al., 2015) identifies that, as well as organizational characteristics, the issues of the environment in which they are inserted, such as perception of legal enforcement and commitment, impact in corporate disclosure. In the literature on IR in the private sector, the results demonstrate that contrary to what was intended with the use of the approach, the reports have low readability, especially in countries that value transparency or establish it on a mandatory basis (Du Toit, 2017; Stone & Lodhia, 2019).

According to the guidance booklet for preparing the IR, despite listing the information necessary to evaluate how organizations position themselves in the pursuit of their results, it is the institution's responsibility to determine materiality and how the data will be reported (Normative Decision – TCU no. 170, 2018); In Brazil, the preparation of this type of document in the public sector leaves room for discretion, despite its direction via normative decision (Normative Decision – TCU nº 170, 2018; TCU, 2018). Communication Theory supports the study, as it considers the transmission of information as a communicative process that takes place through the integral transmission of the message (Bedford & Baladouni, 1962). Among the possibilities of analysis based on theory, the work concentrates on the semantic aspect (Li, 1963) through the study of readability.

Readability is a mathematical formula that analyzes the text's syntactic structure, centered on its content, based on its construction (Ferri et al., 2023; Velte, 2023). Du Toit (2017) demonstrates that it can be seen as an approximation of comprehensibility. Velte (2023) points out that the objectivity of the measurement and the resulting reduction in bias are positive points of the method. Thus, readability is observed as an element that highlights nuances of message transmission in the communicative process.

From the perspective that understanding comes from processing and is impacted by the readability of information (Stahl, 2003), and considering the evidence in the literature regarding the possible impacts of legal obligations on readability, the research problem arises: How does the judgment made by the TCU, previously informed to the institutions, impact the readability of the Management Reports? Therefore, this research aims to analyze how the perspective of institutions on having their accounts judged by the TCU can affect the readability of Management Reports.

Other papers have analyzed the experience of IR in the public sector but point out that there are still many questions to be researched, considering the particularities arising from its use in other institutional contexts (Montesino & Brusca, 2019; Vitolla et al., 2019; Nicolo et al., 2020). Furthermore, research that deals with this Brazilian experience, from the perspective of dissemination, is concentrated in specific sectors, such as state-owned companies (e.g., Faria et al., 2023; Favato et al., 2020), public universities (e.g., Ribeiro et al., 2024) and Professional Councils (e.g., Freitas & Freire, 2017; Kallenbach et al., 2022).

Furthermore, none of them address the possible noise that the fact that the institution knows in advance whether the TCU will judge its report may cause in its construction. Other works focusing on the topic indicate the need to expand research (e.g., Ribeiro et al., 2020; Costa et al., 2022). Furthermore, accountability is vital, and users' understanding of reports is fundamental to fulfilling accountability (Cohen et al., 2022).

In this way, the research is justified by analyzing the readability of management reports, considering their availability, and focusing on possible impacts on the readability of Management Reports, resulting from the institution's awareness regarding the judgment of the TCU. Thus, the research offers a theoretical contribution, as it discusses, in the light of Communication Theory, the possible noise arising from the legal obligation to present and judge reports. In particular, the evidence contributes to discussing the literature on accountability and IR in the public sector.

Furthermore, the research makes a practical contribution by providing information to report preparers in institutions. This diagnosis can help them prepare documents to understand how they have presented themselves in terms of readability compared to what they are intended to do—that is, to be readable. Finally, the work also contributes to society, as it helps to improve this accountability instrument, helping the Brazilian population, its primary recipient, to read it and thus exercise its role of social control.

This paper consists of this introduction and then the theoretical framework. Then, the methodological procedures are explained, followed by the presentation and discussion of results. A complementary robustness analysis is constructed, and the final considerations section completes the proposed discussion.

2 THEORETICAL FRAMEWORK

2.1 Management Report, Integrated Report, and Accountability

According to the TCU Organic Law, public sector entities judge the Management Report (Law No. 8,443, 1992) in the accountability process. This document allows systemic observation of the body's performance during the financial year and must cover all resources managers receive to carry out accountability (Normative Instruction—TCU no. 84, 2020).

For some years, the TCU has been outlining strategies to improve accountability and financial auditing processes to make them more transparent, credible, and useful (Normative Instruction - TCU no. 84, 2020). A significant advance was the adoption of digital resources in 2015 by implementing the e-Contas system so that entities could provide information digitally (TCU, 2020a). Thus, accountability in the years covering this study followed the flow in which Account Presenting Units (APUs) submitted their Management Reports via the Internet on the e-Contas portal for judgment by the Court (TCU, 2020b). Thus, accountability in the years covering this study followed the flow in which Account Presenting Units (APUs) submitted their Management Reports via the Internet on the e-Contas portal for judgment by the Court (TCU, 2020b).

