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MASTER´S FINAL WORK

DISSERTATION

THE IMPACT OF THE ADOPTION OF IFRS 16 - LEASES ON THE READABILITY OF FINANCIAL REPORTS

CATARINA ALVES DE MATOS

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ORIENTAÇÃO:

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GLOSSARY

IASB – International Accounting Standards Board

IAS – International Accounting Standard

IFRS – International Financial Reporting Standard

ABSTRACT

In January 2016, the International Accounting Standards Board (IASB) introduced International Financial Reporting Standard (IFRS) 16, which came into effect on January 1, 2019. This standard brings substantial changes to the accounting of leases from the lessee's perspective, replacing the previous International Accounting Standard (IAS) 17. Its primary goal is to enhance transparency and comparability across financial statements. IFRS 16 introduces a capitalisation model for most leases, requiring companies to recognise lease assets and lease liabilities on the Statement of Financial Position, effectively eliminating the distinction between "finance" and "operating" leases, from the lessee perspective.

Hence, this study investigates if this change in accounting standard made the notes in the annual reports of FTSE 100 companies more complex, and secondly, the determinants influencing the readability of annual reports in their notes. Given the importance of transparent financial communication for stakeholders, the readability of these reports has emerged as a critical aspect of corporate governance. This research aims to identify the factors that significantly affect the readability of annual reports, focusing on both qualitative and quantitative attributes, such as company lease liabilities, net income, size, industry, profitability, and the use of complex language.

The analysis is conducted using readability metrics such as the Gunning Fog Index, Flesch Reading Ease, Flesch-Kincaid Grade Level and SMOG Index Readability Score. Statistical regression models are employed to assess the relationship between the identified determinants and the readability.

Regarding the readability of the notes, the findings indicate that there’s no statistical significance between the means, therefore the complexity of the text remained the same. Regarding the statistical model, it was found that annual reports with lenghtier notes became mores complex.

The study highlights the need for companies to balance their notes to the statements of financial position with clear and accessible communication, especially as corporate governance increasingly emphasizes the importance of transparency and readability in financial reporting.

Keywords: Accounting standard; Leasing; IFRS 16; IAS 17; Readability; FOG Index; Flesch Reading Ease; Flesch-Kincaid Grade Level; SMOG Index Readability; FTSE 100.

RESUMO

Em janeiro de 2016, o IASB introduziu a norma IFRS 16, que entrou em vigor no dia 1 de janeiro de 2019. Esta norma traz mudanças substanciais no tratamento contabilistico dos *Leases* do ponto de vista do *lessee*, substituindo a IAS 17. Com principal objetivo de aumentar a transparência e a comparabilidade entre as demonstrações financeiras. A IFRS 16 introduz um modelo de capitalização para a maioria dos *Leases*, exigindo que as empresas reconheçam os *lease assets* e as *lease liabilities* no Balanço, eliminando a distinção entre *leases* "financeiros" e "operacionais".

Assim, este estudo investiga se a mudança na norma contabilística tornou as notas nas demonstrações financeiras das empresas integrantes do FTSE 100 mais complexas e, em segundo lugar, os determinantes que influenciam a *readability* das notas nas demonstrações financeiras. Dada a importância da comunicação financeira transparente para as partes interessadas, a *readability* dos relatórios emergiu como um aspecto crucial para a Corporate Governance. Este estudo visa identificar os fatores que afetam significativamente a *readability* das demonstrações financeiras, com foco em atributos qualitativos e quantitativos, como *lease liabilities*, *net income*, tamanho da empresa (total de ativos), setor, rentabilidade e o uso de linguagem complexa.

A análise é realizada utilizando métricas de *readability*, como o *Gunning Fog Index*, o *Flesch Reading Ease*, o *Flesch-Kincaid Grade Level* e o *SMOG Index Readability Score*. São utilizados modelos de regressão estatística para avaliar a relação entre os determinantes identificados e a readability.

No que diz respeito à *readability* das notas, os resultados indicam que não há significância estatística entre as médias, portanto, a complexidade do texto permaneceu a mesma. Quanto ao modelo estatístico, constatou-se que demonstrações financeiras com notas mais longas tornaram-se mais complexas.

Esta dissertação conclui que a mudança na norma não teve um impacto significativo na complexidade das notas nas demonstrações financeiras das empresas do FTSE 100, pois não foi observada uma diferença estatisticamente significativa. É importante destacar a necessidade de as empresas equilibrarem as suas notas às demonstrações financeiras com uma comunicação clara e acessível, especialmente à medida que a *corporate governance* enfatiza cada vez mais a importância da transparência e da legibilidade no relato financeiro.

Palavras-chave: Norma contabilística; *Lease;* IFRS 16; IAS 17; *Readability; FOG Index; Flesch Reading Ease; Flesch-Kincaid Grade Level; SMOG Index Readability;* FTSE 100.

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1. INTRODUCTION

As of January 2016, the International Accounting Standards Board (IASB) introduced the International Financial Reporting Standards (IFRS) 16 that became effective from January 1st 2019 on. This standard significantly alters the accounting treatment of leases, under the lessee perspective, replacing the International Accounting Standard (IAS) 17, and has as its objective to provide more transparency and comparability amongst financial statements. The new standard introduces the capitalisation model for most leases, where the leases are recognised as lease assets and lease liabilities on the Statement of Financial Position, extinguishing the distinction of "finance and operating" leases.

The new model is anticipated to significantly affect companies' financial statements, including the Statement of Financial Position and the profit and loss account, as well as various ratios and metrics that reference these figures, and in its readability, affecting how the users comprehend them, and therefore use them. Numerous authors have analysed and estimated the impacts using different methods to capitalise operating leases and assess the average effect on financial statements and ratios for a sample of companies. For companies with substantial leasing activities, such as those in the retail, airline, and telecommunications industries, the transition to IFRS 16 has been particularly impactful (Zamora-Ramírez, 2018). These companies now present a more comprehensive view of their financial obligations, although at the cost of increased complexity in financial reporting.

