INFORMATIVE QUANTITY AND QUALITY OF MANAGEMENT REPORTS: CNMV GUIDE EFFECT

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ABSTRACT

This paper focuses on two issues of narrative information: the quantity of information and its quality. For this purpose, we analyze the two attributes that constitute the information quantity (amount of text and visual elements), as well as a quality indicator and its nine categories of items that compose it in an attempt to measure the information quality. In particular, we examine their evolution and their explanatory factors. The results reveal that both the quantity and quality of information have experienced significant increases. In addition, the size of the company displays a positive relationship with the amount of text and visual elements, whereas compliance with the CNMV guide only positively affects the amount of text. On the other hand, in general, larger companies issue management reports with higher informative quality and compliance with the CNMV guide is also positively related to quality.

1. Introduction

This paper contributes to a broader knowledge on two fundamental issues of narrative information, such as the quantity and quality of information. As a novelty, we study the two attributes that define the quantity of information (text and visual elements) and we propose a new measure to quantify the information contained in the visual elements. In addition, to measure quality, we develop a quality indicator which represents a greater computational richness than coding ordinary that is typical of the disclosure indices.

The narrative or non-financial information has come to achieve special significance for two key reasons. First, the financial information provided by traditional accounting is increasingly considered insufficient, as it has failed to prevent accounting scandals or the financial crisis of recent years. Second, companies attempt to be deemed legitimate in the eyes of their stakeholders, communicating their contributions to the development of a fairer and more sustainable world.

Both factors have stimulated a growth in this type of information in recent years (Beattie & Davison, 2015; Beattie, McInnes, & Fearnley, 2004; Beattie & Smith, 2013; Seah & Tarca, 2013). However, the increase in narrative information has not been exempt from criticism, especially given that it rarely responds to users' expectations (Linsley & Shrives, 2006). In addition, it may be difficult to interpret, either due to the way in which it is presented or given the language used (Suárez, 2015). For these reasons, regulators view narrative disclosures as the key to achieve the desired change in the quantity and quality of corporate reporting (Beattie et al., 2004).

In order to tackle this issue, organisations such as the Securities and Exchange Commission (SEC, 1998), International Organization of Securities Commissions (IOSCO, 2003), International Accounting Standards Board (IASB, 2006, 2010) and the National Stock Market Commission (CNMV, 2013) have proposed the use of visual elements or graphic resources such as tables, graphics, figures, maps, organisational charts and flowcharts that facilitate greater understanding of a text that contains non-financial information (Hopwood, 2007). In addition, the Jenkins report (AICPA, 1994), the SRI International (1987) and the Canadian Institute of Chartered Accountants (CICA, 1991) have contributed to authors like Botosan (1997), Robb, Single, and Zarzeski (2001), Vanstraelen, Zarzeski, and Robb (2003), following their recommendations, develop quality indices to assess the quality of the disclosure contained in non-financial information.

For these reasons, our study will differentiate two attributes in the quantity of narrative information, such as the amount of text and visual elements. Moreover, our work takes as a reference the *Guide for the Preparation of the Management Report of Listed Companies* published by CNMV (CNMV, 2013) –hereinafter CNMV guide– to develop a quality index that

measures the quality of narrative information, since among its objectives highlights the need to increase the scope and quality of the information it contains and improve its presentation (CNMV, 2013).

In general, studies that have analyzed the amount of narrative information contained in the accounting documents have focused only on the first attribute, that is, the text quantity, measured in terms of the number of pages (Beattie, Dhanani, & Jones, 2008; Guthrie, 1982; Lee, 1994; Trotman, 1979; Unerman, 2000), number of sentences (Beretta & Bozzolan, 2004; Hasseldine, Salama, & Toms, 2005; Hooks & Van Staden, 2011; Joseph & Taplin, 2011; Urquiza, Navarro, & Trombetta, 2010) or the number of words (Li, 2008; Rutherford, 2003; You & Zhang, 2009). In addition, there has been a particular neglect on the attribute related to the visual elements (Beattie et al., 2008; Beattie, 2005), when, beyond text, the visual forms in the dissemination of financially information have a growing interest (Davison, 2015). For all this, we pay attention to the quantification of both attributes and, given the difficulty of measuring the amount of visual elements, we propose, in contrast to other research where the number of visual elements (Van Beest, Braam, & Boelens, 2009; Havemo, 2018) or the pages of visual elements (Beattie et al., 2008; Lee, 1994) are used, to go a step further by defining a new variable to quantify the visual elements, as will be seen later, the equivalent words of visual elements.