During the period analyzed by the research, accountability was regulated by Normative Instruction (NI) No. 63 (2010), which established that, annually, it was up to the TCU to publish the list of organizations to be judged, chosen by the court. Thus, everyone submitted their reports through the e-Contas portal, but only a few had their documents evaluated and knew in advance whether they would be approved.

Since 2018, the TCU's Normative Decision (ND) No. 170/2018 implemented IR as the approach to be used in the Management Report, under the justification of breaking with the technical model with which public entities were accountable (Normative Decision – TCU no. 170, 2018; According to the Value Reporting Foundation (VRF, 2021), reports that use the IR approach present organizations' information in an integrated manner, the objective of which is to communicate about the entity's value generation over time.

In this sense, the initiative is intended to make the annual accountability process more efficient and effective and contribute to improving public administration, making it more accountable (TCU, 2018). This research contributes to verifying whether this occurred, analyzing textual readability before and after the adoption of the IR. The discussion about accountability in the public sector is extensive and applied to different perspectives (e.g., Kaur & Lodhia, 2019; Grossi et al., 2020; Porumbesco et al., 2021) but the literature does not present a consensus on the definition of accountability term. This work starts from the definition of accountability as a mechanism that holds politicians and bureaucrats accountable, forcing them to provide transparent accounts in sufficient quantity to allow society to evaluate them and, when necessary, punish them (Pinho & Sacramento, 2009).

Accountability is essential as environments committed to accountability inspire more confidence in the integrity of the conduct of public servants (Caruana & Kowalczyk, 2020). Thus, governments are encouraged to function more efficiently, effectively, and economically (Caruana & Kowalczyk, 2020).

However, simply making public information available to society does not guarantee understanding of what is provided if the instrument through which the information is made available is not structured to guarantee understanding by those for whom it is intended (Zucolotto & Teixeira, 2014). From the point of view of information readability, how the information is disclosed and to whom it is disclosed may even influence greater ease or complexity of disclosure (Gosselin et al., 2021).

2.2 Communication and Accounting Theory

Communication Theory was born in the field of telecommunications, and its application in accounting was seminally discussed by Bedford and Baladouni (1962), who pointed out that accounting information is a message, and its transmission is a communicative process. This process is only effective when the message is fully transmitted which can be interpreted entirely (Bedford & Baladouni, 1962). Li (1963) points out that three types of analysis are possible considering this theory: Technical, Semantic, and Effectiveness Aspect. This work addresses the second point, which focuses on the information's content.

Dias and Nakagawa (2001) argue that accounting's basic function is to communicate and that its mission is to recognize, measure, and communicate events capable of affecting an entity's assets. Killian (2010) argues that accounting is a communicative process based on business language.

Even so, communication hardly ever occurs since noise can affect information (Bedford & Baladouni, 1962), which is characterized by elements that can interfere with the quality of the message (Bedford & Baladouni, 1962). Along these lines, one of the possible noise producers is the emitters, who influence the transmission and content of the message (Dias & Nakagawa, 2001).

The literature indicates that efficient communication is essential to achieving user understanding and effective communication (Jones & Smith, 2014). One way to measure this efficiency is the information the individual can assimilate (Dias, 2000), opening space for discussion about textual attributes, such as readability.

Readability is a mathematical formula focused on constructing the text and its syntactic structure (Souza et al., 2019). In this context, the analysis of readability is related to syntactic complexity, based on the length of words (measured in the number of syllables) and the length of sentences (measured through the number of words) (Stone & Lodhia, 2019).

2.3 Previous studies

The need for public information to be interpreted to fulfill accountability is basic to support dialogue between citizens and public administration (Cohen et al., 2022). The literature points out that success in the communicative process is directly related to the readability of information (Souza et al., 2019), and its increase has been associated with improving the quality of reports (Velte, 2023).

In the field of sustainability-related reports, previous work demonstrates that the lower readability of these reports may be associated with an overload of information to obscure poor performance in certain areas (Wang et al., 2018). Although hypotheses related to management obfuscation are commonly associated with the private sector, their applicability is also indicated as adaptable to the public sector (Ferri et al., 2023).

Regarding the readability of IR in the private sector, Roman, Mocanu & Hoinaru (2019) demonstrated that countries that value transparency present less readable reports. In line with Ferri, Manes-Rossi & Zampella (2023), Roman, Mocanu & Hoinaru (2019) argue that this result may derive from the fact that, in environments with greater transparency, there tends to be a greater amount of information provided, affecting the readability.

Other recent works also show that contrary to expectations, the readability of reports produced using the IR approach is low (e.g., Raimo et al., 2021; Stone & Lodhia, 2019 & Velte, 2023). Evidence shows that this low readability is recurrently found in environments with mandatory delivery due to information overload (Stone & Lodhia, 2019).

