A new methodology to measure impression management
– A linguistic approach to reading difficulty

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Abstract

Previous studies on impression management in the form of reading ease manipulation use readability formulae, such as Flesch, Fog, and Lix, and cloze scores. Readability formulae are based on word and sentence length and thus constitute crude measures of reading difficulty. Cloze scores do not measure comprehension, but inference.

This study uses an approach based on linguistics and psychology, overcoming the validity problems inherent in readability formulae and cloze scores. This is achieved by means of (1) basing its assumptions of what constitutes text on research carried out by discourse analysis, a sub-discipline of linguistics, (2) by means of basing its assumptions of readability on psychological assumptions of comprehension difficulty. What is more, it uses an objective and quantifiable method of measuring readability by means of using computer-assisted corpus analysis.

The four measures of reading difficulty in this study are based on the grammatical devices within and between sentences and include the following: (1) amount of cohesive ties within and between sentences, (2) distance between grammatically linked expressions, (3) proportion of new and given information, (4) amount of pronouns in a given text.
1. INTRODUCTION
This paper is part of a larger study two-part study. The first part is concerned with answering the question whether management engages in impression management in narrative annual report sections. The second part tries to determine which factors influence the use of impression management in narrative annual report sections. This paper examines the methodology to be applied in measuring impression management.

1.1 Definition of impression management in the context of corporate reporting
Social psychology defines impression management as the goal-directed activity of controlling or regulating information in order to influence the impressions formed by an audience:

Through impression management, people try to shape an audience's impressions of a person (e.g., self, friends, enemies), object (e.g., a business organization, a gift, a consumer product), event (e.g., a transgression, a task performance), or idea (e.g., pro-life versus pro-choice policies, capitalism versus socialism).

(Schlenker website [http://schlenker.socialpsychology.org]; emphasis added).

Thus, in the context of corporate reporting, impression management refers to management manipulating company outsiders’ perceptions and decisions of company performance and prospects.

1.2 Research methodology
In written communication the behaviour displayed by management engaging in impression management cannot be directly observed, but manifests itself verbally. This entails a linguistic analysis of texts. For this reason, linguistics provides the appropriate methodology for analyzing the verbal manifestations of impression management use in narrative annual report documents.

1.2.1 Measuring impression management - Obfuscation of negative organizational outcomes
Previous research has identified three types of strategies adopted by management when engaging in impression management, namely (1) the obfuscation of negative organizational outcomes, (2) the attribution of performance (attribution of positive outcomes to internal factors and of negative outcomes to external factors), and (3) the use of performance referents (Comparison of increasing performance with external referents and of decreasing performance with internal referents).
However, this study solely focuses on the analysis of impression management in the form of obfuscation of negative organizational outcomes. It is based on the obfuscation hypothesis which claims that management is biased in their reporting, emphasizing positive organizational outcomes and obfuscating negative organizational outcomes.

This study focuses on the obfuscation of negative organizational outcomes by linguistic means, i.e. it investigates the way language is used to manipulate the impressions and decisions of external parties. There are two ways language is used for impression management purposes, namely (1) reading ease manipulation and (2) rhetorical manipulation. Reading ease manipulation uses the prose itself as a proxy for obfuscation and rhetorical manipulation uses persuasive strategies as a proxy for obfuscation. This paper focuses on reading ease manipulation; Rhetorical manipulation is covered in a sister paper.

Figure 1 illustrates the way impression management in the form of reading ease manipulation is measured and analyzed in this study:
1.2.2 Measuring impression management - Reading ease manipulation

Obfuscation in the form of reading ease manipulation is concerned with the obfuscation of negative organizational outcomes by means of manipulating the readability, i.e. the reading difficulty, of narrative annual report documents. This means that management manipulates the perceptions and decisions of narrative annual report readers by means of rendering them more difficult to read.
The basic problem underlying the study of impression management in accounting narratives as manifest in reading ease manipulation is choosing a methodology which is able to accurately identify, analyze and measure readability.

Conventional methodologies tend to be problematic, since they have limited linguistic and psychological validity. This means that the analysis is limited to the sentence level and does not take into account the elements impacting on text comprehension.

This study proposes a new methodology based on discourse analysis. Discourse analysis is a linguistic sub-discipline which focuses on the interconnection within and between sentences. It thus allows extending the analysis of written texts “beyond the sentence level and considers the communicative constraints of the context” (Connor 1996: 11). It furthermore provides the “descriptive apparatus for describing textual cohesion, structures of texts, theme dynamics, and metatextual features” (Connor 1996: 11). This results in a concept of readability which is based on textual complexity.

1.3 Contribution of this research

Previous research focuses on obfuscation as an instrument of impression management and employs a variety of readability scores and a range of rhetorical and thematic content analysis techniques. However, there are very few studies using linguistic analysis techniques which are able to adequately capture managerial manipulation in the form of obfuscation. They tend to be of an experimental nature and their findings are tentative and inconclusive. In particular, previous readability measures primarily capture sentence length, thus lacking in linguistic validity, since syntactical complexity is more varied than mere sentence length.

The methodology for analyzing reading ease manipulation is based on research carried out in linguistics, which provides the measure with linguistic validity. Reading ease manipulation is based on textual complexity as a proxy for obfuscation.

The introduction of new methodologies for investigating textual complexity provides an opportunity for re-examining obfuscation by means of reading ease manipulation.
1.4 Organization of the paper

Section 2 provides an overview of reading ease manipulation methodologies applied in measuring impression management in prior research. Section 3 identifies the hypothesis to be tested, and Section 4 discusses prior studies measuring reading difficulty. In Section 5 a new reading ease manipulation methodology developed in this study is introduced. The hypothesis for testing is expanded and the specific measures of reading difficulty are defined. In Section 6 the narrative sections of sample annual reports are investigated for evidence of impression management. Section 7 summarises the research and its implications.

2. LITERATURE REVIEW

Figure 2 illustrates three strategies management adopts when engaging in impression management: (1) Obfuscation, (2) Attribution and (3) Performance referents. Previous accounting research from an impression management perspective has identified four different ways negative organizational outcomes (‘bad news’) can be obfuscated, namely: (i) Reading ease manipulation, (ii) Narrative disclosure, (iii) Thematic manipulation and (iv) Rhetorical manipulation. Four proxies for obfuscation are identified. In each case, the focus of analysis, methodologies used, and various research objectives for each strategy/type of obfuscation are also identified.

Table 1 summarises prior research of obfuscation studies into four methodological categories, namely (i) reading ease manipulation, (ii) rhetorical manipulation, (iii) narrative disclosure and (iv) thematic manipulation.
**Figure 2: Manifestations of impression management in narrative annual report sections**

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<tr>
<td>Types of obfuscation</td>
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<td>(i) Reading ease manipulation</td>
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<td>(ii) Rhetorical manipulation</td>
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<td>(iii) Narrative disclosure</td>
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<td>(iv) Thematic manipulation</td>
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<td>Thematic choice</td>
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<td>Rhetorical features</td>
<td>Key words</td>
<td>Positive/negative organizational outcomes</td>
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<td>Performance explanations</td>
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<td>Focus of analysis</td>
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<td>Transitivity index</td>
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<td>Texture index</td>
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<td>Research objective</td>
<td>Relationship between readability and increasing/declining financial performance</td>
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<td>Rhetorical devices and increasing/declining financial performance</td>
<td>Thematic content and increasing/declining financial performance</td>
<td>Relationship between performance explanations and increasing/declining financial performance</td>
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<td>Positive/negative keywords and increasing/declining financial performance</td>
<td>Thematic content analysis</td>
<td>Relationship between comparisons of performance and financial performance, size, and organizational age</td>
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<td>(i) Reading ease manipulation</td>
<td>(ii) Rhetorical manipulation</td>
<td>(iii) Narrative disclosure</td>
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<td>Clatworthy and Jones (2001a)$^4$</td>
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<td>Yuthas et al. (2002)</td>
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<td>Subramanian et al. (1993)</td>
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<td>Jones (1996)</td>
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<td>Courtis (1998)</td>
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<td>Sydserff and Weetman (1999)$^1$</td>
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<td>Clatworthy and Jones (2001b)</td>
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<td>Rutherford (2003)</td>
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<td>Courtis (2004)</td>
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</table>

$^1$ Methodological discussion

$^2$ Clatworthy and Jones (2003) both test for the association between positive/negative organizational outcomes and increasing/declining performance and the attribution of positive/negative organizational outcomes to internal/external factors and increasing/declining/performance.

$^3$ CSR = corporate social reporting.

$^4$ Clatworthy and Jones (2001a) positive/negative organizational outcomes represent one thematic component of a variety of items they test for their association with increasing/declining performance.
2.1 Obfuscation of negative organizational outcomes

Since management controls “the accounting communication process which monitors their performance” (Adelberg 1979: 187), it is not neutral in its presentation of accounting narratives. This reporting bias manifests itself in a tendency to obfuscate failures and underscore successes (Adelberg 1979) and is known in the accounting literature as the obfuscation hypothesis.

The obfuscation hypothesis is derived from agency theory and is based on the information asymmetry between management and annual report users. Since managerial remuneration (in the form of stock options and bonuses) and reputation are linked to firm performance, management has incentives to report positive organizational outcomes (‘good news’) more clearly than negative organizational outcomes (‘bad news’). This is due to the fact that the disclosure of unexpected negative organizational outcomes leads to shareholders selling their shares and to reputational losses for management. This, in turn, results in a decrease in the value of the firm, which, in turn, may make the company more vulnerable to hostile takeovers (known in the literature as ‘the market for corporate control’ (Jensen and Ruback 1983), and to the decrease in managerial value on the market place.

Figure 3 summarises various obfuscation mechanisms used to manipulate transparency. In narrative annual report sections the obfuscation of negative organizational outcomes is achieved by means of (a) disclosure choices and (b) the way information is presented.

2.1.1 Obfuscation using disclosure choices

Disclosure choices may be biased and disclosure choices may be selective to influence users’ impression of the company’s performance and prospects. Bias entails conveying information as positively as possible and selectivity involves omitting or including certain items of information. Bias and selectivity in financial accounts manifest themselves in the form of visual effects (emphasis of certain numbers by means of highlighting, font and size) and by the inclusion/exclusion of specific numbers (such as profit before tax) in the financial accounts, specifically on (1) textual material, (2) pictorial material, and (3) graphs. Selecting text for disclosure amounts to obfuscation by means of thematic choice. Disclosing text in a biased way
amounts to obfuscation by means of thematic manipulation. Whereas disclosing information selectively involves selecting specific themes, disclosure bias involves emphasising positive information.

Disclosure in the form of pictorial material is used to provide a visual representation of the company (See studies by Graves et al. 1996; Preston et al. 1996; Douglis 2000). Bias is to emphasize positive images and selectivity to draw attention to specific images. Disclosure in the form of graphs displays financial information in visual form (See studies by Beattie and Jones 1997, 1999, 2000; Godfrey et al. 2003). Bias is used to emphasize positive trends and conceal negative trends. For example, a carefully constructed graph can disguise the fact that an apparent rise in sales has not been particularly spectacular. Selectivity is used to include specific items of financial information and to exclude others.

2.1.2 Obfuscation by means of presentation
Obfuscation by means of presentation manifests itself both visually and linguistically in the textual part of narrative annual report sections. Visual obfuscation entails using layout, font, and other means of graphic design to draw the readers’ attention to positive organizational outcomes and away from negative organizational outcomes. Linguistic obfuscation involves obfuscating negative organizational outcomes by means of linguistic manipulation in the form of reading ease manipulation and rhetorical manipulation. Reading ease manipulation uses textual difficulty and rhetorical manipulation uses rhetorical devices as a proxy for obfuscation. The objective of these studies is to investigate whether the language used in narrative annual report sections transparently communicates performance information or whether it is being used by management to strategically manipulate the perceptions and decisions of shareholders and stakeholders.
Figure 3: Obfuscation mechanisms

Narrative sections

Text

Presentation

Discourse

Selectivity

- Thematic choice

Bias

- Thematic manipulation

- Reading ease manipulation
- Rhetorical manipulation

Language

Visual effects

Pictorial material

- Disclosure

- Bias and selectivity

Graphs

- Disclosure

- Bias and selectivity

- Positive images
- Selection of specific images

- Manipulation of scale
2.2 Reading ease manipulation

Research focusing on reading ease manipulation regards textual complexity as a proxy for obfuscation. It is based on the assumption that management conceals negative organizational outcomes by means of complex prose.