IFRS 16 mandates that lessees must recognize almost all leases on their Statements of Financial Position, replacing the previous model that distinguished between operating and finance leases. This shift aims to provide a more accurate representation of a company's financial position and obligations, enhancing transparency. However, this change also introduces complexity in financial reporting, potentially affecting the readability of financial statements, particularly the notes.

The readability of financial statements is a critical aspect of financial communication, influencing stakeholders' ability to make informed decisions. For companies listed on the United Kingdom market index FTSE 100 index, these documents are particularly scrutinized by a diverse group of investors, analysts, and regulatory bodies. In January 2019, the introduction of IFRS 16 brought significant changes to the accounting of leases, with the potential to impact the clarity and comprehensibility of financial reports.

To contextualise, the readability refers to the ease with which a reader can process and comprehend written text. To study the impact of this change from IAS 17 to IFRS 16 on the readability of the Notes of the companies included in the FTSE 100, several measures of readability will be used to provide more accurate results since it has been proven that using only one measure has some limitations that will be explained furthermore.

Thus, this research aims to evaluate the readability of the financial statements of FTSE 100 companies before and after the implementation of IFRS 16. By assessing changes in readability, this research seeks to identify the extent to which the new leasing standard has influenced the comprehensibility of financial disclosures. Additionally, the study identifies the determinants of the level of readability of the notes about leases.

Understanding the implications of IFRS 16 on financial statement readability is crucial for stakeholders who rely on these documents for decision-making. This study will contribute to the ongoing discourse on financial reporting standards and their real-world effects, offering insights for companies, regulators, and investors, more specifically to contribute to the post-implementation literature IFRS 16 published. This research focuses on the impact of IFRS 16 adoption on the readability of financial reports among FTSE 100 firms. Given the complexity introduced by the new lease disclosures, this study aims to understand how managers adjust their reporting practices to ensure compliance while maintaining report clarity. The study also seeks to identify the determinants influencing the presentation of lease information and to assess whether the adoption of IFRS 16 has affected the overall readability and transparency of financial disclosures for investors and stakeholders.

The structure of the study is organized as follows. Section 2 provides the Background, offering a contextual overview of IFRS 16 and IAS 17. Section 3 delves into the Literature Review, summarising relevant academic work on financial report readability and its impact on investors and market behaviour. Section 4 describes the Sample and Descriptive Statistics, presenting data from FTSE 100 companies and key characteristics of the sample. Section 5 outlines the Research Design, detailing the methodology and tools used to assess the readability of the financial notes. Section 6 focuses on the Results and Analysis, interpreting the findings and their implications for both theory and practice. Finally, Section 7 presents the Conclusion, summarizing the main insights and suggesting future research directions.

2. BACKGROUND

Lease accounting has undergone significant evolution, reflecting changes in the economic environment and the increasing complexity of financial transactions. This journey, from the early adoption of IAS 17 to the comprehensive framework of IFRS 16, highlights the efforts of standard setters to enhance transparency and comparability in financial reporting.

The accounting for leases was first issued in 1982, the IAS 17 *Accounting for Leases*, replaced in 2001 by the IASB, for the IAS 17 *leases*, issued in 1997 by the International Accounting Standards Committee (IASC) and for many years the model has been discussed by many scholars, mainly because not all obligations and rights were being recognised in the statement of financial position, resulting in lack of comparability (Beattie et al., 1998) (Zamora-Ramírez, 2018).

Under IAS 17, leases were classified into two categories: operating leases and finance leases. This classification was based on the extent to which risks and rewards incidental to ownership of the leased asset were transferred to the lessee. In the case of financial leases all the risks and rewards are passed on to the lessee, which means they must recognise both the assets and the liabilities in the Statement of Financial Position, and in the case of operational leases the rights and obligations are not transferred to the lessee, meaning that it's not recognised in the statement.

While IAS 17 provided a clear distinction between operating and finance leases, it faced criticism for allowing significant off-balance-sheet financing. Many companies structured leases to qualify as operating leases, thereby keeping substantial liabilities off their balance sheets, which obscured the true financial position of the entities (Duke et al., 2009).

Acknowledging the shortcomings of IAS 17, the IASB initiated a project to create a new standard aimed at improving transparency and comparability. Following extensive consultations and discussions, IFRS 16 was released in January 2016 and took effect for annual periods starting on or after January 1, 2019.

IAS 17 is superseded by IFRS 16 in January of 2019, with the objective of setting out "the principles for the recognition, measurement, presentation and disclosure of leases. The objective is to ensure that lessees and lessors provide relevant information in a manner that faithfully represents those transactions. This information gives a basis for users of financial statements to assess the effect that leases have on the financial position, financial performance and cash flows of an entity" (IFRS 16 - Leases, Paragraph 1, 2019) , therefore, with this new standard the firms are required to recognise all the rights and obligations of all the lease contracts, with some exceptions.

IFRS 16 eliminates the distinction between operating and finance leases for lessees. Instead, it requires lessees to recognise almost all leases on the Statement of Financial Position. This includes an asset representing the right-of-use of the leased item for the lease term and a corresponding liability for the lease payments. The new standard requires detailed disclosures about leasing activities, encompassing both qualitative and quantitative information. The goal is to give users of financial statements a clearer insight into how leases affect the entity's financial position, performance, and cash flows.

There are exceptions, for short-term leases (those with a duration of 12 months or less) and leases involving low-value assets. Lessees have the option to account for these leases using an approach similar to the operating lease model under IAS 17.

Now with IFRS 16, for existing operating leases, entities will need to recognise both a lease asset (representing the right-of-use of the underlying asset) and a lease liability (reflecting the present value of future lease payments), rather than merely recording a lease expense.