Furthermore, Du Toit (2017) demonstrated a correlation between the perception of the quality of companies listed on the Johannesburg Stock Exchange, South Africa, where IR is mandatory, and their low readability. In other words, companies identified as having better quality IR, according to a large auditing company, also had more complex reports to read (Du Toit, 2017).

2.4 Formulation of Hypotheses

Bovens (2007) understands accountability as an institutional relationship mechanism in which a participant, called an "actor," must explain himself and respond to a forum about his conduct. Bovens, Schillemans and Hart (2008) point out that the learning component results from accountability. For them, the intended return of the accountability mechanism is to increase the efficiency of those accountable based on learning about the needs and interests of those they address (Bovens et al., 2008).

In the case of the Management Report, which is delivered annually, reasoning allows us to assume that, as the years pass, there is an improvement in the structuring of this in the institutions since the actors involved learn how to do it. Furthermore, considering IR's membership, the report is expected to improve over the years. In this way, the first research hypothesis was formulated:

H1: The readability of Management Reports from federal institutions increased after adhesion to Integrated Reporting.

Zeng (2019) demonstrates that legal and institutional systems positively affect institutional communication, especially regarding transparency in information disclosure. The literature also indicates that legal enforcement mechanisms can affect corporate disclosure (e.g., Cahan et al., 2015). Given its

conceptual multiplicity, enforcement is treated in this work as the mechanisms associated with control initiatives that act on the organization and produce effects on it (Jia et al., 2009).

Regarding the relationship between enforcement and accountability, Schedler (1999) explains that the accountability process involves stages of information and justification associated with the person responsible and the punishment stage, which encompasses the enforcement capacity, that is, the application of penalties in response to non-compliance with standards. In this sense, the literature points out that the absence of supervision or effective investigation makes it more difficult to apply sanctions to those who disobey the law (Power & Taylor, 2001).

Leuz, Nanda and Wysocki (2007) demonstrate that countries that are more committed to applying enforcement mechanisms affect how institutions respond to legal and voluntary obligations. Previous studies indicate that institutions in strong law enforcement contexts are more committed to ethical behavior (Chih et al., 2010; Leuz et al., 2007).

Thus, from the literature, the legal obligation to provide annual accounts to the TCU is understood as an enforcement mechanism. Despite this, the fact that the effective assessment of the reports delivered by the court occurs only in some previously chosen documents, under the knowledge of the institution that reports, can generate different effects than those caused in institutions that already know in advance that they will not be analyzed. In this way, the second research hypothesis was formulated:

H2: The Management Reports of judged institutions are more readable than those of institutions that are not judged.

Until the 2017 financial year, the Management Report was an extensive document in terms of its number of pages. The Ministry of Finance, a participant in the pilot project in 2017, pointed out in a subsequent analysis that the reduction in the number of pages was different from the introduction of the IR, indicating a tendency towards smaller reports (TCU, 2018). In the literature, Oprisor, Tiron-Tudor and Nistor (2016) point out that IR causes the creation of clear and concise information, serving as an accountability tool.

Also, the IR framework guides that preparing reports takes conciseness as a basic principle (VRF, 2021); this is corroborated by the TCU, which highlights the importance of management reports being concise documents (TCU, 2018). In Normative Decision No. 170 (2018), the court defines concise reports as using only the space necessary to convey the intended messages. In conjunction with the

learning component presented by Bovens, Schillemans and Hart (2008), the research formulated its third hypothesis:

H3: More concise Management Reports have greater readability.

3 METHODOLOGICAL PROCEDURES

The annual Management Reports analyzed were issued in the federal public sector between 2016 and 2019. As the reports are delivered in the following year to which they refer, the analysis included the reports delivered to the TCU between 2017 and 2020 and were available on the aforementioned court's website. The subsequent period was not included due to the change in the delivery procedure, which would affect comparability between the periods analyzed. The starting year of the sample, 2016, was chosen so that the same number of years analyzed after joining the IR, that is, two years, was examined before joining it. Thus, the sample comprises two years before accession, 2016 and 2017, and two years after, 2018 and 2019.

In 2021, in the reporting for the year 2020, Normative Instruction No. 84/2020 revoked NI No. 63/2010, which was in force until 2019, bringing significant changes. From this exercise, only the most relevant organizations regarding materiality in the Union's General Balance Sheet began to have their accounts judged, and they were obliged to send their reports to the TCU for judgment (Normative Instruction—TCU no. 84, 2020).

In this way, the APUs now must only make the Management Report for the 2020 financial year available on their electronic portals, without having to present them to the TCU if they are not on the list listed by the body for the judgment of accounts (Normative Instruction - TCU No. 84, 2020). Therefore, it should be noted that the sample period studied runs until 2019, with reports delivered in 2020. Similarly, the regulations in force at the time, NI no. 63/2010, were considered for analysis. Therefore, the research did not consider reports delivered after issuing the new standard.