Thus, studies from the impression management approach which focus on reading ease manipulation are based on the premise that management has the “tendency to manipulate or arrange prose to enhance ‘good news’ [positive organizational outcomes] with easier to read writing, and mask ‘bad news’ [negative organizational outcomes] with more difficult writing” (Courtis 1998: 461).

Research focusing on examining impression management in narrative annual report documents by means of reading ease manipulation investigate whether management manipulate the perceptions and decisions of outside parties by rendering narrative annual report sections difficult to read.

Studies can be grouped in the following categories: (1) investigations of the readability of various narrative annual report documents in order to determine whether they are difficult to read (Lewis et al. 1986), (2) investigations of the variability of readability within a particular narrative annual report document in order to determine whether some sections are more difficult to read than others (Courtis 1998, Clatworthy and Jones 2001; Courtis 2004), and (3) studies focusing on methodological development (Smith and Taffler 1992a, Stevens et al. 1992, Jones 1997, Sydserff and Weetman 1999, Stevens et al. 1992, Syserff and Weetman 2002). They test various readability measures and compare results of in order to determine which is the most suitable for examining the readability of accounting narratives.

Smith and Taffler (1992a) compare the results of three readability measures, namely Flesch, Lix and Cloze. In order to rule out the effect of company characteristics on textual difficulty, they include both failed and non-failed companies which are matched by sector, turnover, financial year-end. Based on all three measures, the chairman’s reports of all companies are found to be difficult to read. Cloze scores indicate that “even users of the greatest sophistication have difficulty in fully comprehending financial narratives” (Smith and Taffler 1992a: 94).
Courtis (1995) uses the *Flesch*, *Fog*, and *Lix* scales to examine the readability of Hong Kong annual reports, which have been prepared in English, but whose target readership speaks English as a second language. His hypothesis is that annual reports by Hong Kong companies should be easier to read. This is based on the assumption that prepares would take the limited linguistic abilities of their target readership into consideration. However, his hypothesis is not borne out by the results of his analysis.

2.3 Relationship between impression management and ‘good/bad news’

This body of research attempts to establish a relationship between impression management in narrative annual report sections and ‘good/bad news’ in the financial accounts. Stanton et al. (2004: 57) summarize current research opinion on impression management in narrative annual report sections:

> Increasingly, annual reporting is viewed as an exercise in obfuscation. Sections of the reports are allegedly managed so as to present management in as favourable light as possible, particularly in situations that are identity threatening. For a corporation with poor or indifferent performance, there is opportunity to create an impression at variance with an overall reading of the report.

The association between impression management in and ‘good/bad news’ is based on the assumption of an information incongruity between the narrative annual report sections and the financial accounts. Thus, if management has not engaged in impression management, the information provided by the financial accounts and the narrative statements on the firm’s performance and prospects are consistent (Assuming no earnings management has taken place). If, however, the information of the financial accounts is not consistent with the information in the narrative statements, we can assume that management has used the narrative statements to manipulate the impressions and decisions of annual report users.

This gives rise to two possible scenarios, namely (1) the negative organizational outcomes reported in the financial statements is not reflected or not strongly enough reflected in the narrative statements and (2) the positive organizational outcomes reported in the financial accounts is not reflected or not strongly enough reflected in the narrative statements. Only negative organizational outcomes is analyzed the previous literature.
The positive organizational outcomes reported in the financial statements not being reflected or not being strongly enough reflected in the narrative statements can occur when a company appoints a new CEO. Research on earnings management suggests that incoming CEOs take a ‘big bath’, i.e. they engage in downwards management in the year they take over the running of the company and in and upward management in the following year. This is part of a strategy of managing expectations and setting achievable performance goals (Pourciau 1993).

2.3.1 Relationship between reading ease manipulation and ‘good/bad news’

Studies in reading ease manipulation examine the association between readability and profitability, the hypothesis being that companies with ‘bad news’ tend to obfuscate more than companies with ‘good news’ which makes the narrative annual report sections of firms with ‘good news’ easier to read than those with ‘bad news’.

Jones (1988) uses the Flesch readability score to investigate the readability of a company’s chairman’s narratives over a thirty-year period. The relationship between readability and seven independent variables is examined by means of regression analysis, namely 1) time, 2) operating profit/sales, 3) return on capital employed, 4) turnover, 5) legal status, 6) change of title from directors’ report to Chairman’s report, and 7) change of chairman. Readability is judged to be low and a negative correlation between readability and both turnover and time is established. As turnover increases and time passes, readability declines. Readability is found to be positively correlated with listing status.

Baker and Kare (1992) conduct research into the readability of US annual reports. They examine the relationship between the readability of the President’s Letter to Shareholders, measured by means of the Flesch readability score, and profitability and company size. Results indicate that the President’s Letter to Shareholders is difficult to read, i.e. requiring a reading level equivalent to college education. They find an inverse relationship between size and readability, but the association between readability and profitability is inconclusive.
Smith and Taffler (1992b) test the usefulness of readability and understandability measures for the prediction of bankruptcy. However, they find both readability and understandability scores to be unrelated to the profitability of the companies in question.

Smith and Taffler (1992a) investigate the relationship of the readability (Flesch and Lix) and understandability (cloze) of the Chairman’s report and bankruptcy. They find a readability to be a good predictor of bankruptcy, but understandability fails to successfully distinguish between failed and non-failed companies. This is attributed to the lack of accounting sophistication of the undergraduate accounting student test group. However, it could equally be due to the lack of validity of the cloze procedure, which is more likely to measure inference skills than comprehension.

Subramanian et al. (1993) investigate the relationship between readability, measured by means of Flesch and Fog, and ‘good/bad news’. For this purpose, they create a matched sample of under-performing and over-performing companies. They use a style analysis software program which complements the traditionally used readability measures with three additional components which capture style, namely a) strength, i.e. the strength of delivery of the document’s message, which is based on simplicity and conciseness, b) description, i.e. the use of modifiers such as adjectives and adverbs, and c) jargon, i.e. the vocabulary only known by a specific group of people. They find overall readability and strength to be positively correlated with company performance, however, they discover no significant difference in description and jargon between the two groups of companies.

Courtis (1995) examines the association between the readability of Hong Kong annual reports, and sector, size, and profitability, but none of the results are statistically significant. He also finds that readability has not improved significantly over time. In his critique of Courtis’ (1995) article, Jones (1996) points out that this study provides evidence for the syntactical difficulty of Hong Kong annual reports rather than their understandability. He further draws attention to the difficulty of evaluating annual reports in a bilingual environment.
Courtis (1998) examines the variability of readability scores within the Chairman’s Address of 120 companies listed on the Hong Kong stock exchange by means of using the Flesch score. He hypothesises that the variability of readability scores is a reflection of managers trying to hide poorly articulated bad news amongst clearly formulated good news. He finds that all companies display statistical variability. He further explores the relationship between the variability of readability and both profitability and frequency of press coverage. The idea is that companies in the public eye will want to minimise interference from investors and government and regulatory agencies by means of increased reading ease manipulation. The hypothesis is not particularly convincing. Voluntary disclosure research states the opposite, namely that companies in the public eye have higher voluntary disclosures and a generally more open disclosure policy because they are exposed to public scrutiny. Marston and Shrives (1991: 205) state that large companies are “more likely to have underlying reasons for increased disclosure” than small ones. Consequently, Courtis’ (1998) hypotheses are that companies with bad news and companies which are often cited in the press are more likely to hide bad news in their annual reports. He finds a significant relationship between variability of readability scores and companies with bad news, but not with companies often cited in the press.

However, Clatworthy and Jones (2001b), who replicate this study in the UK, fail to support Courtis’ hypotheses. The fact that the first passage of the Chairman’s report is easier to read than the middle section and the end is attributed to thematic structure rather than obfuscation. In this respect, their study is unusual since it relates comprehension difficulty to thematic structure. However, the methodology, which leads to the discovery of a three-part structure with eleven main themes, is not revealed and no evidence is found for a relationship between thematic structure and company performance.

Sydserff and Weetman (2002) analyze the Chairman’s report and Manager’s report of 26 small UK investment trusts with the aim of discovering whether the narrative sections of ‘good’ and ‘bad performers’ show any significant differences in (a) Flesch readability score, (b) transitivity index, or (c) DICTION scores. Whereas the result of their analysis is mixed, the overall conclusion is that both the transitivity index and
the DICTION scores provide “useful alternatives for the accounting researcher investigating impression management” (Sydserff and Weetman (2002: 539).

Rutherford (2003) examines whether companies use textual complexity to obfuscate bad performance. Using the text length and the Flesch reading ease index to measure obfuscation by means of reading ease manipulation, he finds no evidence for the obfuscation hypothesis.

Table 2 provides an overview of the narrative disclosure studies focusing on reading ease manipulation. The different results regarding the relationship between readability and profitability can be attributed to two factors, a) the questionable reliability and validity of readability measures and b) the different measures used to capture ‘good/bad news’.
<table>
<thead>
<tr>
<th>Study</th>
<th>Country</th>
<th>Time scale</th>
<th># of annual reports</th>
<th>Narrative sections</th>
<th>Readability measure</th>
<th>Independent Variables</th>
<th>Statistics</th>
<th>Results</th>
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<td>Flesch</td>
<td>Size, profitability</td>
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<td>1978-1985</td>
<td>66</td>
<td>Chairman’s narratives</td>
<td>Cloze, Lix, Flesch</td>
<td>Bankruptcy</td>
<td>Correlation analysis</td>
<td>Insignificant for profitability significant</td>
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1 (1) operating profit/sales, (2) return on capital employed
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<td>1986, 1991</td>
<td>32</td>
<td>Chairman’s address, notes</td>
<td>Flesch, Fog, Lix</td>
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<td>Profitability, press coverage</td>
<td>---</td>
<td>Significant for press coverage</td>
</tr>
<tr>
<td>Sydserff and Weetman (1999)</td>
<td>UK</td>
<td>1995/96</td>
<td>10</td>
<td>OFR</td>
<td>Flesch, texture index</td>
<td>None</td>
<td>---</td>
<td>No correlation between Flesch and texture index</td>
</tr>
<tr>
<td>Clatworthy and Jones (2001b)</td>
<td>UK</td>
<td>1999/2000</td>
<td>27</td>
<td>Chairman’s narratives, Chairman’s report</td>
<td>Flesch, transitivity index, DICTION</td>
<td>Performance</td>
<td>ANOVA</td>
<td>Significant for thematic structure Mixed results</td>
</tr>
<tr>
<td>Sydserff and Weetman (2002)</td>
<td>UK</td>
<td>2001</td>
<td>14</td>
<td>President’s Letter and MDandA</td>
<td>Performance</td>
<td></td>
<td>---</td>
<td>+ and – performance are more communicative</td>
</tr>
<tr>
<td>Yuthas et al. (2002)</td>
<td>USA</td>
<td>1998</td>
<td>64</td>
<td>OFR</td>
<td>Flesch</td>
<td>Risk, performance, size, regulation</td>
<td>Multiple regression analysis</td>
<td>Insignificant for all variables</td>
</tr>
<tr>
<td>Rutherford (2003)</td>
<td>UK</td>
<td>2001</td>
<td>14</td>
<td>President’s Letter and MDandA</td>
<td>Performance</td>
<td></td>
<td>---</td>
<td>+ and – performance are more communicative</td>
</tr>
</tbody>
</table>
3. RESEARCH QUESTIONS AND HYPOTHESES
The research analyzes the use of impression management in narrative annual report sections. Two hypotheses are tested, the first examining the relationship between impression management and reading ease manipulation, and the second examining the association between reading ease manipulation and ‘good / bad news’.

3.1 Association between impression management and reading ease manipulation
The obfuscation hypothesis states that management tends to obfuscate negative organizational outcomes. This hypothesis is examined by reference to reading ease manipulation. Reading ease manipulation is based on textual complexity as a proxy for obfuscation. The expectation is that narrative annual report sections will be difficult to read. The hypothesis for testing is:

**H₁:** Companies use reading ease manipulation as a means of obfuscating negative organizational outcomes, which renders their narrative sections more difficult to read and comprehend.