Table I. Recognition on the Statement of Financial Position

Items	IAS 17		IFRS 16
	Finance lease	Operational lease	(All leases, with some exceptions)
Assets recognised in the Statement of Financial Position	Yes	No	Yes
Liabilities recognised in the Statement of Financial Position	Yes	No	Yes
Rights and obligations off Statement of Financial Position	No	Yes	No

3. Literature Review

In the past few years, there has been some developments in literature about the new standard, the IFRS 16, introduced by the IASB on January 2016, that superseded IAS 17 and came into effect on January 1st of 2019 (IFRS 16 - Leases, 2019) introducing a new lessee accounting model, the capitalisation model, as explained before.

Prior to 2019, the IASB and the Financial Accounting Standards Board (FASB) have had a convergence project in their hands to develop a single approach resulting in all assets and liabilities arising from a lease recognised in the Statement of Financial Position, in the case of IAS 17 only finance leases are reported as assets and liabilities.

Different research explores the effects that would be caused by the change in the accounting standard, financially and in the readability, studies such as the one by (Imhoff et al., 1998), assess the financial implications of converting operating leases into capital leases, and examining the changes that would come into effect and if it would significantly impact the financial reporting, (Zamora-Ramírez, 2018), (Barone et al., 2014).

3.1. The Financial Effects of a New Accounting Standard and Capitalising Leases

Research by Barone et al. (2014), concludes that the proposed lease accounting changes would impact significantly the financial reporting of companies. This study is a review of the existent literature related to the lease accounting changes that the IASB and FASB proposed, focusing on the implications of the proposed changes by the IASB and FASB. The existing literature addresses (1) the significant economic implications of the proposed changes, for both preparers and users of financial reports, namely alterations to financial ratios, risk assessments, and audit processes; (2) financial ratios, what would be the impacts of capitalising operating leases on key financial ratios, impacting how companies' financial health and performance are perceived; (3) credit assessments, stating that several studies

indicate that operating leases influence credit market prices and assessments, because the capitalisation of these leases could alter credit ratings and borrowing costs for companies; (4) Auditor perceptions, finding a consensus among auditors that footnote disclosures are more reliable than recognised amounts in financial statements; (5) comment letters analysis, an analysis of 640 comment letters on the Exposure Draft revealing an opposition to the proposed changes, concerns include the complexity of the new standards, the excessive cost of implementation, and perceived irrelevance of the information for most stakeholders; finally (6) strategic business impacts, previous research shows distinct strategic uses for operating leases, particularly in terms of debt capacity, which are mitigated by regulatory and investor scrutiny.

Supporting this, Zamora-Ramírez & Morales-Díaz (2018) determine that the implementation of IFRS 16 significantly alters the financial reporting landscape, making it crucial for entities to carefully consider their choices and estimations under the new standard. To understand how the decisions taken by the entities under the IFRS 16 impact their financial statements, Zamora-Ramírez & Morales-Díaz (2018) divide their study into two main categories, the accounting treatment allowed by the IFRS 16, where firms can opt to use the full retrospective approach and the modified retrospective approach for initial application, affecting the initial measurement of lease liabilities and right-of-use assets, consequently impacting equity, Statement of Financial Position, and P&L statements differently; and the estimates and judgements, the estimations that this new standard requires, such as the lease term and the discount rate, impacting the recognised amounts. For this, the authors use variables such as prepayments, the timing of lease payments (in advance or arrear), and difference in discount rates. Thus, the research highlights several impacts of IFRS 16 on the financial statements, on leverage ratios an increase due to recognition of lease liabilities is observed, a decrease on Return on Assets (ROA) because of the recognition of right-of-use assets, and an increase in the EBITDA is observed as lease expenses are replaced with depreciation and interest expenses. These impacts are more noticeable in industries with significant use of operating leases, such as retail, airlines, and hospitality.

The financial implications of converting operating leases into capital leases are assessed through a process called constructive capitalisation and it is analysed by Imhoff et al. (1998) to understand the effects on financial statements and key financial ratios. The authors propose a methodology for capitalising operating leases by estimating the present value of future lease payments and recognising them as both an asset and a liability on the Statement of Financial Position. When it comes to the Statement of Financial Position, capitalising operating leases results in an increase in both assets and liabilities. In the Statement of profit or loss, lease expenses that were once categorised as operating expenses are now classified as interest and depreciation expenses, changing the way income is reported. Regarding financial ratios, the debt-to-equity ratio and other leverage measures increase because of the inclusion of lease liabilities. ROA (Return on Assets) and other profitability metrics are also affected as total assets increase and the nature of expenses shifts. Ratios like the current ratio and quick ratio

may change based on how lease-related liabilities are classified. The study suggests that capitalising leases provides a clearer picture of a company's financial commitments and assets, improving transparency and comparability in financial statements.

Besides the impacts on the Statement of Financial Position and financial ratios, Cotten et al. (2013) examines the impact of capitalising operating leases on the credit ratings of companies, studying how this accounting change influences the assessment of a company's financial health by credit rating agencies. As the research by Imhoff et al. (1998) the authors also simulate the capitalisation of operating leases by estimating the present value of future lease payments. Recognising an increase in both assets and liabilities as well, and an alteration in the presentation of the Statement of profit or loss due to the reclassification of lease expenses to interest and depreciation expenses. It is found that by capitalising operating leases leads to the deterioration of credit ratings, primarily due to the increase in reported debt, which affects leverage ratios and perceived financial risk, this impact differs across companies depending on the extent of their operating lease commitments. The authors recommend greater transparency and standardized reporting of lease obligations to provide a more accurate picture of a company's financial position, defending the adoption of accounting standards that require the capitalisation of operating leases.

Napier & Stadler (2020) explain and categorise the effects of a new or amended accounting standard, accounting consequences are expected. Changes in recognition, measurement, presentation, and disclosures are a few of these. A new standard may mandate that certain elements that were previously excluded from the financial statements be acknowledged, such as a requirement that certain leases that were previously kept off-balance sheet be recorded as assets and liabilities. A new standard may alter the methodology used to measure specific things that are already included in the financial statements, even though recognition of a new item will by itself require that item to be measured. Additionally, it might alter how some items are displayed, such as moving items that were formerly part of other comprehensive revenue into profit or loss. Thus, they study specifically the case of IFRS 15 Revenue from contracts with customers, analysing the effects empirically through annual reports of the largest listed European companies, comment letters and interviews.