The list of Accounting Units to be judged is made available in advance and subject to updates, all before the presentation period to the entity that will carry out the judgment. For example, through Normative Decision 180, published on December 11, 2019 (*Decisão Normativa – TCU nº 180, de 11 de dezembro de 2019*), the list of account providers and all technical and structural aspects, such as form, term, and related content. Figure 1 summarizes how the process happens:

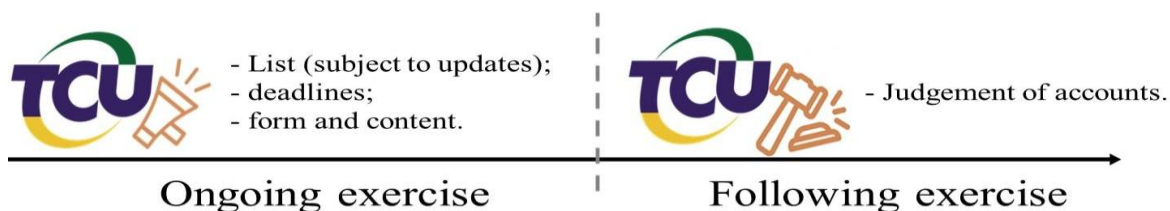


Figure 1– Summary of the process between disclosure and judgment of Accounting Units.
 Note: The figure shows that the entity that will be judged is aware that it will pass judgment in the still ongoing year but will present the report the following year when the trial will be held.
 Source: Prepared by the authors.

The reports were extracted between January and September 2021, using the Simple Mass Downloader browser extension on the documents, obtaining 4,783 reports. Of this total, 672 reports were excluded due to the lack of temporal comparability due to the extinction, creation, or aggregation of institutions. Some units that had reports that were not available were also excluded, which resulted in the exclusion of a further 27 documents. Another 364 reports were excluded because they were in image format, which did not allow processing. The analysis included 3,720 reports and 930 papers per year, corresponding to 80% of the initial documents.

Several metrics, such as the Flesch, Fog and Smog index, can be used to perform readability analysis. However, to construct this research, the Flesch index (1948) was used due to its precision and simplicity (Dubay, 2007; Velte, 2023) and because it is the most used formula in these types of research, increasing the comparability of results (Férrandez, 2013; Velte, 2023). Furthermore, it was found that the Flesch index is the most suitable for specialized narrative texts, such as Management Reports (Holtz & Santos, 2020; Borges & Rech, 2019; Moreno & Casasola, 2016).

Although the Flesch index was developed for English-language texts, Martins et al. (1996) also verified a satisfactory metric performance in Portuguese texts. The expression used in the search is as follows:

$$FLESCH = 206,835 - 1,015 \times ASL - 84,6 \times ASW \quad (1)$$

ASL is the average sentence length resulting from dividing the number of words by the number of sentences in a document. ASW is the average size of each word, obtained by dividing the number of syllables by the number of words. The proposal is that texts with long sentences are more difficult for the reader, measuring syntactic difficulty like longer words, which would measure semantic difficulty. The Flesch index varies between zero and 100, with the lower the score, the lower the readability.

Counting words, syllables, and sentences was carried out with the help of the R Project for Statistical Computing, with the help of the "RStudio" v.1.4.1103 interface, reading page by page. Given the purpose of the research and the expression of readability, the reports' tables, charts, and images were not analyzed. The package used was "readability" (Rinker, 2018), which operationalizes

the extraction of each word from a corpus of documents as a token, and based on the size of the words, the syllables are divided.

After calculating readability and satisfying the research objective, an analysis of the main descriptive statistics was carried out, in addition to carrying out average tests, relationship measures by correlation, and calculation of multiple linear regression, using the following model:

$$FLESCH = \alpha + \beta_1 \text{ YEAR} + \beta_2 \text{ JUDGED} + \beta_3 \text{ PAGE} + \varepsilon \quad (2)$$

Where: YEAR corresponds to the reference year; JUDGED is the binary variable, assuming 1 for the accounts that were judged and zero for the others; and PAGE corresponds to the number of pages in the report, which approximates the complexity of the body.

The sign of β_1 was expected to be positive since each entity's learning curve can lead to better reports over time. However, due to the high similarity between reports over the years, the value of the coefficient may not be significant. Or it is admissible for the coefficient to be negative since, over time, organizations that report information may become more complex and present more complex reports to read.

Knowing that your account will be judged, the entity will be able to make a greater effort in producing its report, which could improve quality and readability. Because of this, it is believed that the sign of β_2 will be positive, indicating that the possibility of judgment can be an inducer of quality. Concerning β_3 , it is possible to imagine that an entity with a greater number of pages, approximating the complexity of its performance, may have less readability.

The main tests related to regression models were carried out to obtain consistency in the results presented. These included checking collinearity, normality of residuals, the Chow test, and heteroscedasticity. As a decision criterion, as is common in the area, a significance of 5% was used.