This first hypothesis is further developed in Section 5 into 12 sub-hypotheses.

3.2 Association between reading ease manipulation and ‘good/bad news’
The research also seeks to answer the question whether the use of impression management varies in relation to ‘good/bad’ news. It is hypothesized that impression management is positively related to ‘bad news’ (declining performance) and inversely related to ‘good news’ (increasing performance). This means that the more ‘bad news’ a company has to report, the more impression management is used in its narrative annual report sections.

The research tests the hypothesis that the narrative annual sections of companies with ‘bad news’ show a high level of reading ease manipulation, whereas the narrative annual report sections of companies with ‘good news’ show low levels of reading ease manipulation, as follows.
H2: Narrative annual report sections of companies with ‘good news’ (increasing performance) are easier to read (less textually complex) than those with ‘bad news’ (declining performance).

4. MEASUREMENT OF IMPRESSION MANAGEMENT

4.1 Content analysis

The analysis of narrative annual report sections necessitates a methodology capable of analyzing text in a systematic way. Content analysis is a textual analysis technique developed by the social sciences. It is used to determine the occurrence of certain words, concepts, or themes within texts. The analysis involves quantifying and tallying their presence and then making inferences about the messages within the texts. To conduct a content analysis, the text is broken down, or coded, into manageable categories on a variety of levels, e.g. word, phrase, sentence, or theme.

Accounting research distinguishes between two different approaches, namely (1) syntactic content analysis, which “focus[es] on analysing the readability of the text using syntactical features” and (2) thematic content analysis, which is interested in “identify[ing] specific trends, attitudes or content categories from the text and then draw inferences from them” (Jones and Shoemaker 1994: 143). The objective of syntactic content analysis is to “analyse and quantify the cognitive difficulty of reading the message”, whereas that of thematic content analysis is to “extract and analyse themes inherent within the message” (Jones and Shoemaker: 1994: 143). Syntactic content analysis also includes rhetorical text analysis techniques. Figure 4 provides an overview of the content analysis techniques used in accounting research into impression management.
Figure 4: Content analysis techniques used in impression management research

<table>
<thead>
<tr>
<th>Type of content analysis</th>
<th>Syntactic content analysis</th>
<th>Thematic content analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language</td>
<td></td>
<td>Content</td>
</tr>
<tr>
<td>Linguistic features</td>
<td>Syntax</td>
<td>Rhetoric</td>
</tr>
<tr>
<td>Methodology</td>
<td>Readability formulae</td>
<td>Texture index</td>
</tr>
<tr>
<td></td>
<td>Understandability</td>
<td>Transitivity index</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DICTION</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WORDS</td>
</tr>
<tr>
<td>Focus of analysis</td>
<td></td>
<td>Passive voice</td>
</tr>
<tr>
<td></td>
<td></td>
<td>certainty</td>
</tr>
<tr>
<td></td>
<td></td>
<td>optimism</td>
</tr>
<tr>
<td></td>
<td></td>
<td>activity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>realism</td>
</tr>
<tr>
<td></td>
<td></td>
<td>commonality</td>
</tr>
</tbody>
</table>

- Syntax features: Fog, Flesch, Lix
- Rhetoric features: Cloze
- Methodology features: Computerised content analysis
- Content features: Computerised content analysis
- Focus of analysis features: Sentence length, Number of syllables, Word length, Deletion of every n\textsuperscript{th} word, topicality, intertextuality, conjunction, connectivity, specificity, situationality, shift in info category, Passive voice, certainty, optimism, activity, realism, commonality
Whereas syntactic content analysis involves the investigation of the linguistic aspects of texts, thematic content analysis entails the examination of the content of texts. Syntactic content analysis is used to investigate obfuscation in the form of reading ease manipulation and rhetorical manipulation. Thematic content analysis is used to investigate both obfuscation in the form of narrative disclosure and thematic manipulation and managerial behaviour in the form of attribution.

4.2 Measuring reading difficulty

The concept of readability originates in education research where it is used to determine the reading difficulty of primary school texts in order to classify them into different reading levels. Accounting research from an impression management perspective has adopted the concept of readability and its various measures for investigating the obfuscation of negative organizational outcomes in narrative annual report documents by means of reading ease manipulation.

There are three approaches to textual difficulty, namely (1) a text-centered approach, (2) a user-centered approach, and (3) an integrative approach focusing on both aspects. Table 3 provides an overview of the different concepts, units of analysis, methodologies, measures and hypotheses underlying the three approaches to reading difficulty used in previous research. This research uses a text-centered approach, whereby textual complexity is analysed using discourse analysis. The concept of textual complexity which lies at the heart of the paper, is discussed in Section 5.
<table>
<thead>
<tr>
<th>Focus</th>
<th>Text-centered components</th>
<th>User-centred components</th>
<th>Integrative approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concept of readability</td>
<td>Readability</td>
<td>Textual complexity</td>
<td>Understandability</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Communicative effectiveness</td>
</tr>
<tr>
<td>Unit of analysis</td>
<td>Sentence level</td>
<td>Text level</td>
<td>Text level</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sentence level¹</td>
</tr>
<tr>
<td>Methodology</td>
<td>• Lix</td>
<td>Discourse analysis</td>
<td>Cloze</td>
</tr>
<tr>
<td></td>
<td>• Fog</td>
<td></td>
<td>Texture index</td>
</tr>
<tr>
<td></td>
<td>• Flesch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metrics</td>
<td>• Word length</td>
<td>• Amount of cohesive ties</td>
<td>Deletion of every nᵗʰ word</td>
</tr>
<tr>
<td></td>
<td>• sentence length</td>
<td>• Pronoun density</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Number of syllables per word</td>
<td>• Relationship between given and new info</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Distance between anaphor/bridge and antecedent</td>
<td></td>
</tr>
<tr>
<td>Hypothesis</td>
<td>Long words and long sentences make a text difficult to read</td>
<td>Lack of cohesive devices make a text difficult to read</td>
<td>Unfamiliarity of reader with text characteristics make a text difficult to read</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lack of communicative effectiveness makes a text difficult to read</td>
</tr>
</tbody>
</table>

¹ The unit of the level is the so-called t-unit, which consists of a main clause and all the subordinate clauses attached to it.
4.2.1 Text-centered approach

A text-centered approach claims that textual difficulty is a function of the text itself, i.e. elements such as word length, sentence length and number of cohesive devices within the text. Studies from the impression management approach which focus on reading ease manipulation are also referred to as ‘readability research’, since one of its main aims is to determine how easy the narrative sections of annual reports are to read. Readability is measured by means of so-called ‘readability formulae’ or ‘scores’ which give an indication of the syntactical difficulty of text:

Readability formulae are therefore “a function of the length of sentences and the size of words in a text” (Harrison and Bakker 1998: 122). They represent a “single summary reading ease score” (Courtis 1995: 6) for a particular text or text passage.

They work by comparing a calculated score with “predetermined standards of written materials graded according to difficulty” (Courtis 1995: 5), ranging from comics to scientific articles. They thus represent objective and quantifiable methods of measuring comprehension difficulty.

They were first developed in education research to assess the difficulty of reading material for school children. To transfer this methodology to the area of accounting research can lead to potential validity problems due to a difference in the subjects’ age and due to the fact that narrative annual report sections have never been subject to grading. Thus, the application of readability formulae in this context is highly questionable (Stevens et al. 1992: 371).

The most commonly used readability formulae in accounting research are the Flesch and Lix scores. They are based on the counting of sentences, words, syllables and characters. The counts are subsequently input into a formula which represents the reading ease of a particular text. Whereas the Flesch score “is related to memory
span”, the Lix score is associated with the “reader’s speed of recognition” (Courtis 1995: 5).

**Flesch score**

The Flesch score measures sentence length and syllables per 100 words. The closer the score is to zero, the more incomprehensible the text under investigation is. “The underlying assumption is that the longer the sentences and the longer the words within these sentences, then the more difficult the text being measured” (Sydes and Hartley (1997: 143). The advantage of the Flesch score is that it is very simple to apply since it is part of word-processing packages such as Word.

**Formula 1: Flesch score**

\[
206.835 - 0.846wl - 1.016sl
\]

- \(wl\) = word length = number of syllables per 100 words
- \(sl\) = average sentence length = total number of words/total number of sentences

**Lix score**

The caculation of the Lix score is shown below. A low Lix score indicates a high level of readability.

**Formula 2: Lix score**

\[
S + W
\]

- \(S\) = average number of words per sentence
- \(W\) = the percentage of words of seven or more letters

Since readability scores reduce readability to a single measure, they have been criticized by accounting, linguistics, and education researchers for being too simplistic:

How easy a text is for an individual to read is the result of the interaction of a number of different factors. It is a multifaceted phenomenon, reflecting properties both of texts and readers and the interaction between them. (Bailin and Grafstein 2001: 292)
Readability formulae do not take text features such as syntactical complexity, lexis, and rhetorical features into consideration, which play a part in rendering a text difficult to read. They also ignore reader characteristics, including background knowledge, interest in the subject of the text under investigation, level of general education, and reading speed and strategies (Fulcher 1997: 501).

Readability formulae can thus be regarded as mere predictors of text difficulty:

Predictors are shortcuts to making tentative decisions in the absence of more precise information. This is so, because there is no direct link between estimates (or predictions of) text difficulty and reader comprehension. (Fulcher 1997: 501)

What is more, research has shown readability measures to lack in so-called “inter-formula consistency” (Stevens et al. 1992: 372), as far as judging how easy or difficult difficulty a particular type of text is to read, which calls their reliability into question. This problem is accentuated further by computer packages, which have been found to be unreliable in calculating readability scores in a recent study (Sydes and Hartley 1997: 144). Their conclusions after testing four different computer packages are:

(i) … different readability scores will be obtained from ostensibly the same readability measure if different computer packages are used, and
(ii) … this is more likely to be the case when programs are used on more difficult texts.

These findings call both the validity and the reliability of readability scores into question and thus the results of narrative disclosure studies based on these measures.

4.2.2 User-centered approach

A user-centered approach regards textual difficulty as a function of the reader and the writer, such as background knowledge and ability to convey ideas. As discussed in the previous section, any measure dealing with comprehension difficulty needs to take two components into consideration, (a) the text and (b) the reader. Readability research only focuses on text only. The limitations posed by lack of reader involvement have been addressed in accounting research by means of differentiating between ‘readability’ and ‘understandability’, with readability being text-centred and understandability being reader centred:
Readability thus measures the textual difficulty of a passage; while understandability measures the ability of a reader to gain knowledge from a text, and is contingent not only on syntactical difficulty, but also on reader characteristics such as the reader's background, prior knowledge, interest, and general reading ability. Different readers may, thus, exhibit different levels of understanding because of their individual reading abilities. The readability or syntactic complexity of a text, however, is essentially fixed. Readability is a prerequisite of aggregate understandability; but does not guarantee individual understandability. (Jones, 1997: 105f.)

Understandability is measured by means of the *cloze* test, which requires the deletion of words or phrases from a text at either random or fixed intervals which target readers are then asked to complete. Subsequently, a percentage score is calculated which indicates the success of readers at guessing the missing words. Thus, the *cloze* test involves the “*direct assessment by readers of textual complexity*” (Jones, 1997: 106). Whereas the *Flesch* and *Lix* scores measure complexity of display, the *cloze* score measures meaning (Jones 1996: 87). In fact, Smith and Taffler (1992a), who compare *cloze* with *Flesch* and *Lix* scores, find significant differences for them in same text. Only *Flesch* and *Lix* scores are highly correlated. The also find the level of the *cloze* score to be dependent on the user’s level of accounting sophistication. This indicates that different concepts are being measured. This leads them to the following conclusion:

… understandability is related both to complexity of context and to education and experience, and constitutes a different measure to readability indices calculated independently of either user or context. (93)

The relatively low *cloze* scores recorded even for sophisticated users of accounting information, such as partners and managers or a Big 8 accounting firm are attributed to the difficulty of the accounting narratives.