Duke et al. (2009) investigate the financial implications and strategic uses of operating and synthetic leases in the aftermath of the Enron scandal. The paper explores how these leasing methods, operating and synthetic leases (a hybrid financing arrangement that combines elements of both operating leases and secured loans), can be used to obtain financial benefits. Operating leases allow firms to use assets without owning them, keeping lease obligations out of the Statement of Financial Position, making financial statements appear more favourable by reducing debt and improving financial ratios. Synthetic leases are structure in a way that combines the benefits of both operating and capital leases, these leases enable firms to maintain the tax benefits of ownership while keeping the lease off the Statement of

Financial Position. The Enron scandal led to increased scrutiny and regulatory changes aimed at improving transparency in financial reporting, but despite the changes, companies continued to find ways to structure leases that exploit financial benefits while adhering to the new regulations while complying to the new regulations, the authors discuss the effectiveness of the regulatory changes and the ongoing challenges in ensuring transparent financial reporting. The research concludes that while operating and synthetic leases have historically provided significant financial benefits to companies, increased regulatory scrutiny and changes in accounting standards are likely to diminish these advantages.

With this, it is important to study if firms with greater amounts of lease liabilities have less readable notes:

H2. Firms with higher amounts of lease liabilities will have less readable notes.

3.2. The Effects of a New Accounting Standard on the Readability of the Financial Reporting

Richards & van Staden, (2015) find that, in many cases, the adoption of IFRS has led to more complex financial statements, characterised by longer sentences and a higher frequency of technical jargon. This increased complexity may be a challenge for non-expert users in understanding the financial health and performance of companies, as of Lang & Stice-Lawrence (2015) in the retail industry specifically, investors are more likely to invest in firms that have shorter and more readable financial reports.

Through the study, the authors try to understand whether the adoption of IFRS, which aims to standardise financial reporting globally, has made financial statements more or less accessible to various stakeholders, including investors and analysts, using several readability metrics such as the Fog Index, Flesch-Kincaid Grade Level, and others, they analyse financial reports from a selection of companies before and after the implementation of IFRS. They suggest that companies and regulators should consider the readability of financial reports to ensure that the information is accessible to all stakeholders, not just those with specialised financial knowledge. Guay et al. (2016) found that there's a positive relationship between financial statement complexity and the extent of voluntary disclosure, meaning, firms with more complex financial statements tend to provide more voluntary disclosures to help investors and other stakeholders in understanding their financial position. Overall, the authors emphasize the critical role of voluntary disclosures in mitigating the challenges posed by complex financial statements.

To understand if the updates and modifications to international accounting standards (IAS/IFRS) have led to greater complexity in financial reporting, potentially affecting the clarity and usability of financial information for stakeholders, Morais et al. (2020) use readability metrics to assess the

complexity of accounting standards, such as the Flesch Reading Ease and Flesch-Kincaid Grade Level. The findings indicate that international accounting standards have indeed become more complex over the years. This increasing complexity is attributed to several factors, including the incorporation of more detailed rules, broader coverage of financial reporting issues, and the inclusion of new standards addressing emerging financial phenomena. The study suggests that while these changes aim to enhance the comprehensiveness and accuracy of financial reporting, they also make the standards more challenging to understand and apply, especially for smaller firms and less experienced practitioners.

Thus, an effect in the readability of the reports is expected with the change to IFRS 16 as well as its length, resulting in less readable notes:

H1. The change to IFRS 16 will affect the readability of the financial reporting resulting in less readable notes.

H3. Firms with lengthier annual reports will have less readable notes.

Firms involved in earnings management tend to produce less readable annual reports (Lo et al., 2017). Specifically, these reports often contain longer sentences, more complex words, and denser text, making it more difficult for stakeholders, such as investors and analysts, to interpret the financial information. These findings suggest that reduced readability in annual reports could be a deliberate strategy by firms to obscure the details of earnings management activities, potentially hindering the detection of such practices. In this line of thought the authors highlight that the readability of financial disclosures may serve as an indicator of potential earnings manipulation and overall financial transparency. It is also found that companies with less readable annual reports tend to have less persistent earnings. This suggests that firms may use complex language to conceal poor earnings quality or to make it more difficult for stakeholders to fully understand their financial situation (Li, 2008). Therefore, it is important to assess if firms that have negative net income have higher values of readability:

H4. Firms with negative net income will have higher values of readability, meaning their notes will be more complex.

The prior research analysed has shown that regulatory changes, report length, and the financial structure of a firm can all impact the complexity of financial disclosures. Building on the previous studies, this research explores the following four key hypotheses concerning the determinants of financial report readability.

4. RESEARCH DESIGN

To thoroughly evaluate the readability of financial reports following the adoption of IFRS 16, this research will focus on identifying shifts in the clarity and comprehensibility of these documents. The approach will use well-established readability measures, building upon methodologies previously applied in several articles, such as in (Guay et al., 2016) (Pinto et al., 2020). These readability metrics, including indices like the Gunning Fog Index, Flesch-Kincaid Reading Ease, and SMOG Index, will serve as the core tools for assessing textual complexity and accessibility. By employing these metrics, the study aims to quantify how easily financial reports can be understood post-IFRS 16 implementation.

In addition, to explore the potential determinants of changes in readability, a statistical examination will be conducted. Specifically, this analysis will investigate whether firm-specific characteristics - such as firm size, profitability, leverage, and industry classification - have a measurable impact on the variations in report readability following the implementation of IFRS 16. To establish whether these relationships are statistically significant, the research will apply a regression analysis framework. This methodology will allow for the identification of any significant correlations or patterns between the readability of financial disclosures and specific firm attributes in the post-IFRS 16 landscape.