The following section presents the data obtained and an analysis thereof. For robustness, after operationalizing the multiple linear regression model, quantile regressions were performed, where the sample is subdivided into quantiles. This results in the relationship between the predictors in different percentiles specific to the sample, for example, in the median, the lower tail, and the upper legibility distribution.

4 PRESENTATION AND ANALYSIS OF RESULTS

The average readability of the analyzed reports was 48.69, influenced by an average length of almost nine words per sentence and 1,762 syllables per word (Table 1). It is possible to observe that this readability is getting worse over time: from 51.95 in 2016, the Flesch index fell to 45.5 in 2019, with a t-statistic in the mean difference test of 12.7618, indicating different average values.

The data suggest that this reduced readability occurred due to increased words per sentence (ASL in equation 1). In fact, from an ASL value of 8.001 in 2016, the number of words per sentence rose to 10.12, on average, in 2019. There was also a reduction in median readability.

It is important to highlight that the dispersion of values, measured by standard deviation, was reduced in the period following the decrease in the average. This result rejects hypothesis 1, which assumes that the readability of federal institutions' management reports increased after adherence to Integrated Reporting.

Table 1
Readability descriptive statistics

	Average	Median	S.D	Minimum	Maximum
Total					
Readability	48,69	46,83	10,68	18,35	99,09
ASL	8,982	9,459	4,36	0,001801	70,9
ASW	1,762	1,779	0,1017	1	2,227
2016					
Readability	51,95	50,09	11,18	18,38	99,09
ASL	8,001	8,095	4,381	0,001801	70,9
ASW	1,735	1,758	0,114	1	2,227
2017					
Readability	50,32	48,38	10,61	20,08	97,84
ASL	8,384	8,71	4,14	0,007395	50,15
ASW	1,75	1,768	0,1067	1	2,13
2018					
Readability	46,98	45,47	9,9	18,35	92,24
ASL	9,425	9,88	4,129	0,005089	23,26
ASW	1,777	1,789	0,08641	1,353	2,129
2019					
Readability	45,5	43,78	9,716	25,07	91,54
ASL	10,12	10,65	4,461	0,01088	63,9
ASW	1,786	1,798	0,08865	1,088	2,071
Judged (455)					
Readability	46,26	44,32	9,175	27,75	98,43
ASL	9,965	10,75	4,181	0,006861	23,09
ASW	1,778	1,794	0,09288	1,023	2
Non-Judged (3265)					
Readability	49,02	47,3	10,83	18,35	99,09
ASL	8,845	9,179	4,367	0,001801	70,9
ASW	1,759	1,776	0,1026	1	2,227

Source: Research data.

Table 1 also presents the descriptive statistics of the reports separated into two large groups: those that were subject to judgment by the Federal Court of Accounts and the other reports that were not subject to judgment. The number of cases judged was 455, while 3265 were not judged, corresponding to 12% and 88% of the cases in order. The judged cases had worse readability, resulting from a larger word size per sentence (ASL) and more syllables per larger word. All differences were significant in a two-mean

difference test: t-statistics of 5.18, 5.15, and 3.74. In other words, the judged reports had worse readability, contrary to what was expected.

However, the mean test or the descriptive statistics analysis does not guarantee a difference in readability in the judged accounts concerning the non-judged accounts. One of the reasons is that the number of accounts judged varied over the years, as seen in Table 2.

Table 2
Distribution of judged and non-judged accounts

Year	2016	2017	2018	2019	Total
Non-Judged	766	775	852	872	3265
Judged	164	155	78	58	455

Source: Research data.

It is possible to observe that the most recent years were also those in which readability worsened and, at the same time, the number of judged accounts reduced, which could be another indication that the judgment affects readability. By analyzing the relationship between readability and judgment, the correlation result indicates a significant and negative relationship, although weak, of 8% (0.0847), reinforcing the evidence found in the descriptive analysis.

The regression model was initially used, with readability as the dependent variable. It is expected that part of the readability performance is due to the existence or absence of the account judgment. In addition to the year, the number of pages in the report was also considered, which can be a proxy for the complexity of the agency's actions. In short, readability would be a function of the year, the number of pages, and whether the account was judged, the latter being a binary variable. The regression result is shown in Table 3 below.

Table 3
Linear regression

	Coefficient	t ratio	p-value
Constant	52,1898	125,6	<0,001
YEAR	-2,36119	-15,09	<0,001
JUDGED	-4,27455	-7,933	<0,001
PAGE	0,0040565	2,21	0,0271
R2	0,072264		
Fc	96,48339		

Note: Dependent variable = FLESCH

Source: Research data.

It is possible to note that the fact that the entity has its account judged affects the report's readability. But contrary to hypothesis 2, which assumes that the Management Reports of judged institutions are more readable than institutions that are not judged, the sign is negative since the angular coefficient obtained for the JUDGED variable is negative (-4.27) and significant (p-value below 0.001); this

indicates that having the accounts judged tends to reduce the quality of the report, measured by the readability of the Flesch index.