However, these results could also be an indication that the measure itself is flawed. Jones’ findings (1997: 124) suggest severe shortcomings as far as the *cloze* test’s “*measurement of comprehension, ... validity, and ... [its] precise meaning*” are concerned. In fact, what the *cloze* score is really testing is not comprehension, but inference, i.e. the ability of the reader to correctly guess missing words (Jones 1997: 118). Furthermore, due to its reliance on reader participation, the *cloze* procedure can only measure, but not predict readability (Lewis et al. 1986: 202). Another drawback of the *cloze* procedure is its dependency on direct reader involvement of through personal contact or questionnaires (Lewis et al. 1986: 202), which makes it very time-
consuming and impractical for accounting researchers. Consequently, there are only two accounting studies using the cloze procedure (Smith and Taffler 1992a,b).

What is more, there is a lack of evidence as far as the cloze procedure’s suitability for all types of texts or genres and age groups is concerned. Like readability measures, the cloze score was originally developed by education researchers. Since narrative annual report documents differ substantially from elementary pedagogic materials, the validity of the cloze score is questionable in this context.

Both readability and understandability measures suffer from the drawback that their underlying concept of reading is too simplistic. They ignore the purpose of reading a particular text and the reading strategies employed:

Readers use texts for a wide range of reasons: to get an overview of a subject, to answer specific questions, to carry out a task, etc. They may read sequentially, or dip into the text where they think it might be useful; they may skim read, search for specific information, or study in depth. (Harrison and Bakker 1998: 124)

In fact, understandability studies are fundamentally flawed because they do not take into account that narrative annual report sections are primarily written for a very specific user group of well-informed readers with a strong interest in the text under investigation who have a specialist knowledge of the subject, and - what should not be forgotten - familiarity with the specific type of text under investigation. Although Jones (1997: 122) regards shareholders as the target readership, or ‘readership population’, as he refers to them, of corporate annual reports, I would argue that corporations tailor their annual reports to the needs of their most influential user groups, i.e. financial analysts and institutional investors, and not individual shareholders. These user groups tend to differ substantially in background knowledge and experience in reading annual reports.

In fact, from a reader perspective, reading comprehension can be regarded as consisting of three aspects. The first aspect is the reader’s pre-existing general knowledge of the language used in the narrative section. This involves both the complexity of the text reflected in its syntax and lexis. In general, the higher the level of education, the more comprehensible the text will be. The second aspect involves
the knowledge of the topic of the text under investigation. This depends on the reader’s professional qualification and/or interest in the subject. The more knowledgeable the reader is on the topic discussed in the text, the easier it will be to comprehend. The third aspect is based on the familiarity with the particular type of text under investigation. The more familiar the reader is with the particular type of text, the easier it will be to understand.

Faris and Smeltzer (1997) find background knowledge to be a crucial factor as far as annual report comprehensibility is concerned. Stevens et al. (1992: 373) show that the key for reading comprehension is not the ‘reading level’ of the target readership, but prior knowledge of the topic:

Thus, the reader must be familiar with the concepts (for example, efficient market), terms (for example, revenue), and context (for example, financial report) if the reader is to comprehend the message that the writer hopes to convey. (Stevens et al. 1992: 373)

Research in psychology confirms the importance of world knowledge and relevance in text comprehension. Since text comprehension is a function of cognitive processes, psychology also provides more adequate methodologies for measuring ‘understandability’ than the cloze procedure. They include recall and recognition by means of questionnaires and multiple-choice tests.

4.2.3 Integrative approach
Thus, both readability and understandability measures inadequately incorporate reader characteristics and thus lack validity. Their other shortcoming is their limited reflection of textual characteristics. Although the textual limitations of readability measures have been widely recognised by accounting researchers, they have been used for the last forty years for lack of a better alternative:

Although sentence complexity is probably the real causal factor in difficulty, length correlates highly with complexity and is much easier to count. Even though word length and sentence length may not cause difficulty, they have been found to be good indices of difficulty. (Courtis 1995: 5)

According to Fulcher (1997: 501), readability measures tend to correlate at about 0.64 to 0.70 with other measures of text difficulty, such as cloze, and teacher estimates of
text difficulty. However, there are a variety of textual features which are not reflected by readability measures:

They do not measure word frequency, concept density, level of abstraction, the appropriateness of the organisation, coherence and logical presentation of ideas. Nor do they take account of elements of format or graphic design such as length of type line … (Courtis 1995: 6)

The challenge for accounting researchers is to develop a measure for comprehension difficulty which encompasses both reader and text characteristics. This has been attempted by Sydserff and Weetman (1999) in their texture index.

The ‘texture index’ is an alternative readability measure for analysing the Operating and Financial Review. It integrates the elements of a text which readers perceive as crucial in understanding narratives:

Readability formulae have been criticised as a method for scoring accounting narratives because of their focus on word- and sentence-level features and not on whole-text aspects, their lack of regard for the interests and motivation of the reader, and their inappropriateness for evaluating adult-based and technical accounting narratives. [The texture index] addresses these criticisms. (Sydserff and Weetman 1999: 459)

It is different from conventional readability formulae since it combines both text-centred and user-centred elements (Sydserff and Weetman 1999: 461).

The texture index was developed by Roseberry (1995) in order to help writers evaluate the textual difficulty of their texts. It is based on de Beaugrande and Dressler’s (1981) ground breaking work in text linguistics. They regard texts as consisting of seven standards of textuality which render a text as communicatively effective. “If any of these standards is not considered to have been satisfied, the text will not be communicative” (de Beaugrande website).

The standards can be categorized into text-centered standards and user-centered standards. User centered standards can be further categorized into producer (writer) standards and receiver (reader) standards.
Table 4 provides an overview of the indexicals used in the texture index. They are modeled on de Beaugrande and Dressler’s (1981) concept of textuality and categorized into text-centered and user-centered standards.

<table>
<thead>
<tr>
<th>Table 4: Standards of textuality</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Text-centred standards</strong></td>
</tr>
<tr>
<td>Reader-centred standards</td>
</tr>
<tr>
<td>Connectivity (Coherence)</td>
</tr>
<tr>
<td>Conjunction (Coherence)</td>
</tr>
<tr>
<td>Shift in information category</td>
</tr>
<tr>
<td>Specificity</td>
</tr>
<tr>
<td>Topicality</td>
</tr>
<tr>
<td><strong>Writer-centred standards</strong></td>
</tr>
</tbody>
</table>

The texture index, which is based on Roseberry’s (1995) model, consists of indexicals, which represent seven criteria for evaluating texts, namely (1) topicality, (2) intertextuality, (3) conjunction, (4) connectivity, (5) shift in information category, (6) specificity, and (7) situationality. As a matter of fact, the texture index captures similar criteria of communicative effectiveness as those established by a panel of five experts in the field of reading/writing research (Fulcher 1997), namely (a) linguistic structure, (b) contextual structure (purpose and audience, context of use, information gaps, layout and visual support), (c) conceptual structure (degree of familiar and unfamiliar text content, informational relationships, degree of abstractness, and temporal structure), and (d) reader-writer relationship (use of pronouns, tense and voice).

(1) **Topicality**
Topicality refers to “the degree to which the narrative adheres to the main topic(s) and the overall topic framework” (Sydserff and Weetman 1999: 465). This element does not capture a textual feature, but a thematic feature in that it checks for the presence or absence of pre-defined topics or themes. In this respect it reflects the goals of the thematic content analysis strand of narrative disclosure research. Consequently, the texture index incorporates both textual elements and themes and thus represents a unique combination of syntactic and thematic content analysis.
(2) Intertextuality
The second indexical, intertextuality “concerns the factors that make use of one narrative dependent upon the knowledge of other material” (Sydserff and Weetman 1999: 467). In this particular context, it refers to the interconnection of the narrative sections of the annual report with the financial statements and notes.

(3) Conjunction
Conjunction “is concerned with the specific words or phrases … which function as links and bind narratives together” (Sydserff and Weetman 1999: 468). Conjunction refers to the same concept as grammatical cohesion discussed further on.

(4) Connectivity
Connectivity measures the degree to which each succeeding part of the narrative refers to an earlier part by means of creating semantic links from one t-unit to the next by means of repetition of words or phrases. Connectivity refers to the same concept as grammatical cohesion discussed further on.

(5) Shift in information category
Shift in information category refers to the measure of coherence resulting from shifts in information category. Consequently, “the measure of topic shift is therefore a quantification of how many information categories are contained in the report and how frequently the category changes” (Sydserff and Weetman 1999: 471).

(6) Specificity
Specificity measures the extent of specific references in a text, i.e. the extent of quantified information provided.¹

(7) Situationality

¹ This measure is similar to Krumbholz’ s (1994) precision scale and Wiseman’s (1982) degree of specificity, who use them as a way of quantifying information provided in the narrative sections of annual reports, with the aim of constructing disclosure indices. The former categorises information onto a sliding scale into a) point information, b) interval information, c) comparative information, d) additional information or explanation, and e) not classifiable information. He also classifies information into a) verbal, b) numerical, and c) mixed. The latter classifies information into a) quantitative information, b) specific, but non-quantitative information, and c) items referred to in general terms.
Situationality tests whether the Operating and Financial Review occurs in the relevant context, i.e. the annual report. Situationality “is either satisfied or not for the narrative as a whole and is therefore not relevant to a unit-by-unit analysis” (Sydserff and Weetman 1999: 472).

**Scoring**

The unit of analysis is extended beyond the word level and comprises an “independent clause with all subordinate clauses attached to it” (Sydserff and Weetman 1999: 463), which is referred to as a text-unit or t-unit.

Narrative sections are scored for each indexical and the indexical scores are subsequently combined to provide a score for texture. The scoring system is a categorical score of 0, 1 or 2; zero denoting the absence of a particular characteristic and one and two different degrees of presence of this particular feature. The methodology is similar to that of a voluntary disclosure index, only that the texture index captures components of readability, whereas the voluntary disclosure index measures the amount and type of voluntary information contained a particular narrative section of an annual report.

The advantage of this new scoring approach compared to its predecessors is that it constitutes a more complex measure of textual complexity than conventional readability measures. This is reflected in the lack of association between the texture index and the Flesch readability score:

> The generality of low correlation coefficients between each indexical and the Flesch readability scores … provides a strong indication that the indexicals offer information about the narrative which is not captured in a readability score. (Sydserff and Weetman 1999: 473)

However, its disadvantage compared to readability measures, such as the *Flesch* and *Lix* scores, it its subjectivity, which is the result of the researcher and not a computer evaluating the text.

**4.2.4 Methodological problems associated with the integrative approach**

What is more, there are a number of methodological problems associated with (a) its subjectivity, (b) the unit of analysis and (c) some of the indexicals which make up the
texture index. First of all, the texture index is a very subjective measure whose analysis and scoring approach depends entirely on the judgment of the researcher. Secondly, the text unit does not extend beyond the sentence which means that the analysis does not pick up on phenomena occurring over several sentences. The importance of extending the unit of analysis to the whole sentence will become apparent further on. Thirdly, the following shortcomings as associated with some of the indexicals themselves: The term ‘information category’ within the indexical ‘shift in information category’ is not very clearly defined and it is hard to reliably differentiate it from the term ‘topic’ used in the indexical ‘topicality’.

The indexical ‘intertextuality’ only refers to the interconnection of information in the narrative annual sections with information found in other sections of the annual report. However, the concept of ‘intertextuality’ originates in the disciplines of linguistics and literary studies, where it is used in a much wider sense. It is based on the idea that texts do not stand in isolation, but are interconnected with other texts. These intertextual relationships include anagram, allusion, adaptation, translation, parody, pastiche, imitation, and other kinds of transformation. In the context of business writing, this means that a specific Chairman’s report does not stand on its own, but has to be seen and read in the context of business writing in general and in the context of thousands of other Chairman’s reports in particular.

The indexical ‘situationality’ is misunderstood by Sydserff and Weetman (1999). Coined by De Beaugrande and Dressler (1981), it does not refer to the fact whether a text occurs in the relevant context, but it means that the writer and reader must share the same background knowledge for a text to be ‘readable’ or easily understood.

Finally, concerning the indexical of ‘conjunction’, there is no linguistic basis supporting Sydserff and Weetman’s (1999) claim that additive conjunctions are inferior to adversative or causal conjunctions. In fact, when presenting a list of activities or events, additive conjunctions are the only appropriate linguistic means to do so.
For these reasons, despite its improvements on previous readability measures, the texture index is a flawed measure of reading ease manipulation and thus suffers from potential validity problems.