By combining readability analysis with regression models, the study aims to provide a detailed understanding of how the IFRS 16 has affected the quality of financial reporting and whether these changes are influenced by inherent characteristics of the firms.

4.1. Readability Measures

Several readability measures will be used to test the H1., thus in this section the several key readability indices used to assess the complexity of written text will be introduced. The Fog Index, the Flesch-Kincaid Reading Ease Score and Flesch-Kincaid Grade Level, and lastly, the Smog Index.

Fog Index: Developed by Robert Gunning (1952) the fog index is a readability test that measures the complexity of English writing. It is designed to estimate the number of years of formal education required for a reader to understand a text on the first reading. It is calculated using:

(1) The average sentence length = $\frac{\#words}{\#sentences}$.

(2) The percentage of complex words (words with three or more syllables) = $\frac{\#complex\ words}{\#words} \times 100$.

(3) Fog Index = (1) + (2) × 0.4.

The levels of fog are the following: ≥ 18 (unreadable), 14–18 (difficult), 12–14 (ideal), 10–12 (acceptable), and 8–10 (childish) (Li, 2008).

Flesch-Kincaid Reading Ease Score: developed by Rudolf Flesch**,** this measure calculates the ease with which a text can be read and understood. It is calculated using:

(1) The average sentence length = $\frac{\#words}{\#sentences}$.

(2) Average number syllables per word = $\frac{\#syllables}{\#words}$.

(3) $206.835 - 1.015 \times (1) - 84.6 \times (2)$.

The score ranges from 0 to 100, with higher scores indicating easier readability.

Flesch-Kincaid Grade Level: this measure indicates the minimum education required to understand the text. It is calculated using:

(1) Average sentence length = $\frac{Total\ words}{Total\ sentences}$.

(2) Average syllables per word = $\frac{Total\ syllables}{Total\ words}$.

(3) $0.39 \times (1) + 11.8 \times (2) - 15.59$.

Smog Index Readability Score: this index estimates the years of education needed to comprehend a piece of writing. It is calculated using:

(1) Total polysyllables (words with three or more syllables).

(2) Total sentences.

(3) $1.0430 \times \sqrt{(1) \times (30 \div (2))} + 3.1291$.

The readability index (Read) is defined as the first principal component of the readability measures described, (Guay et al., 2016) (Pinto et al., 2020). The factor analysis is performed across the sample of the Annual reports of the FTSE 100 companies in the years between 2018 and 2020/2021 depending on the fiscal year end of each company. In this case, as shown by Table II only one factor has an eigenvalue greater than one, meaning that this factor (Read) explains 88.02% of the variation in these measures. Table II also shows the 1st factor, the dominant factor, strongly correlates with the variables fog, fklevel, and smog. Ultimately, the readability index (Read) is designed in such way that higher values mean less readable text.

Table II. Factor and pattern analysis of readability measures

Factor analysis					
Factor	Eigenvalue	Prop. of variation explained	Cumulative prop. of variation explained	First principal comp. weight	Readability measures
1st	2.62969	88.02%	88.02%	0.9767	Fog Index
2nd	0.38128	12.76%	100.78%	-0.2564	Flesch-Kincaid Reading Ease
3rd	-0.00638	-0.021%	100.57%	0.8939	Flesch-Kincaid Grade Level

4th	-0.01703	.0.057%	100%	0.9631	Smog Grade

Pattern matrix

	1st	2nd	Uniqueness
(1)	0.9955	-0.0154	0.0088
(2)	-0.1485	0.5986	0.6196
(3)	0.8033	-0.0462	0.3525
(4)	0.9855	0.1434	0.0081

Legend: (1)Fog index; (2) Flesch-Kincaid Reading Ease; (3) Flesch-Kincaid Grade Level; (4) Smog Grade.

4.2. Determinants of Annual Report Readability

The following regression model is designed to examine the factors influencing the readability of financial reports, particularly in the period following a significant change in accounting standards. The model aims to identify how various firm-specific characteristics impact the ease with which stakeholders can comprehend annual reports, with readability as the dependent variable.

$$READ = \beta_0 + \beta_1 LLIAB + \beta_2 PLENGHT + \beta_3 LOSS + \beta_4 LSIZE + \beta_5 PROF + \beta_6 LEV + \beta_7 RIND + \beta_8 TIND + \beta_9 HIND + \varepsilon_t$$

Table III presents the definitions of the variables used in the study, divided into dependent and independent variables. The dependent variable, shown in Panel A, is the readability of financial reports (*READ*), and is associated with Hypothesis 1 (H1). Panel B lists the independent variables, which include financial and industry-specific, the first variables *LLIAB*, *PLENGTH* and *LOSS* are used to test hypothesis 2,3 and 4 respectively, the other variables are control variables. Finally, Panel C lists the control variables, including firm size (*LSIZE*), profitability (*PROF*), leverage (*LEV*), and industry-specific dummy variables, which help account for additional factors that could influence the readability of financial reports but are not the primary focus of the hypotheses. This structure helps examine the relationships between these variables and the readability of financial reports.

Table III. Variables definition

Variable	Definition	Hypothesis
Panel A: Dependent Variables		
READ	Represents the readability of the financial reports, and it is defined in such way that higher values indicate more complex and less readable text.	**H1**
Panel B: Independent Variables		
LLIAB	Lease liabilities.	**H2**
PLENGTH	Percentage of the notes related to Leases in the financial report.	**H3**
LOSS	Dummy variable equal to 1 if net income negative, 0 otherwise.	**H4**
Panel C: Control Variables		
LSIZE	Firm's size measured by the natural logarithm of total assets.	
PROF	EBIT divided by total assets.	
LEV	Ratio of total debt to total assets.	

RIND	Dummy variable equal to 1 if Retail, 0 otherwise.
TIND	Dummy variable equal to 1 if Transport, Freight & Storage, 0 otherwise.
HIND	Dummy variable equal to 1 if Travel, Personal & Leisure, 0 otherwise.