This result is consistent with the test of the difference between two means previously reported, where the Flesch index for the 455 reports judged was 46.26, below the average of 49.02 for the 3265 reports. A possible explanation for this value, obtained in the research, is that the supervised entity uses the textual language as a strategy mechanism to reduce the chances of a question through a more complex text.

The year variable also presented a negative angular coefficient, opposite to what was expected. Thus, instead of learning, where the passage of time could improve textual quality, each year resulted in a reduction in the Flesch index of 2.36. When complementing this information with the data in Table 1, it is possible to note that between 2017 and 2018, there was a substantial reduction in the Flesch index, from 50.32 to 46.98.

A possible explanation for this was the implementation of integrated reporting in the public sector, which brought something new to information preparers. However, this is, in a way, contradictory since one of the objectives of this report format is to improve the communication of information (Normative Decision – TCU no. 170, 2018; TCU, 2018); one of the ways is through textual readability, which did not occur.

To finalize the analysis of the regression result, the number of pages also produced an angular coefficient inverse to that expected since, based on hypothesis 3, it was expected that management Reports with a smaller number of pages would present greater readability. The findings, however, indicate that readability was lower in more concise reports, contrary to what was initially assumed by H3.

Table 4 summarizes the hypotheses developed and the results found.

Table 4

Hypotheses and research results

Hypothesis	Result
H1: The readability of Management Reports from federal institutions increased after adherence to Integrated Reporting.	Hypothesis rejected. The results indicate a drop in readability.
H2: The Management Reports of judged institutions are more readable than those of institutions that are not judged.	Hypothesis rejected. Reports from judged institutions are less readable than those that are not.
H3: More concise Management Reports have greater readability.	Hypothesis rejected. It was found that more concise documents had lower readability.

Source: Prepared by the authors.

Regarding hypothesis 1, the results contradict what was expected from previous literature, which points out that learning contributes to improving accountability (e.g., Bovens, Schillemans & Hart, 2008), as it demonstrates that the readability of reporting has declined over the years. As stated, an important element in the period analyzed was the introduction of IR as a structuring element

of the Management Report. Other studies also found low readability in documents produced using the approach (e.g., Raimo et al., 2021; Stone & Lodhia, 2019; Velte, 2023).

In this sense, a possible explanation for the findings is that, given that it is a legal process of accountability that involves efforts to enhance transparency, institutions may have attempted to provide more information in their duty to make it public. This explanation would be consistent with what has been presented in previous literature (e.g., Raimo et al., 2021; Stone & Lodhia, 2019).

When analyzing the data considering communication theory, noise in the communicative process can be seen. Thus, the drop in readability interferes with the complete transmission of the message, which, in this case, would be between public institutions and citizens. It should be noted, however, that, as raised by Cohen et al. (2022), for the accountability process to occur in public administration, the information must be provided in a way that allows users to understand it.

Concerning hypothesis 2, related to the difference in readability between institutions with judged reports and those not to the detriment of what was expected from previous results (e.g., Cahan et al., 2015; Zeng, 2019), the judged reports were less readable. In this way, it can be assumed that the interaction between enforcement and the possibility of legal punishment from the TCU judgment may generate adverse effects on the construction of reports.

A possible explanation for the results, in line with previous research (Ferri et al., 2023; Wang et al., 2018), is that there is, in the construction of the text, an attempt to obfuscate other information from performance and management, from message overload, which affects readability. Still, in the same way, as discussed above, regarding hypothesis 1, another explanation would be that, upon knowing that they would be judged, the institutions sought to explain themselves more in the available space, becoming less readable.

Finally, hypothesis 3, related to the conciseness of reports and improved readability, was also refuted. As conciseness is one of the principles of IR, the TCU recommends, in its booklet, the use of the smallest number of pages possible, even suggesting an ideal quantity - much smaller than what was commonly practiced until then (TCU, 2018). In this sense, in line with other analyses carried out, it is assumed that the attempt to convey fundamental information in the accountability process in a reduced space may have led to a greater number of words per sentence - as verified in the results found -, which in turn decreases readability.

Thus, regarding the aspects that influence readability, presented by Gosselin, Maux and Smaili (2021), the evidence obtained in the difference, association, and regression analysis tests reinforces that readability can be influenced by how the information is reported. In turn, this conclusion also makes sense from the perspective of noise produced in communication due to interference from the sender (Dias & Nakagawa, 2001).

5 COMPLEMENTARY AND ROBUSTNESS ANALYSIS

From the analysis carried out, two aspects stand out, which deserve a more in-depth analysis. The first is the influence of the period since the YEAR variable was relevant in the regression results (Table 3, previous). The second is whether the results differ between documents with reduced readability and documents with high readability. In other words, looking at the extremes of the data is interesting to check whether the conclusions obtained are valid.