5. MEASUREMENT OF IMPRESSION MANAGEMENT IN THIS STUDY

5.1 Corpus analysis

The basic problem underlying the study of impression management in accounting narratives is a methodological one. Since the investigation of impression management in narrative annual report sections entails analyzing the way language is used to manipulate the readers’ perceptions of the company, it necessitates linguistic methodology which allows the empirical quantitative analysis of texts.

Corpus linguistics offers such a methodology in the form of corpus analysis. Corpus linguistics is simply the study of language through corpus-based research. A corpus can be defined in the following way:

A collection of linguistic data, either written texts or a transcription of recorded speech, which can be used as a starting-point of linguistic description or as a means of verifying hypotheses about a language. (Crystal 1991).

In the context of this study, the corpus constitutes of 100 Chairman’s Reports, taken from the corporate annual reports of UK companies.

Three main area of corpus based linguistic study are lexis (e.g. word use, idioms, irregular plurals), syntax, i.e. sentence level features (e.g. use of prepositions, verb forms, pronouns, agreement), and discourse, i.e. the structure of text (e.g. cohesion above the sentence level).

Corpus analysis involves all processes related to processing, usage and analysis of corpora. It entails the computerized analysis of the linguistic features of the sample texts. For this purpose, texts which have been rendered machine-readable need to be annotated with additional information in order to allow the speedy and easy retrieval and analysis of the linguistic information contained in the corpus.
Due to its objectivity and linguistic validity corpus analysis provides a suitable alternative to syntactic content analysis for investigating the linguistic characteristics associated with readability.

Figure 5 illustrates the interrelationship between impression management in the form of obfuscation, methodologies and disciplines used in this study to capture, measure and analyse it:
5.1.1 Corpus analysis using Coh-Metrix

There are very few commercially available corpus analysis programs which are suitable for analyzing reading difficulty. The Department of Psychology at the University of Memphis, Tennessee is currently developing a corpus analysis program specializing in analyzing reading difficulty called Coh-Metrix which functions as an alternative to conventional readability formulae.

Coh-Metrix is a totally automated text analysis tool which computes reading difficulty measures at various language levels. The problem is that higher level (sentence level and above) phenomena, such as cohesion, are notoriously difficult to capture by means of automated techniques. For this reason, it does not provide linguistic validity at the language level which is argued to be a crucial element for reading difficulty in this research.
5.1.2 Corpus analysis using MMAX2

This study uses MMAX2, which is a text analysis program specializing in discourse features, i.e. linguistic features which extend beyond the sentence level. It has been developed by the European Media Laboratory GmbH (http://eml-r.villa-bosch.de) in Heidelberg, Germany. It is written in Java and processes XML-encoded texts which make use of standoff annotation. It uses an XML parser and XSL stylesheet processor. The advantage of using MMAX2 over other corpus analysis programs, such as Coh-Metrix, is that it provides an interactive approach to textual analysis, which allows the input of the researcher and thus results in greater linguistic validity.

Unlike Coh-Metrix, it does not compute reading difficulty measures. However, its output is used as a basis for computing reading difficulty. The measures for reading difficulty used in this study are developed separately in the next section and are based on linguistic research.

5.2 Discourse analysis

The methodology proposed in his study for analyzing reading difficulty addresses two validity problems inherent in conventional concepts and measures of readability, namely a linguistic and a psychological one.

The first is concerned with the concept of text itself. Text is not just a collection of sentences, but represents a network of both grammatical and semantic connections which go beyond the sentence level. For this reason, readability measures need to capture this aspect of text.

Conventional readability measures suffer from validity problems since “the linguistic assumptions underlying readability formulae are problematic … [in that they] do not in fact measure what they were designed to measure” (Bailin and Grafstein 2001: 298). This is due to the fact that the linguistic criteria “that form the basis for readability scores do not constitute a satisfactory basis for assessing reading difficulty” (Bailin and Grafstein 2001: 286).

The second concerns text comprehension. What makes a text difficult to read and understand goes beyond word and sentence length. Undoubtedly, long words takes
longer to process since they occur less frequently and thus take more time to access
and interpret. Long sentences are also more difficult to understand, since they make
more demands on working memory (Graesser et al. 2004: 194).

This study introduces an objective and quantifiable method of measuring readability
which is based on research carried out by linguistics and psychology. It thus
overcomes the validity problems inherent in readability formulae and cloze scores and
the subjectivity and methodological problems inherent in the texture index.

This is achieved by means of (1) basing its assumptions of what constitutes text on
research carried out by discourse analysis, a sub-discipline of linguistics, (2) by means
of basing its assumptions of readability on psychological assumptions of
comprehension difficulty, and (3) by means of using computer-assisted corpus
analysis.

From a linguistic point of view, readability formulae are inadequate since they can
only account for textual difficulty as far as word and sentence length is concerned.
They do not capture an important characteristic of text that has a large impact on
comprehension, namely the interrelatedness within and between sentences:

Typically, in any text, every sentence except the first exhibits some form of [link]
with a preceding sentence, usually with the one immediately preceding. In other
words, every sentence contains at least one anaphoric tie [= a word or phrase which
refers back to an earlier word or phrase] connecting it with what has gone before.
Halliday and Hasan (1976: 293)

If these interconnections within and between sentences are missing, a text becomes
difficult to read and comprehend. Thus, a linguistically valid readability measure
needs to capture in some way the extent to which a text contains connective devices.

For the purpose of this paper, text linguistics and discourse analysis are regarded as
one and the same discipline. Text linguistics or discourse analysis is the linguistic sub-
discipline which extends the analysis of written texts beyond the sentence level. It
thus provides the means for analyzing the complex interrelationships between
sentences.
Appendix 1 contains a summary of the definitions of the linguistic terms used in this paper.

5.2.1 Cohesion

For this purpose, discourse analysis introduces the concept of cohesion. Cohesion refers to a set of relationships which connect different parts of text by meaning. Whereas grammatical cohesion refers to the way a text hangs together in terms of grammatical and lexical devices, semantic coherence refers to the way a text hangs together in terms of content (Halliday and Hasan (1976) refer to semantic cohesion as coherence).

The concept of cohesion plays an important part in reading difficulty since it provides the linguistic cues of how sentences should be conceptually related. If they are missing, a text becomes more difficult to read and understand.

Figure 6 illustrates the features and linguistic devices of cohesion. The two type of cohesion are explained in more detail further on.

<table>
<thead>
<tr>
<th>Figure 6: Features and linguistic devices of cohesion</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Semantic cohesion</strong></td>
</tr>
<tr>
<td>Set of relationships which connect different parts of a text by meaning</td>
</tr>
<tr>
<td>Locational, temporal and causal relations</td>
</tr>
<tr>
<td>• resemblance</td>
</tr>
<tr>
<td>• cause-effect</td>
</tr>
<tr>
<td>• temporal sequence</td>
</tr>
<tr>
<td>• attribution</td>
</tr>
<tr>
<td><strong>Grammatical cohesion</strong></td>
</tr>
<tr>
<td>Grammatical or lexical relationships that connect different parts of a text</td>
</tr>
<tr>
<td>Referential relations</td>
</tr>
<tr>
<td>• anaphors</td>
</tr>
<tr>
<td>• bridges</td>
</tr>
</tbody>
</table>

Example 1 illustrates an interrelationship between two parts of the sentence by means of semantic cohesion. The two parts of the sentence are linked by means of the conjunctive if which states a conditional relation. The event described in the second part of the sentence only takes place if the event described in the first part also takes place.
Example 1: Interrelationship between two parts of the sentence by means of semantic cohesion

If our sales remain low in Eastern Europe, we will have to close our outlets Hungary and Poland.  
Key: Underlined words/-phrases constitute the markers for semantic cohesion.

Example 2 demonstrates an interrelationship between two sentences by means of grammatical cohesion.

Example 2: Interrelationship between two sentences by means of grammatical cohesion

Mr. Biggs is retiring at the end of this year. He has been Chairman of this company for 6 years.  
Key: Underlined words/phrases constitute the antecedents; Bold words/phrases constitute the anaphors/bridges.

The two sentences are interlinked by means of the personal pronoun he in the second sentence which refers back to Mr. Biggs in the first sentence.

5.2.2 Semantic Cohesion
Semantic cohesion refers to a set of relationships which connect different parts of text by meaning. Cohesion includes relationships denoting resemblance (Example 3), cause-effect (Example 4), time (Example 5), and attribution (Example 6) (Wolf et al. 2003).

Example 3: Semantic cohesion – Relationships denoting resemblance

Mr. Biggs is finance director of TIC Plc. He also sits on the Board of SAAC.  
Key: Underlined words/phrases constitute the markers for semantic cohesion.
Example 4: Semantic cohesion – Relationships denoting cause-effect

Due to the difficult economic conditions in the previous financial year, the Board has decided not to pay a dividend.

Key: Underlined words/phrases constitute the markers for semantic cohesion.

Example 5: Semantic cohesion – Relationships denoting time

Mr. Biggs first worked as finance director for TIC Plc. Then he became CEO of SAAC.

Key: Underlined words/phrases constitute the markers for semantic cohesion.

Example 6: Semantic cohesion – Relationships denoting attribution

According to Mr. Biggs, TIC Plc has no intention of launching a takeover bid for SAAC.

Key: Underlined words/phrases constitute the markers for semantic cohesion.

As evident in Examples 3 to 6, semantic cohesion is achieved by means of conjunctions, such as and, also, but (resemblance), due to, if, therefore (cause-effect), then, before, subsequently (temporal), and according to (attribution).

Semantic cohesion plays an important role in rendering texts comprehensible to the reader. Texts which lack semantic cohesion relationships, i.e. where the meaning of one part of the text is unrelated to the meaning of another part of the text, are notoriously difficult to read and understand. This is demonstrated by Example 7. Although the two sentences in Example 7 are grammatically cohesive in that the personal pronoun he in the second sentence clearly refers to Mr. Biggs in the first sentence, they are not coherent, since they lack semantic cohesion. Unlike Example 3, there does not seem to be any interrelation in terms of meaning.
Example 7: Semantic cohesion – Texts which lack semantic cohesion relationships

Mr. Biggs is finance director of TIC Plc. He sits on the Board of SAAC.

Key: Underlined words/phrases constitute the markers for semantic cohesion. In this example semantic cohesion is missing.

Although semantic cohesion plays an important part in the readability of texts, this study focuses on grammatical cohesion relationships as basis of readability. This is due to software availability.

5.2.3 Grammatical cohesion
Grammatical cohesion refers to the grammatical or lexical relationships that connect different parts of a text. Grammatical cohesion is achieved by means of several linguistic devices, including reference (Example 8), substitution (Example 9), ellipsis (Example 10), and lexical cohesion (Example 11) (Halliday and Hasan 1976). In Example 8 the pronoun he is used to refer to Mr. Biggs. In Example 9 the company is used as a substitute for TIC Plc. In Example 10 stores is left out in the second part of the sentence. This is referred to as an ellipsis. In Example 11 changes semantically refers to the 21st century.

Example 8: Grammatical cohesion – Cohesion by reference

Mr. Biggs is retiring at the end of this year. He has been Chairman of this company for 6 years.

Key: Underlined words/phrases constitute the antecedents; Bold words/phrases constitute the anaphors/bridges.

Example 9: Grammatical cohesion – Cohesion by substitution

TIC Plc has been in financial difficulty for a while. The company is now facing takeover bids from two competitors.

Key: Underlined words/phrases constitute the antecedents; Bold words/phrases constitute the anaphors/bridges.
Example 10: Grammatical cohesion – Cohesion by ellipsis

First, two new stores were opened in Hungary, and then another three shortly afterwards.

Key: Underlined words/phrases constitute the antecedents; Bold words/phrases constitute the anaphors/bridges. In this example the anaphor is empty.

Example 11: Grammatical cohesion – Cohesion by lexical cohesion

Mr. Biggs has brought TIC Plc into the 21st century. Changes involve the launch of a brand new website and a major face-lift of stores.

Key: Underlined words/phrases constitute the antecedents; Bold words/phrases constitute the anaphors/bridges.

Grammatical cohesion plays an important role in text comprehension since it provides structural links between sentences. Texts lacking cohesive ties which bind sentences together by means of grammatical devices are difficult to understand. This is demonstrated by Example 12. Although the sentence in Example 12 is cohesive in terms of the two parts being connected by means of and, it is not cohesive, since the nature of the relationship between the new website to the first part of the sentence is not made clear, as is the case in Example 11.