This regression will be used to test the other 3 hypotheses, H2 with variable *LLIAB* to assess if firms with higher amounts of lease liabilities will have less readable notes, H3 with variable *PLENGTH* to understand if firms with lengthier annual reports will have less readable notes, and H4. with variable *LOSS* to assess whether firms with negative net will have higher values of readability.

As mentioned before, the control variables are used to account for factors that could influence the relationship between the independent and dependent variables, even though they are not the main focus of the study, *LSIZE* helps to understand if the size of the sample's companies influences the level of readability of the notes, *PROF* is used to assess if firms with greater values of profitability have higher levels of readability, and the variable *LEV* is used to understand if the firms with greater levels of debt have the tendency to have higher values of readability, thus more complex notes.

Because Zamora-Ramírez (2018) conclude that the impact of the decisions of firms under the IFRS 16 in the reports are more noticeable in industries with significant use of operating leases, such as retail, airlines, and hospitality, the dummies *RIND*, *TIND* and *HIND* are used to assess if they have a statistically significant relationship with the readability of the financial reports and the change to the IFRS 16, and a positive relationship is expected, indicating that because these industries have a higher level of use of operating lease it is expectable that text in the notes would become more complex due to the change in the accounting for leases.

5. Sample Construction

To analyse the impact of IFRS 16 on the annual reports of companies, the study focuses on firms listed in the FTSE 100, which includes the 100 largest companies operating in the United Kingdom across various sectors, as outlined in Table IV. The sample covers a diverse range of industries, providing a comprehensive view of how the adoption of IFRS 16 affects financial reporting across different business environments.

The research methodology involves collecting the annual reports of these 100 companies for a period spanning one year prior to the implementation of IFRS 16 (adjusted for each firm's fiscal year) and two years post-implementation. This timeline allows for a detailed comparison of the changes in the readability and structure of financial disclosures, particularly in the Notes section, Accounting Policies, and the overall content of the reports. The focus on pre- and post-implementation reports is designed to identify shifts in reporting clarity and complexity due to the introduction of lease capitalization requirements under IFRS 16. By applying readability measures to these documents, the

study aims to provide insights into whether the standard has made financial reports more challenging for users to interpret, while also evaluating how firms have adapted their reporting practices to comply with the new lease accounting rules.

Table IV. Sample composition by sector of activity

Sample Sector/Industry	**Number of companies per sector**	**Percentage of companies per sector**
Mining & Extraction	5	6.7%
Chemicals, Petroleum, Rubber & Plastic	5	6.7%
Retail	7	9.3%
Business Services	8	10.7%
Food & Tobacco Manufacturing	6	8%
Communications	2	2.7%
Travel, Personal & Leisure	5	6.7%
Utilities	5	6.7%
Transport, Freight & Storage	2	2.7%
Transport Manufacturing	2	2.7%
Wholesale	5	6.7%
Wood, Furniture & Paper Manufacturing	5	6.7%
Printing & Publishing	3	4%
Banking, Insurance & Financial Services	1	1.3%
Construction	4	5.3%
Industrial, Electric & Electronic Machinery	7	9.3%
Textiles & Clothing Manufacturing	0	0%
Property Services	2	2.7%
Public Administration, Education, Health Social Services	1	1.3%
Total	**75**	**100%**

Several companies were removed from the initial sample to ensure the integrity and comparability of the data. This was done either because of insufficient information available in their financial reports or because they were identified as outliers based on the variable *LSIZE* (logarithm of company size). The decision to exclude these companies was aimed at refining the dataset to maintain a more homogenous and comparable sample in terms of company size, thus enhancing the accuracy and relevance of the analysis. As illustrated in *Appendix I. Box plot of variable LSIZE*, these outliers represented significant deviations from the rest of the sample, potentially skewing the results. Consequently 25 companies[1] were excluded from further analysis.

6. Results and Analysis

This section is divided in two parts, the first part where the descriptive statistics and the results for the readability measures are presented testing the equality of means for the years before the adoption and the years after, analysing the readability measures with the objective of understanding if the complexity of the text in the notes of the annual reports has become more complex after the adoption of IFRS 16, therefore, to test H1., and the second part, where the descriptive statistics and the results of the model used to identify how the various firm-specific characteristics impact the ease with which stakeholders can comprehend annual reports are shown.

[1] the following firms were excluded from the sample: Shell plc, BP plc, HBSBC Holdings plc, Barclays plc, Lloyds banking group plc, Prudential plc, Aviva plc, Natwest group plc, Standard chartered plc, Marks and spencer group plc, Haleon plc, Legal & genera1 group plc, London stock exchange group plc, M&g plc, Phoenix group holdings plc, Admiral group plc, Airtel Africa plc, 3i group plc, Burberry group plc, Hargreaves Lansdown plc, Intermediate capital group plc, F&C investment trust plc, Rightmove plc, Pershing square holdings limited, Scottish mortgage investment trust plc.

6.1. Readability Measures

Table V. Readability Measures of Annual Reports

Measures:	**Panel A: Years before the adoption of IAS 17**		
	Mean	Median	Standard Deviation
Gunning FOG Index	19.52253	18.71	3.351539
Flesch-Kincaid Reading Ease	36.40373	36	8.2922961
Flesch-Kincaid Grade Level	15.39347	14.97	2.837777
SMOG Index Readability	16.81627	16.24	2.513913
Nº firms	75		
Measures:	**Panel B: Years after the adoption of IFRS 16**		
	Mean	Median	Standard Deviation
Gunning FOG Index	19.40633	18.88	3.101396
Flesch-Kincaid Reading Ease	36.1818	36.115	7.472562
Flesch-Kincaid Grade Level	17.372	17.05	3.381374
SMOG Index Readability	16.7722	16.47	2.399863
Nº firms	150		
Measures:	**Panel C: All firms**		
	Mean	Median	Standard Deviation
Gunning FOG Index	19.44507	18.82	3.179934
Flesch-Kincaid Reading Ease	36.25578	36.1	7.737577
Flesch-Kincaid Grade Level	16.71249	16.01	3.337604
SMOG Index Readability	16.78689	16.4	2.432941
Nº firms	225		

Table V presents the descriptive statistics for the readability measures of annual reports under two accounting standards, IAS 17 and IFRS 16, for the sample.