For a more in-depth study to verify the influence of the temporal aspect, the sample was divided annually. The regression was obtained for each period, still with the Flesch index as the dependent variable and without the YEAR variable. For the second aspect, quantile regression was calculated using 25%, 50%, and 75% of the sample percentiles.

Table 5 presents the ordinary least squares expression results without the year variable. It is possible to notice some interesting results when the analysis is performed over time. The number of pages in the document became relevant in terms of the model after the introduction of integrated reporting. In this case, starting from 2018, verifying a direct relationship between the number of pages and readability is possible, which previously did not have significance. However, the effect caused by adding pages is relatively small since adding one page, on average, changes the readability indicator by 0.02.

From a practical point of view, this result corroborates the assumption that to explain better, more space must be used. However, the fact that more space is used does not greatly improve the quality of the analyzed report in terms of readability. However, the fact that the entity has its accounts judged remains an inverse factor concerning the Flesch index. Faced with the possibility of a more rigorous examination by the Federal Court of Accounts, the entity makes its text more complex. There is an exception in 2018, which was precisely the first year of the adoption of integrated reporting. The specific result for this year may be due to the standard's emphasis that reports should also focus on readability.

Table 5
Linear regression by year

	2016	2017	2018	2019
Constant	53,2355 (<0,001)	51,4326 (<0,001)	44,5779 (<0,001)	43,3042 (<0,001)
JUDGED	-4,22891 (<0,001)	-5,45984 (<0,001)	-1,81945 (0,1192)	-3,60789 (0,0061)
PAGE	-00325885 (0,3417)	-0,00127081 (0,6708)	0,0210253 (<0,001)	0,0233332 (<0,001)
R²	0,025067	0,038603	0,02495	0,026329
Fc	11,91718	18,61102	11,86036	12,5333

Note: Dependent variable = FLESCH; p-value in parentheses.

Source: Research data.

The second analysis was performed using quantile regression. The model is like equation (2), using 0.25, 0.50, and 0.75 (Table 6). It is possible to notice that the YEAR and JUDGED variables are consistent for the different readability levels, with results with negative and significant signs. However, in the case of the JUDGED

variable, the weight of this variable on readability is greater at higher values; this is noted by the value of the angular coefficient presenting a value, in modulus, greater for 0.75 than for 0.25.

Table 6
Quantile regression

	Tau	Coefficient	t ratio
Constant	0,25	43,29580	117,770
	0,50	50,97770	99,953
	0,75	59,06730	100,961
YEAR	0,25	-1,57060	-11,344
	0,50	-2,36893	-12,334
	0,75	-2,82770	-12,834
JUDGED	0,25	-2,01702	-4,232
	0,50	-4,09190	-6,188
	0,75	-6,19935	-8,173
PAGE	0,25	0,00555	3,417
	0,50	0,00089	0,395
	0,75	0,00012	0,046

Note: The p-values are all less than 0.001, except the last two, which correspond to 0.35 and 0.96.

Source: Research data.

The behavior of the coefficients for the PAGE variable was significant at 0.25, when readability is lower, but does not influence the dependent variable at 0.5 and 0.75. Thus, the significance obtained by this variable in the regression (see Table 3) arises from low readability reports. Therefore, the results found in the difference, association, and linear regression analysis tests continue to be reiterated from the point of view that the year/model and judgment are important for the readability of the reports, reiterating what was expected from previous literature (e.g., Gosselin, Maux & Smaili, 2021).

Figure 2 presents the angular coefficient's behavior for the research variable of interest, denoted as 'JULGADA,' using quantile regression based on the model from equation (2). The angular coefficient obtained with the ordinary least squares (OLS) method was -4.27, as shown in Table 3. Interestingly, the coefficient for the 0.25 quantile is higher than that for the 0.75 quantile (-2.07 versus -6.20, according to Table 6, in order).

Figure 2 reveals that the coefficient decreases as it analyzes documents with higher readability that have been judged. It's important to note that the negative sign warrants closer attention during analysis, especially since the best reports in terms of readability are more penalized in this aspect when subjected to judgment.