Example 12: Grammatical cohesion – Text lacking cohesive ties

Mr. Biggs brought TIC Plc into the 21st century and the new website includes many features, including online ordering and a discussion forum.

Key: Underlined words/phrases constitute the antecedents; Bold words/phrases constitute the anaphors/bridges. In this example, the anaphor/bridge is missing.

5.2.4 Psychological validity: The effect of cohesion on text processing

In order to establish the psychological validity of cohesion on textual complexity, the interrelationship between cohesion and text processing needs to be explored. In this context, it is important to establish the effect of altering cohesion on text processing.

Research tends to differentiate between shallow text processing and deep text processing. Shallow text processing refers to the “understanding of verbatim text and
main ideas ... i.e., what readers actually encounter in a text”. Deep text processing refers to “the construction of an integrated representation of the text in memory. These representations go beyond shallow processing in that they require the reader to integrate all important text information into a holistic representation that gives readers the 'big picture’.” (Lehman and Schaw 2002: 740).

Shallow text processing manifests itself recall and recognition, which can be measured by means of recall of text facts and multiple choice-questions (Britton and Gulgoz, 1991; McKeown et al. 1992). Deep text processing is measured by means of keyword sorting tasks.

Research in psychology finds that increasing textual cohesion encourages the connection of ideas in the text, with the result that as each new idea is introduced, it can be integrated into an ongoing mental representation of the text (Zwaan and Radvansky, 1998). Textual cohesion can be promoted through referential and causal connectives, which enable readers to integrate text information with a minimum of effort, presumably because relationships among text ideas are clarified (e.g., Loxterman, Beck, and McKeown, 1994; McKeown et al., 1992; McNamara and Kintsch, 1996).

Research has shown high levels of cohesion to positively influence syntactic processing and comprehension of main ideas by enabling readers to construct referential and causal links between adjacent text segments (Campbell 1995; McKeown et al., 1992).

A manipulation of cohesion results in a positive association between high cohesion and shallow text processing, measured by means of recall of text facts and multiple choice-questions (Britton and Gulgoz, 1991; McKeown et al. 1992).

If increasing textual cohesion results in improved performance on text comprehension, then, according to the obfuscation hypothesis, impression

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2 Cohesion is referred to as ‘local coherence’ and contrasted with ‘global coherence’, which refers to “the extent to which the reader is able to construct textwide inferences and integrate broad text ideas
management by means of reading ease manipulation should result in low cohesion of narrative annual report sections.

However, understanding written text does not only depend on cohesion, but also on other text-processing variables, including world-knowledge (McNamara 2001) and relevance (Lehman and Schraw 2002).

McNamara (2001), who examines the interrelationship between cohesion and world-knowledge on text processing, finds that low-knowledge readers benefit from high cohesion, whereas high-knowledge readers benefit from low-cohesion. The reason for this phenomenon is that cohesion gaps require the reader to make inferences either from world knowledge or from previous textual information:

> When inferences are generated, the reader makes more connections between ideas in the text and knowledge. This process results in a more coherent mental representation. Hence, cohesion gaps can be beneficial for high-knowledge readers because their knowledge affords successful inference making. McNamara (2001: 194)

In the context of the present study this means that for expert users of narrative annual report sections, such as fund managers and investment analysts high readability is positively correlated with low cohesion, whereas for ‘naïve’ users, such as individual shareholders, high readability is negatively associated with low cohesion.

However, Lehman and Schraw (2002), who investigate the effect of manipulating cohesion and coherence and relevance on both shallow and deep text processing, find cohesion and coherence breaks to have few effects on text comprehension. Relevance, which refers to the extent to which text segments are relevant to the reader’s goals and purposes, impacts both on shallow and on deep text processing.

What research in psychology shows is that text comprehension is not a simple process in that it depends on a variety of factors and on the interaction between these factors. Factors comprise of textual factors, such as cohesion, and on user factors, such as their world-knowledge and the relevance of the text to its readers.

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into ... a mental representation of the text that integrates background knowledge with text information to create a full picture of the situation described in the text” (Lehman and Schaw 2002: 738).
However, due to both methodological and practical reasons, the methodology proposed in this study is solely based on textual factors. First of all, the readership of Chairman’s Reports is very broad, consisting not only of user groups with specialized financial knowledge, such as institutional shareholders, financial analysts, and auditors, but also user groups with a limited business background, such as small shareholders, the general public. For this reason, it is impossible to construct a readability measure based on reader-based standards. Also, for practical reasons, it is both difficult and time-consuming to conduct and to evaluate questionnaires and multiple-choice tests to the representatives of the various user groups of Chairman’s Reports.  

5.2.4 Framework for grammatical cohesion analysis

The framework for the cohesion analysis follows Müller and Strube (2001). They focus on two types of cohesive relations, namely (a) anaphoric relations and (b) bridging relations. Both of these refer to the interrelation between two or more noun phrases in a given text. A noun phrase is a word or group of words functioning in a sentence exactly like a noun, with a noun or pronoun as head. A noun phrase can be a noun or pronoun alone, but is frequently a noun or pronoun with pre- and/or post-modification. Example 13 contains sentences illustrating noun phrases. Noun phrases in cohesive relations are underlined and the heads of noun phrases are shown as bold. In the second sentence, the pronoun it represents the noun phrase (and the head of the noun phrase). In the third sentence, the head of the noun phrase the troubled company is company and troubled acts as a pre-modifier.

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3 ‘Coherence’ is used in the same sense as ‘cohesion’, namely as “the extent to which the relationships between ideas and text are explicit” (McNamara 2002: 51).

4 In some respect, Weetman et al.’s (1994) survey of analysts and institutional investors view on the Operating and Financial Review represents research on the relevance aspect of a particular narrative annual report document to two specific user groups.
Example 13: Noun phrases

**TICC Plc** is now facing bankruptcy. It has been in difficulty for a number of years. As a last attempt to save the troubled **company**, its founder and CEO, Mr. Timothy Biggs, has brought in business consultant Roy Roberts to carry out a thorough analysis. The **result** was the closure of loss-making **outlets** and a complete make-over of remaining **outlets**.

Key: Underlined words/phrases constitute the noun phrases; Bold words/phrases constitute the heads of noun phrases.

Cohesive relations involve the concepts of anaphors, bridges, and antecedents. Anaphors and bridges are words or phrases which refer back to noun phrases which have occurred earlier in the text and which are called antecedents. Examples 14 and 15 demonstrate the concepts of anaphors, bridges, and antecedents. Antecedents are marked by means of underlining and the anaphor and bridge by means of bold. Example 14 contains an anaphor in the form of a personal pronoun, whereas Example 15 contains a bridge which forms a cause-effect relationship with its antecedent.

The difference between anaphors and bridges is that anaphors always stand in a co-referential relation to their antecedent, bridges no not. Co-reference is a relation between two or more noun phrases standing in a cohesive relationship specifying the same extra-linguistic entity. In Example 14 **Mr. Biggs** and **he** both refer to the same real person carrying the name Biggs. Since the noun phrases **Mr. Biggs** and **he** stand in a co-referential relationship, they form an anaphoric tie with **he** as the anaphor and **Mr. Biggs** as the antecedent. In Example 15 the noun phrase **various changes** and **the result** do not refer to the same extra-linguistic reality, but rather form an implicit link. For this reason, they form a bridge with **various changes** as the antecedent and **the result** as the bridge:

Example 14: Anaphor

**Mr. Biggs** is retiring at the end of this year. **He** has been Chairman of this company for 6 years.

Key: Underlined words/phrases constitute the antecedents; Bold words/phrases constitute the anaphors/bridges.
Example 15: Bridges

Mr. Biggs introduced various changes to the company. The result was an immediate increase in profits.

Key: Underlined words/phrases constitute the antecedents; Bold words/phrases constitute the anaphors/bridges.

Following Müller and Straube (2001), anaphors include pronouns (Example 16), direct anaphors (Example 17), and expressions standing in a conceptual IS-A relation specified by their antecedent (Example 18) (“IS-A” denotes “is a” as in “a rose is a flower” or “a spaniel is a dog”) (or hyponym-hyperonym). Hyponym is a subordinate term, i.e. a word of narrower or more specific meaning that comes ‘under’ another of wider or more general meaning. For example, rose is the hyponym of flower. Hyperonym is a superordinate term, i.e. a word with a broad meaning constituting a category into which words with more specific meanings fall. For example, flower is the hyperonym of rose, lily, etc.

Example 16 illustrates a personal pronoun as an anaphor referring back to Mr. Biggs. Pronouns functioning as anaphors include personal pronouns (he, she, etc.), reflexive pronouns (themselves, each other), and demonstrative pronouns (these, those).

Example 16: Anaphors including pronouns

Mr. Biggs is retiring at the end of this year. He has been Chairman of this company for 6 years.

Key: Underlined words/phrases constitute the antecedents; Bold words/phrases constitute the anaphors/bridges.

Example 17 shows that, in lay terms, direct anaphors involve repetition. Linguistically, in direct anaphors the identity of the head noun of both noun phrases is realized by the same noun, namely decision.
Example 17: Anaphors including direct anaphors

The board made the decision not to pay a dividend this year. This decision has been taken despite increasing profits.

Key: Underlined words/phrases constitute the antecedents; Bold words/phrases constitute the anaphors/bridges.

In example 18 executive directors functions as the hyponym and top management as the hyperonym.

Example 18: Expressions standing in a conceptual IS-A

Mr Jones sacked the entire top management of TIC plc. The executive directors have now filed lawsuits against the company.

Key: Underlined words/phrases constitute the antecedents; Bold words/phrases constitute the anaphors/bridges.

Following Müller and Strube (2001), bridges, can take three forms, namely cause-effect (Example 19), part-whole (Example 20), and entity-attribute (Example 21). In Example 19 the labour-saving costs mentioned in the second sentence are the result of installing a sophisticated ordering system, mentioned in the first sentence.

Example 19: Cause-effect bridges

TICC Plc installed a sophisticated automated ordering system. Labour-saving costs are estimated to be £2.5 million per year.

Key: Underlined words/phrases constitute the antecedents; Bold words/phrases constitute the anaphors/bridges.

In Example 20 the manufacturing plants are part of a larger entity, namely the company.
Example 20: Part-whole bridges

The company has been facing problems for the last two years. The manufacturing plants in Rowley and Quiggley are now being threatened with closure.

Key: Underlined words/phrases constitute the antecedents; Bold words/phrases constitute the anaphors/bridges.

In Example 21 the bright colours in the second sentence are an attribute of the make-over mentioned in the first sentence.

Example 21: Entity-attribute bridges

The stores were given a complete make-over. The bright colours are aimed at attracting a younger clientele.

Key: Underlined words/phrases constitute the antecedents; Bold words/phrases constitute the anaphors/bridges.

5.3 Developing hypotheses and cohesion-based measures of textual complexity

The methodology proposed in this study represents a text-centered approach to textual difficulty. Although user-centered elements are crucial in determining the communicative effectiveness of texts, they are difficult to pin down and measure in the context of Chairman’s Reports. First of all, the audience of Chairman’s Reports is very broad, consisting not only of user groups with specialized financial knowledge, such as institutional shareholders, financial analysts, and auditors, but also user groups with a limited business background, such as small shareholders, the general public. For this reason, it is impossible to construct a readability measure based on reader-based standards. Also, for methodological reasons, it is difficult to send Chairman’s Reports to representatives of various user groups.

For this reason, the proposed methodology represents an alternative to conventional measures of textual difficulty based on text-centered standards of textual difficulty, such as Lix, Fog and Flesch. In order to reflect the whole-text aspect of reading difficulty, the term ‘readability’ is replaced by ‘textual difficulty’ in this study.
Grammatical cohesion provides structural links within and between sentences. Earlier we have demonstrated the important role of cohesion in text creation and the important role of cohesion in text comprehension.

We can thus conclude that texts lacking cohesive ties are difficult to understand. This section introduces three criteria of textual complexity which are based on cohesive ties, namely (1) amount of cohesive ties within a given text and (2) distance between anaphor/bridge and antecedent, and (3) relationship between given and new information.