The mean is 19.52, and the median is 18.71, with a standard deviation of 3.35. This indicates that the reports are moderately complex and require at least some college-level education to comprehend. The spread (standard deviation) is relatively narrow, suggesting that most reports under IAS 17 are similarly difficult to read. The mean slightly decreases to 19.40, with a median of 18.88, and a lower standard deviation of 3.10, with the adoption of IFRS 16. This slight reduction implies a marginal improvement in readability but a consistent overall complexity in reports post-IFRS 16.

The mean score is 36.40, and the median is 36, with a standard deviation of 8.29. The low score indicates that the reports are quite difficult to read, falling in the "very difficult" range. The mean is 36.18, with a median of 36.15, and a lower standard deviation of 7.47. This minimal change suggests a consistent level of reading difficulty across both standards, although the lower standard deviation under IFRS 16 indicates more uniform readability among firms.

The mean grade level is 15.39, with a median of 14.97, and a standard deviation of 2.83. This suggests that understanding these reports requires a reading level equivalent to at least some college education. The mean increases to 17.37, and the median rises to 17.05, with a higher standard deviation of 3.38. This reflects a greater difficulty in understanding financial reports after IFRS 16 adoption, requiring a higher educational level.

The mean SMOG index is 16.82, with a median of 16.24, and a standard deviation of 2.51. Like the other readability measures, this indicates moderate complexity in the reports. The mean decreases slightly to 16.77, with a median of 16.47, and a lower standard deviation of 2.39, suggesting a consistent readability level before and after IFRS 16.

Table VI. Two-sample t test equality of means of the measures of readability by year (IAS 17 vs. IFRS 16)

Measures	Diff = $\mu(0) - \mu(1)$, H_0: diff = 0 [95% confidence interval]		
	μ_{diff}	t-statistic	p-value
			Ha: diff ≠ 0
Fog Index	0.1162	0.2578	0.7968
Flesch-Kincaid Reading Ease	0.2219333	0.2024	0.8398
Flesch-Kincaid Grade Level	-1.978533	-4.3567	0.0000
Smog Index Readability	0.0440667	0.1278	0.8984

This two-sample ttest to the equality of means is conducted to verify **H1**. To understand if the level of difficulty increased after the change to IFRS 16 a two-sample ttest to the equality of means was conducted, Table VI. After close analysis, it is possible to state that the single measure that presents a statistically significant difference between the means of the two groups (IAS 17 = 0 and IFRS = 1) is the Flesch-Kincaid Grade Level, with a significance level of 5% the null hypothesis is rejected, p-value < 0.05. The t-statistic shows a negative value of -4.3567, which indicates that the mean of group 0 is significantly lower than the mean of group 1. Because this readability measure indicates the minimum education required to understand the text, these results indicate that, after the change to IFRS 16, to understand the texts in the Notes of the financial reports related to Leases it would be necessary to have a greater level of education, thus it became more difficult to understand them after the change of standard.

Regarding the other readability measures, no statistical significance was found in the difference between the means of the two groups, with a confidence interval of 5%, it is observed that the p-values are greater than 0.05, thus, the null hypothesis is rejected. This means there is no statistically significant difference between the means of the two groups, after the change in accounting standards the readability of the notes related to Leases in the financial reports remained the same, therefore the **H1** is rejected.

Table VII. Descriptive Statistics

	Panel A: Descriptive statistics for continuous variables				
	Mean	Median	Standard Deviation	Min	Max
LLIAB	758.6066	118.32	1766.728	0	9859
PLENGTH (%)	0.2707536	0.2689294	0.0618621	0.1477448	0.4517473
LSIZE	9.20008	9.030914	1.260987	6.112354	11.9121
PROF	1307.717	484.9	2438.283	-6716.12	13186.28
LEV (%)	0.2764444	0.28	0.1490229	0	0.72
	Panel B: Mean, median and frequencies for dichotomous variables				
	Mean	Median	Nº firms coded = 1	Nº firms coded = 0	Total firms
LOSS	0.1644444	0	37	188	225
RIND	0.0933333	0	21	204	225
HIND	0.0666667	0	15	210	225
TIND	0.0266667	0	6	219	225

Table VII provides descriptive statistics for both continuous and dichotomous variables across the firms in the sample. The results are divided into two panels: Panel A (continuous variables) and Panel B (dichotomous variables).

The results indicate that the logarithm of firm size varies considerably across the sample, with values ranging from 0.0611 to 0.1191. The standard deviation of 1.26 is moderate, indicating some variability but not excessive, meaning most firms tend to cluster around similar sizes. However, the range suggests that there are both small and large firms included, with the largest firm being nearly twice the size of the smallest firm on a logarithmic scale.

The variable *LLIAB*, used to test **H2**, exhibits considerable variability, with a wide range from 0 to 9,859. This is reflected in the high standard deviation of 1766.73. The large discrepancy between the mean and median (758.61 vs. 118.32) suggests that a small number of firms with very high liabilities are skewing the mean upwards. Most firms carry lower values of lease liabilities, as evidenced by the much lower median.

The variable *PLENGTH* represents the length of the notes as a percentage of the total document (annual report) and is used to verify **H3**. The mean and median are identical at 27%, implying a balanced distribution of report length across firms. The standard deviation is low (0.06), suggesting that most firms tend to produce reports of similar length. However, some variation exists, with the smallest report taking up only 15% and the largest one 45%, indicating a moderate range of report lengths across firms.

As the variable *LOSS*, used to assess **H4**, shows around 16% of the firms in the sample reported a loss, while the majority (84%) reported either a break-even or profit. This suggests that most firms in the sample were profitable or at least not experiencing financial losses at the time of data collection.