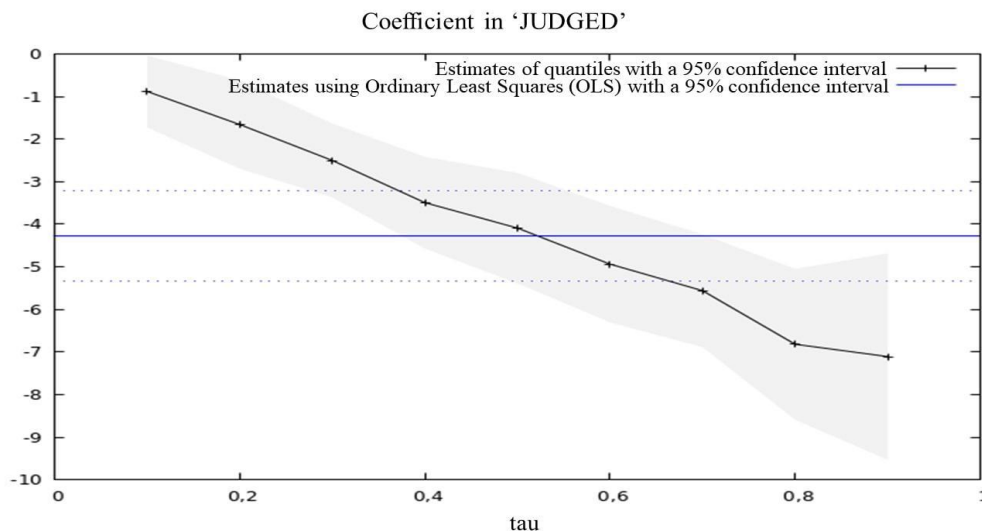


Figure 2 - Behavior of the coefficient related to the judgment by the TCU.

Note: The Figure demonstrates the evolution of the coefficient according to the sample quantile and the angular coefficient by least squares estimation.

Source: Research data.

In graphic terms, this is seen in Figure 2 through the dark line with a decreasing slope. The straight blue line corresponds to the angular coefficient obtained in the OLS of -4.27. The shadow that follows the line in the quantile indicates the confidence interval for each quantile calculated, where it is possible to notice that this range increases the greater the tau, as well as the coefficient, demonstrating that the greater the readability, the greater the difference between judged and not judged.

Finally, the regressions were calculated, modifying the dependent variable. Since the Flesch index depends on two variables, ASL and ASW, values for each were obtained and compared with the results obtained. The aim was to check whether any behavior related to sentence length and phrase length could affect the readability result. It is important to highlight that the analysis focused on the t-statistic and p-value since the variables studied have different scales, making it impossible to use the values of the angular coefficients.

The results are not presented here as a table, as they are like previously obtained values. Only exceptions and discrepancies found will be reported. In the regression obtained by expression (2), it is possible to see that the WORD variable was significant for the dependent variable ASL but presented significance, with a negative angular coefficient for ASW. In the latter case, quantile regression shows that the coefficient was negative and significant for a tau of 0.25 but inverse (positive and important) for a tau of 0.75. In other words, the two effects cancel each other out, making the WORD variable insignificant in the regression with ASW.

5 FINAL CONSIDERATIONS

The research analyzed how federal institutions' perspectives on having their accounts judged by the TCU can impact the readability of Management Reports. The results indicate that readability drops over the years analyzed, refuting the first

research hypothesis. Also, institutions with accounts judged by the TCU had lower readability than those that did not, contradicting the second research hypothesis. Finally, the results indicate that more concise documents have less readability, unlike what was expected in the third hypothesis.

Some possible explanations of the study findings were raised in the discussion. First, the drop in readability during the period in which IR is adhered to is in line with previous literature, which demonstrates lower readability in countries that promote greater transparency or institute the approach legally (Du Toit, 2017; Stone & Lodhia, 2019); this is because information overload can affect the construction of the text and reduce its readability.

Furthermore, the fact that institutions with adjudicated accounts present less readable reports may be related to attempts to obfuscate performance and management (Ferri et al., 2023; Wang et al., 2018). Another assumption is that knowing that their report would be judged, the institutions wrote more in the space they had.

Regarding the last hypothesis, the issue of information overload was again discussed. In addition, the recommendation of fewer pages than usual may have influenced the preparers, who sought to explain the same as before, but in fewer pages.

All discussions raised are also consistent with communication theory, as they represent noise capable of interfering with the construction of reports and the communicative process (Dias & Nakagawa, 2001). In this sense, noise also interferes with accountability by interfering with the communicative process (Cohen et al., 2022), a key aspect in the functioning of public administration.

Based on the evidence presented, this research reinforces the need to explore the linguistic characteristics of corporate and public disclosures to evaluate the usability and quality of published reports as a form of accountability. The findings indicate that, in addition to the change in format, it is important that reports become less nebulous to communicate information.

Future research can examine possible explanations for the event's occurrence, qualitatively analyzing the key topics: what, how, and to whom the information is being reported and what guidelines are used to construct the report regarding lexical content. This indication is reinforced since, in companies, recent previous literature (e.g., Blanco et al., 2021) has demonstrated that the audit must make more effort to mitigate distortions risks when the reports are less readable.

This research has some methodological limitations: first, the report's readability is studied using the complete document without considering each topic's specifics. Furthermore, subsets of observations are not produced, although some of the reports were read through sampling to check the robustness of the analyses. Therefore, supplementary research can further explore the report by subject and indicate, based on excerpts, a categorization of information and its readability.

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