### 5.3.1 Cohesion density: Amount of cohesive ties

This simple measure of textual complexity is based on the amount of cohesive ties in a given text. As has been pointed out, texts lacking cohesive ties are difficult to read and comprehend. Thus, in developing hypothesis 1 in Section 3.1, the following can be posited:

\[ H_{1a}: \text{The less cohesive ties (anaphors and bridges) the more difficult a text is to read and comprehend.} \]

The measure is expressed as percentage of anaphors/bridges per total number of noun phrases.

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5 Although lack of cohesive ties is a crucial aspect of reading difficulty which has not been operationalised in previous research, it is not the only feature of several features which renders a text difficult to read. Others include the complexity of noun phrases (compare the CEO with the newly-appointed power-hungry CEO) and semantic cohesion density (amount of semantic connective devices in a given text).

6 The Coh-Metrix also includes a measure of grammatical cohesion called Co-Reference Cohesion. However, it is quite crude and does not reflect the complexity of cohesion within and between sentences. It does not capture anaphors and bridges, but considers the interrelationship of sentences solely on a morphological basis, namely interrelationship by means of (1) common nouns (e.g. earnings – earnings), (2) two nouns sharing a common stem (e.g. profit –profitability), and (3) words with a stem overlap (e.g. inform - information).

1. The company’s earnings are below that of the previous financial year. Several steps have been taken to address this decrease in earnings.
2. The increase in profit allows us to expand to the North-West and to Wales. This is mainly due to the profitability of our no-frills outlets.
3. We have informed our shareholders of the Board’s decision not to pay a dividend this financial year. This information is also available on our website.

However, it does not capture anaphors and bridges.
Hypothesis 1a can be tested separately for anaphors and bridges, which leads us to Hypotheses 1b and 1c:

\[ \text{H}_{1b}: \text{The less anaphors a text contains, the more difficult a text is to read and comprehend.} \]

\[ \text{H}_{1c}: \text{The less bridges a text contains, the more difficult a text is to read and comprehend.} \]

Measures for Hypothesis 1b and 1c are expressed as percentage of anaphors/bridges per total number of noun phrases.

As has been pointed out earlier, anaphors represent explicit links whereas bridges represent implicit links. From an information processing perspective it is easier to comprehend explicit than implicit information, the following can be posited:

\[ \text{H}_{1d}: \text{The lower the proportion of anaphors versus bridges, the more difficult a text is to read and comprehend.} \]

This is measured by means of the percentage of anaphors compared to bridges.

However, cohesion can also be interpreted as a measure of textual density, i.e. the number of anaphors/bridges associated with a particular antecedent. We can therefore postulate that textual density is a function of the number of anaphors/bridges associated with a particular antecedent:

\[ \text{H}_{1e}: \text{The less anaphors/bridges associated with the antecedents in a given text, the more difficult a text is to read and comprehend.} \]

This is measured as the percentage of total number of antecedents with two or more anaphors/bridges associated with it per total number of antecedents.

5.3.2 Distance between anaphor/bridge and antecedent
Following Biber et al. (1998) the distance between the anaphoric expression/bridge and its antecedent is used as a measure of textual complexity. It is expressed as the number of intervening noun phrases occurring in between each referring expression (anaphor/bridge) and its antecedent.

For this analysis, the antecedent of all anaphoric nouns and pronouns must be identified. The distance between the target referring expression and its antecedent can then be computed automatically. The program simply counts the number of intervening noun phrases occurring in between each referring expression and its antecedent.

As can be seen from Table 5, the distance between referring expressions and their antecedent varies between genres. It is much shorter in spoken language (conversation and public speeches) than in written language (news reportage and academic prose).

<table>
<thead>
<tr>
<th>Table 5: Average distance measures for four genres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average distance</td>
</tr>
<tr>
<td>Conversation</td>
</tr>
<tr>
<td>Public speeches</td>
</tr>
<tr>
<td>News reportage</td>
</tr>
<tr>
<td>Academic prose</td>
</tr>
</tbody>
</table>

Source: Biber et al. (1998)

The reason behind this phenomenon is that the length of the attention span between listeners and readers varies. Whereas the reader can go back to previous sentences to check for coreferences, the listener cannot. In general, it can therefore be stated:

H₁: The greater the distance between referring expression (both anaphors and bridges) and their antecedents, the more difficult a text is to read and comprehend.

Table 6 shows that for anaphors, this phenomenon is even more pronounced between pronominal expressions and their antecedents than between full nouns and their antecedent.
This leads us to the following hypotheses:

**H1a**: The greater the distance between pronominal anaphors and their antecedents, the more difficult a text is to read and comprehend.

**H1b**: The greater the distance between full noun referring expressions (both anaphors and bridges) and their antecedents, the more difficult a text is to read and comprehend.

The distance between antecedents and their associated anaphors/bridges is measured by means of counting the number of intervening noun phrases.

### 5.3.3 Relationship between given and new information

Following Biber et al. (1998) the status of information plays a role in determining textual complexity. The status of information is expressed in a dichotomous relationship of given vs. new information, where non co-referential noun phrases and antecedents are classified as new information and anaphors/bridges as given information. The proportion of given and new information is then used as a measure of textual complexity.

The following chart demonstrates that the proportion of given versus new information varies widely between different genres. Conversation has a lot more given information as opposed to new information than academic prose. The reason for this phenomenon is different memory spans between listeners and readers. Whereas...
readers can refer back to information presented earlier in the text, listeners cannot. Therefore spoken information contains a lot more given information. Textual complexity is therefore a function of the relationship between given and new information.

![Figure 7: Frequency of given versus new referring expressions](image)

Source: Biber et al. (1998)

We can therefore say the following:

**H1**: The higher the proportion of new vs. given information, the more difficult a text is to read and comprehend.

New information can be measured as a percentage of all non co-referential noun phrases plus the total number of antecedents, per total number of anaphors plus bridges.

Within the three concepts of textual complexity, a total of nine readability measures can be computed for each Chairman’s report in the database. First of all, it is important to determine whether any of the measures are correlated with each other. This might be the case for the measures within a particular category. Then, the correlation between these measures of textual complexity and traditional readability scores has to be determined. In this study the *Flesch Reading Ease Score* is used, since it is provided as a feature of *Word*. If there is low correlation between the
readability measures developed in this study and the *Flesch* scores, this proves that
the new measures provide information about the texts which is not captured by
traditional readability scores.

5.3.4 Pronoun density
The density of pronouns is an important metric of comprehension difficulty (Graesser
et al. (2004). Texts are more difficult to understand, when there is a high density of
pronouns. We can therefore posit the following:

\[ H_{1j}: \text{The higher the pronoun density in a given text, the more difficult a text is to read}
\text{ and comprehend.} \]

Following Graesser et al. (2004), pronoun density is defined as the percentage of
pronouns per total number of noun phrases.

Since pronouns serve as cohesive, anaphoric text devices, it makes more sense to
measure pronoun density as the proportion between pronouns and co-referential noun
phrases and not total noun phrases. Therefore we can posit the following:

\[ H_{1k}: \text{The higher the proportion between pronouns (pronominal anaphors) and co-}
\text{referential noun phrases, the more difficult a text is to read and comprehend.} \]

Thus, pronoun density can also be measured as the percentage of pronouns per total
number of co-referential noun phrases

However, we can also regard pronoun density as the relationship between pronominal
anaphors and total anaphors. Therefore, we can posit the following:

\[ H_{1l}: \text{The higher the proportion between pronouns (pronominal anaphors) and total}
\text{ anaphors, the more difficult a text is to read and comprehend.} \]

In this case, pronoun density is the percentage of pronouns per total number of
anaphors.
Table 7 summarises 12 measures of reading difficulty (one for each of the 12 hypotheses outlined above) applied in this paper.

<table>
<thead>
<tr>
<th>Table 7: Measures of reading difficulty</th>
</tr>
</thead>
<tbody>
<tr>
<td>$H_{1a}$: Percentage of anaphors and bridges per total number of noun phrases</td>
</tr>
<tr>
<td>$H_{1b}$: Percentage of anaphors per total number of noun phrases</td>
</tr>
<tr>
<td>$H_{1c}$: Percentage of bridges per total number of noun phrases</td>
</tr>
<tr>
<td>$H_{1d}$: Percentage of anaphors compared to bridges</td>
</tr>
<tr>
<td>$H_{1e}$: Percentage of total number of antecedents with two or more anaphors/bridges associated with it per total number of antecedents</td>
</tr>
<tr>
<td>$H_{1f}$: Distance between antecedents and their associated anaphors and bridges measured as number of intervening noun phrases</td>
</tr>
<tr>
<td>$H_{1g}$: Distance between antecedents and their associated pronominal anaphors measured as number of intervening noun phrases</td>
</tr>
<tr>
<td>$H_{1h}$: Distance between antecedents and their associated full noun referring expressions as the number of intervening noun phrases</td>
</tr>
<tr>
<td>$H_{1i}$: Percentage of all non co-referential noun phrases plus total number of antecedents per total number of anaphors plus bridges</td>
</tr>
<tr>
<td>$H_{1j}$: Percentage of pronouns per total number of noun phrases</td>
</tr>
<tr>
<td>$H_{1k}$: Percentage of pronouns per total number of co-referential noun phrases</td>
</tr>
<tr>
<td>$H_{1l}$: Percentage of pronouns per total number of anaphors</td>
</tr>
</tbody>
</table>

5.4 Using MMAX2 to analyze textual complexity

MMAX2 is an annotation tool which is particularly suited for analysing cohesion, since it allows the analysis of referential relations in a given text. The program identifies and classifies referential relations between expressions.

Annotations in MMAX2 consist of (a) attributes and (b) relations. Attributes include 5 categories, each of which takes a set of possible values, which are indicated in brackets: (1) type of noun phrase (proper noun, definite noun phrase, indefinite noun phrase, personal pronoun, possessive pronoun, and demonstrative pronoun, other), (2) grammatical role (subject, object, other), (3) agreement (person, gender, number), (4) semantic class (abstract, human, physical object, other), (5) co-reference class (anaphoric, bridging), and (6) base noun phrase.

Category (5) is a branching attribute which means that the chosen value influences the availability of other attributes which are said to be dependent on the choice of either value. For example, if anaphoric is selected, a submenu allows the selection on the specific type of anaphoric relation in place (none, direct, pronominal, is-a, and other).
However, if bridging is selected, a submenu allows the selection on the specific type of bridging relation in place (none, cause-effect, part-whole, and entity-attribute).

After using MMAX2 to identify all noun phrases, antecedents, anaphors, and bridges in all 100 Chairman’s Reports, MMAX’s Query Console can be used to calculate all measures of textual complexity.

There are two types of commands, namely (a) DISPLAY, which displays the noun phrases as a document-order list and (b) STATISTICS, which allows the display of some simple descriptive statistics about a result, including all attributes with their absolute and relative value frequencies.

The program allows analysis of relationships between noun phrases on two levels, namely (a) MARKABLE_SET, which is used to model conference and (b) MARKABLE_POINTER, which represents bridging relations.