The profitability variable exhibits significant variability, as shown by the high standard deviation of 2438.28. Firms in the sample range from significant losses (as low as -6716.12) to

extremely high profitability (up to 13186.28). The median of 484.9, which is much lower than the mean, indicates that a small number of highly profitable firms are pulling the average upwards, while most firms report more modest profits. This widespread reflects substantial differences in the financial performance of firms in the sample.

The variable *LEV* is expressed as a percentage, remains consistent across firms, as demonstrated by the identical mean and median values of 28%. The standard deviation of 0.15 suggests a moderate spread, meaning that while some firms rely heavily on debt (up to 72%), others operate without any leverage at all. Overall, most firms maintain a moderate reliance on debt.

Only 9% of firms belong to this specific industry (retail), representing 21 firms out of the 225 in the sample. The vast majority of firms (91%) do not fall into this category.

A small portion (7%) of the sample is made up of firms in the Travel, Personal & Leisure sector, with 15 firms identified under this industry classification.

Transport, Freight & Storage sector represents the smallest proportion of firms in the sample, with only 3% (or 6 firms).

6.2. Readability and the firm-specific characteristics

Table VIII. Relationship between the readability of the notes in the annual reports and firm-specific characteristics with the change to IFRS 16

Independent Variables:	Coefficient	Predicted Sign	Coefficient	P-Value
Intercept	β_0	?	17.18774	0.000
LLIAB	β_1	+	-0.0000482	0.758
PLENGTH	β_2	+	12.54401	0.002
LOSS	β_3	+	-0.793855	0.244
LSIZE	β_4	?	-0.082243	0.690
PROF	β_5	+	-1.264259	0.696
LEV	β_6	?	0.1257414	0.933
RIND	β_7	+	-1.26765	0.137
TIND	β_8	+	0.2873753	0.838
HIND	β_9	+	-0.5940131	0.509
Nº of firms			225	
R-squared			5.71%	

Table VIII shows the results of the analysis of the model used to identify how the various firm-specific characteristics impact the ease with which stakeholders can comprehend annual reports,

revealing a p-value of 0.1702, indicating that the overall model is not statistically significant, suggesting that the independent variables together do not explain a significant amount of variance in Readability Index.

The positive coefficient indicates a minor increase in readability, but the relationship is weak. The coefficient β_1 on *LLIAB*, is negative with a p-value of 0.758, therefore not statistically significant at a significance level of 10%, lease liabilities do not significantly impact the readability of reports, therefore contradicting **H2**. The coefficient is very small and close to zero, indicating almost no relationship.

The coefficient on *PLENGTH* is positive and statistically significant at a 10% level, presenting a p-value of 0.002, indicating that a higher percentage of notes in the financial report is associated with an increase in readability by 12.54 units. This suggests that having more extensive notes makes the report more difficult to read, thus increasing the complexity, therefore supporting **H3**.

Firms that reported a net loss do not have significantly more or less readable reports. The negative coefficient β_2 suggests a slight improvement in readability for loss-reporting firms, but this effect is not statistically significant, thus not supporting **H4**.

The coefficient on *LSIZE* is negative and does not significantly affect the readability of the financial report, suggesting that larger firms might have slightly easier reports to read.

The coefficient on *PROF* is negative and not statistically significant at a significance level of 10%, showing a p-value of 0.696, meaning that profitability has no significant impact on the readability of the reports, the negative coefficient indicates that more profitable firms might have slightly clearer reports, as mentioned by some authors, firms with lower profits have motivation to manipulate the texts in their annual reports.

The coefficient on *LEV* is positive and statistically not significant at a significance level of 10% with a p-value of 0.933, indicating that leverage does not significantly affect the readability of the financial reports.

The three industry dummies corresponding to coefficients β_7, β_8 and β_9, have positive sign suggesting a slight increase in the Readability Index but are not statistically significant at a significance level of 10%.

7. CONCLUSIONS

This study has explored the impact of the adoption of IFRS 16 on the readability of financial reports among FTSE 100 companies. Through the application of various readability measures, including the Fog Index, Flesch-Kincaid Reading Ease and Grade Level, and the Smog Index, it was determined that the transition from IAS 17 to IFRS 16 has generally resulted in minimal changes to the overall readability of the statements of financial position.

When analysing the overall model used to determine how different firm-specific factors influence stakeholders' ability to understand annual reports, it was found that it was not statistically significant. Even though the coefficient of the variable *PLENGTH* was positive and found statistically relevant, meaning that having more extensive notes makes the report more difficult to read, thus increasing the complexity, the other rest of the coefficients showed very low amounts of statistical relevance. Hence, finding **H3** to be the only hypothesis positively verified by this study.

Regarding **H4**, reject by this study, even though firms may have a greater motivation to manipulate the text in notes when their returns are lower, the opposite can also be verified, they may want to justify their losses through explaining very clearly that they happened because of the change in standard

The study has some limitations, first, the readability measures used primarily focus on the linguistic complexity of the text, which may not fully capture other aspects of readability such as formatting, visual presentation, and how readers interpret numerical data. Second, even though the results show that an increase on the extent of the lease related notes in the reports can increase its readability, this could be influenced by the number of words, meaning if some notes have more words there will be more complex words if the notes are less extensive, but it could be more extensive with the purpose of clarifying everything in more detail, therefore a suggestion for future research can be exploring more in depth these notes of specific companies, some with a higher percentage of notes and others with lower percentage of notes. The analysis was restricted to FTSE 100 companies, leaving other regions outside of the sample, therefore many other types of firms. Additionally, while the study focused on the notes related to leases, it did not analyse how other sections of financial reports may have been affected by IFRS 16.

Future research could address these limitations by incorporating a broader set of readability factors, such as user engagement with financial statements and the role of visual aids in enhancing understanding. Additionally, extending the sample to include companies from different markets and smaller firms could provide a more comprehensive view of how IFRS 16 affects readability across varying contexts.

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APPENDICES

Appendix I. Box plot of variable *LSIZE*