Table 8 lists the types of noun phrases needed for cohesion analysis, the level of analysis and the query wording needed to display results:

<table>
<thead>
<tr>
<th>Noun phrase type</th>
<th>Level_name</th>
<th>Query</th>
</tr>
</thead>
<tbody>
<tr>
<td>All co-referential noun phrases</td>
<td>MARKABLE_SET</td>
<td>Coref</td>
</tr>
<tr>
<td>All non co-referential noun phrases</td>
<td>MARKABLE_SET</td>
<td>Coref (coref_class={empty})</td>
</tr>
<tr>
<td>All co-referential noun phrases in an n-member set</td>
<td>MARKABLE_SET</td>
<td>Coref (coref_class={n})</td>
</tr>
<tr>
<td>All anaphors</td>
<td>MARKABLE_POINTER</td>
<td>Coref</td>
</tr>
<tr>
<td>All bridges</td>
<td>MARKABLE_POINTER</td>
<td>(bridging_antecedent={empty})</td>
</tr>
<tr>
<td>All antecedents of bridges</td>
<td>MARKABLE_POINTER</td>
<td>Coref (bridging_antecedent={target})</td>
</tr>
<tr>
<td>All anaphors</td>
<td>MARKABLE_POINTER</td>
<td>Coref</td>
</tr>
<tr>
<td>All antecedents of anaphors</td>
<td>MARKABLE_POINTER</td>
<td>(anaphoric_antecedent={empty})</td>
</tr>
<tr>
<td>All antecedents with n bridges</td>
<td>MARKABLE_POINTER</td>
<td>Coref (anaphoric_antecedent={target})</td>
</tr>
<tr>
<td>All antecedents with n anaphors</td>
<td>MARKABLE_POINTER</td>
<td>Coref (briding_antecedent={n})</td>
</tr>
<tr>
<td>All pronominal anaphors</td>
<td>MARKABLE_POINTER</td>
<td>Coref (anaphoric_antecedent={n})</td>
</tr>
</tbody>
</table>
Table 9 lists the three concepts of cohesion, the measures used, the noun phrase types represented by the various measures, the codes used for analysis and the direction of association with textual complexity:

<table>
<thead>
<tr>
<th>Concept</th>
<th>Measure</th>
<th>Noun phrase types</th>
<th>Code</th>
<th>Direction of association</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relationship between given and new information</td>
<td>New information/given information</td>
<td>New info = all non-co-referential noun phrases + all antecedents of bridges + all antecedents of anaphors/given info = all anaphors, all bridges</td>
<td>NEWGIV</td>
<td>Positive</td>
</tr>
<tr>
<td>Amount of cohesive ties</td>
<td>Anaphors/total number of noun phrases</td>
<td>All anaphors/all non-co-referential noun phrases + all antecedents of anaphors + all antecedents of bridges</td>
<td>COHANA</td>
<td>Negative</td>
</tr>
<tr>
<td></td>
<td>Bridges/total number of noun phrases</td>
<td>All bridges/all non-co-referential noun phrases + all antecedents of anaphors + all antecedents of bridges</td>
<td>COHBRIDGE</td>
<td>Negative</td>
</tr>
<tr>
<td></td>
<td>Anaphors + bridges/total number of noun phrases</td>
<td>All anaphors + all bridges/all non co-referential noun phrases + all antecedents of anaphors + all antecedents of bridges</td>
<td>TOTCOH</td>
<td>Negative</td>
</tr>
<tr>
<td></td>
<td>Anaphors/bridges</td>
<td>All anaphors/all bridges</td>
<td>ANBRIGECOH</td>
<td>Negative</td>
</tr>
<tr>
<td></td>
<td>All antecedents with &gt; 2+ anaphors/all co-referential noun phrases</td>
<td>negative</td>
<td>Negative</td>
<td></td>
</tr>
<tr>
<td></td>
<td>All antecedents with &gt; 2 bridges/all co-referential noun phrases</td>
<td>negative</td>
<td>Negative</td>
<td></td>
</tr>
<tr>
<td></td>
<td>All antecedents with &gt; 2 anaphors + &gt; 2 bridges/all co-referential noun phrases</td>
<td>negative</td>
<td>Negative</td>
<td></td>
</tr>
<tr>
<td>Distance between anaphor/bridge and antecedent</td>
<td>Number of noun phrases between anaphor/bridge and antecedent</td>
<td>number of noun phrases between anaphor/bridge and antecedent</td>
<td>DIST</td>
<td>Positive</td>
</tr>
<tr>
<td>Pronoun density</td>
<td>All pronominal anaphors/total number of noun phrases</td>
<td>/ all non co-referential noun phrases + all antecedents of anaphors + all antecedents of bridges</td>
<td>Positive</td>
<td></td>
</tr>
<tr>
<td></td>
<td>All pronominal anaphors/total number of co-referential noun phrases</td>
<td>all pronominal anaphors/total number of co-referential noun phrases</td>
<td>Positive</td>
<td></td>
</tr>
<tr>
<td></td>
<td>All pronominal anaphors/all anaphors</td>
<td>all pronominal anaphors/all anaphors</td>
<td>Positive</td>
<td></td>
</tr>
</tbody>
</table>

6. MEASURING ‘GOOD/BAD NEWS’
6.1 Previously used measures

Accounting studies from an impression management perspective seek to answer the question whether the use of impression management varies in relation to ‘good/bad news’, the hypothesis being that managements of companies with ‘bad news’ are more inclined to engage in impression management than those of companies with ‘good news’.

Previous studies use two different measures of ‘good/bad news’, namely (1) increasing/declining performance and (2) failed/surviving firms.

6.1.1 Increasing/declining performance

The first measure of ‘good/bad news’ involves a comparison of financial performance over a time-period of at least two years. Thus, a company can be said to be reporting ‘good news’, if its performance has improved from one year to the next. By contrast, a company can be said to be reporting ‘bad news’, if its performance has deteriorated from one year to the next.

Thus, ‘good/bad news’ involves a relative measure of performance, reflecting positive change in performance for ‘good news’ and negative change in performance for ‘bad news’. This results in a sample division into (1) companies reporting ‘good news’ (increase in performance from $Y_0$ to $Y_1$) and (2) companies reporting ‘bad news’ (decrease in performance from $Y_0$ to $Y_1$).

Some studies include the entire sample in their analysis, whereas others only include the top and bottom companies of the ‘good news’ and the ‘bad news’ groups (Courtis 1998; Clatworthy and Jones 2001a, 2001b; Sydserff and Weetman 2002). The second approach provides the advantage of establishing a clear differentiation between ‘good news’ and ‘bad news’ firms and thus enable a clearer association between ‘good/bad news’ and impression management.

6.1.2 Failed/surviving firms

The second measure is based on matched-pair samples of failed and non-failed companies instead of relative measures of performance as a proxy for ‘good/bad
news’ (Smith and Taffler 1992a, 1992b, 1995, 2000). This sample selection allows a clear retrospective classification into ‘good news’ and ‘bad news’ firms.

### 6.2 Industry-based measures

This study conceptualizes ‘good/bad news’ as changes in performance in relation to industry. This is due to the fact that investment decisions are driven by firm performance relative to its competitors. Economic conditions might be such that an entire industry suffers a downturn. In a case like this, ‘good news’ for a particular company might mean a smaller loss than its competitors.

#### 6.2.1 In line / out of line with industry

Aerts (1994, 2001) introduces a measure capturing expected performance. In this case, the performance evolution of a company is compared to that of the industry. If they show a change in the same direction, i.e. both positive or both negative, the performance of the company’s performance is regarded as expected. However, if they show a change in a different direction, i.e. company positive and industry negative or vice versa, then the company’s performance is regarded as unexpected.

Since management is responsible for the performance of their company and has a tendency to hide their failures, it can be hypothesized that performance expectation is negatively associated with impression management. We can thus say that companies whose performance is in line with that of industry are likely to show less evidence of impression management than companies whose performance in not in line with that of industry.

#### 6.2.2 Underperforms/outperforms industry

This concept of ‘good/bad news’ is based on an industry comparison of changes in performance. The company based measure of performance change from one year to the next is compared to the performance change of the industry. If the increase in performance for the company is greater than that of the industry or the decrease in performance is smaller than that of the industry or the company is experiencing an increase in performance whereas the industry is experiencing a decrease, then the company is said to be reporting ‘good news’. However, if the increase in performance is smaller than that of the industry or the decrease in performance is greater than that
of the industry or the company is experiencing a decrease in performance whereas the industry is experiencing an increase, then the company is said to be reporting ‘bad news’.

Thus, it is hypothesized that the management of companies with ‘bad news’ is more inclined to engage in impression management than those of companies with ‘good news’.

Table 10 provides an overview of the measures of ‘good/bad news’ used in this study.

<table>
<thead>
<tr>
<th>Proxy measure</th>
<th>Name</th>
<th>Definition</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expected/unexpected performance</td>
<td>EXPEC</td>
<td>Percentage change in performance in same/opposite direction as industry</td>
<td>% change in profit before taxation</td>
</tr>
<tr>
<td>Outperforms / underperforms</td>
<td>PERFORM</td>
<td>Percentage change in performance greater/smaller than industry</td>
<td>% change in profit before taxation</td>
</tr>
</tbody>
</table>

7. RESULTS

8. SUMMARY AND CONCLUSIONS
References


Appendix 1: Linguistic terminology

Anaphor A word or phrase which explicitly refers back to an earlier word or phrase. Peter was late. He was stuck in a traffic jam. He is an anaphor which refers back to Peter.

Antecedent The first occurrence of a word or phrase which later words or phrases refer back to. Peter was late. He was stuck in a traffic jam. Peter is the antecedent which he refers back to.

Bridge A word or phrase which implicitly refers back to an earlier word or phrase. Peter became Chairman in 1999. The responsibility soon became too much for him. The responsibility is a bridge which refers back to Chairman.

Clause Part of a sentence. The brackets indicate that the following sentence consists of two clauses: [He was late] [because he was stuck in a traffic jam].

Cohesion The connection within and between sentences in texts, e.g. Peter came late. He was stuck in a traffic jam. The link between the pronoun he and its antecedent Peter are aspects of cohesion.

Conjunction A word used to connect sentences or part of sentences. He was late because he was stuck in a traffic jam. Because is a conjunction.

Corpus A collection of texts which is carefully sampled to be maximally representative of the language being analyzed.

Corpus analysis Involves the computerized analysis of the linguistic features of the sample texts.

Corpus linguistics Involves the study of language that includes all processes related to processing, usage and analysis of corpora.

Discourse Discourse is the name given to units of language longer than a single sentence

Discourse analysis The study of cohesion and other relationships between sentences in written or spoken discourse.

Ellipsis The omission of a word that is superfluous or can be understood from contextual clues, e.g. This year’s profit is higher than last year’s [profit]. The ellipsis is indicated by brackets.

Euphemism A mild or vague expression substituted for one thought to be too harsh or direct (e.g., pass over for die).

Genre A grouping of texts which are related by sharing recognizably functionalized features of form and content.

Grammatical cohesion Connection within and between sentences in a text by means of grammatical devices, e.g. Peter came late. He was stuck in a traffic jam. The sentences are grammatically linked by means of he referring back to Peter.

Hyperonym A generic or superordinate term. The word flower is the hyperonym for rose, lily, and violet.

Hyponym A subordinate term. A word or phrase of narrower or more specific meaning that comes ‘under’ another of wider or more general meaning, e.g. rose under flower.
Appendix 1: Linguistic terminology (continued)

Lexical cohesion  Connection within and between sentences in a text by means of meaning, e.g. Mr. Biggs has brought TIC Plc into the 21st century. Changes involve the launch of a brand new website and a major face-lift of stores. The sentences are linked by means of changes referring back to the 21st century.

Lexis  Vocabulary

Morphology  A branch of linguistics concerned with analysing the structure of words. The morphology of a given word is its structure or form, e.g. grow – growth – growing, profit – profitability – profitable.

Passive voice  Grammatical construction involving a passive verb. A grammatical term that contrasts with active voice. The sentence Helen met the visitors is in the active voice and the sentence The visitors were met by Helen is in the passive voice.

Noun  A noun is a word that names a person or thing. Common nouns name persons or things which are not peculiar to one example, i.e. are of a general nature (director, balance sheet), whereas proper nouns name persons or things of which there is only one example (Asia, Enron). Concrete nouns refer to physical things (factory, annual report), and abstract nouns to concepts (prudence, dishonesty).

Noun phrase  A word or group of words functioning in a sentence exactly like a noun, with a noun or pronoun as head. In the following noun phrases the heads are indicated by underlining: the newly appointed CEO and failing industries.

(Personal) pronouns  Each of the pronouns in English (I, you, he, she, it, we, they, me, him, her, us, and them) comprising a set that shows contrasts of person, gender, number, and case.

Reference  Relationship between two expressions which may appear to refer to each other, but they share the same referent in the real world. An example is anaphoric reference which is concerned with one expression, referring back to another, e.g. The CEO claims that he has not been informed.

Rhetoric  Language designed to persuade or impress

Substitution  Substitution, in contrast to reference, is a relationship between words. Contrast: Is that your paper? May I borrow it? (reference) Is that your paper? I didn't get one today (substitution)

Synonym  A word or phrase that means the same as another word or phrase, e.g. to go into administration and to go bankrupt.

Syntax  The way in which words and clauses are ordered and connected so as to form sentences; or the set of grammatical rules governing such word-order.

Tense  Tense is expressed by verbs and indicates whether the action denoted by the verb takes place in the present, past or future, e.g. profits are stable vs. profits have been stable, profits will remain stable.