Otherwise, the literature has focused on the use of quality disclosure indices built by the researchers themselves to measure the quality of the information (Beattie et al., 2004). These indices are made up of a list of information items that must appear in company reports, to which is added a scoring method that results in a detailed measurement system (Hooks & Van Staden, 2011). In general, because of the difficulty of assessing disclosure quality directly, disclosure index studies assume that the amount of disclosure on specified topics proxies for the quality of disclosure (Beattie et al., 2004). Often, a simple binary coding scheme is used, whereby the presence or absence of an item is recorded. Other coding schemes incorporate ordinal measures for each category of items (frequently at three levels, where for each category, a score of 0 is assigned for no disclosure, 1 for some disclosure or 2 for extensive disclosure). However, we develop a quality index or indicator where we do not establish an ordinal coding system but, for each category of items, we compute the number of times that these items appear disclosed, which represents a greater computational richness than coding ordinary. This quality indicator, according to the CNMV guide, contemplates the most important quality items grouped into nine categories.

In addition, our work, unlike others that analyze documents pertaining to corporate governance, corporate social responsibility, sustainability or annual report, focuses on the Management Report[1], which is a non-financial information document that we claim has yet to receive the attention that it deserves in this field, in spite of the fact that it is a mandatory report and so adds value to the study.

In this context, we study the informative quantity and quality of narrative information contained in the Management Report to examine how they have evolved over the last years, what explanatory factors are behind them and what relationships they present. That is, we examine the consolidated management reports of companies listed on the Madrid Stock Exchange for the period 2010-2016, having excluded companies belonging to the financial and real estate sectors owing to the complexity and particularities they present when they publish their reports.

In particular, we compute, on the one hand, the amount of text and graphic resources (as measures of informational quantity) and, on the other hand, the quality indicator and its nine categories of items (as measures of informational quality) to ascertain whether narrative information is increasing. We also analyze whether the size of the company and whether

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[1] The Management Report of the European Unión is equivalent to the Management Commentary of the IASB, the Management Discussion and Analysis (MD&A) of the United States of America (USA) and Canada and the Operational and Financial Review of the United Kingdom (UK).

compliance with the CNMV guide contributes to increasing the quantity and quality of information disclosed by companies, since there seems to be a gap with respect to the studies that analyze the implications of the size of the companies and whether or not they comply with disclosure guidelines on the quantity and quality of the information they provide. Finally, we examine the relationship between the amount of text and visual elements and between the amount of information and quality of the information.

As a foretaste and in relation to the amount of information contained in the management reports, the results reveal significant increases in absolute terms of the two attributes that define the amount of information during the period 2010-2016. We can also highlight the substantial increase in relative terms in the use of graphic resources, to the detriment of the amount of text. In addition, the size of the company has a positive effect on the quantity of text and visual elements. However, companies' use of the CNMV guide for the preparation of management reports positively affects the quantity of text, but not visual elements. On the other hand, we can also note that large companies' use of graphic resources is gaining ground on the amount of text, in contrast to compliance with the CNMV guide. On the other hand and regarding the quality of the information displayed by management reports, both the quality indicator and its nine quality items that compose it also reveal that the quality of narrative information is expanding during the period 2010-2016. In addition, larger companies and those that comply with the CNMV guide show, in general terms, a higher quality of information.

Our results may be of interest to regulatory bodies that issue standards and recommendations that are concerned with the size of accounting reports, since they must take into account that, according to our findings, the amount of narrative information and its quality depend on the size of the company and the monitoring of the guide published by the CNMV. It may also interest those responsible for preparing these reports, analysts and general users of this type of information, and companies that spend portions of their funds to improve them (Ajina, Laouiti, & Msolli, 2016).

The rest of the paper is structured as follows. The second section shows the hypothesis development on which the subsequent analysis is based. The third describes the study design and methodology of the research. The fourth section reveals the results of the analysis and, finally, the fifth summarizes the main conclusions of the study.

2. Hypotheses development

Existing literature has utilized various theories in attempts to explain the factors that stimulate companies to disclose information, some of which are related and complement each other to create a current of research (Michelon, Pilonato, Ricceri, & Roberts, 2016). Thus, neoclassical theory suggests that the disclosure of information is based on the cost-benefit binomial of informing third parties. Specifically, companies choose to disclose information that improves market expectations (Verrecchia, 1983), that is, managers will disclose information when the benefits of disclosure exceed the costs it originates, such as the proprietary costs (discretionary disclosure theory). On the other hand, Watts & Zimmerman (1986) point out that companies have incentives to disclose more information to reduce political costs (positive accounting theory). For Milne (2002) literature that is based on the positive accounting theory of Watts and Zimmerman has expanded both their original arguments and the political costs, that this theory is confused with other theories about the disclosure of information. Moreover, if any theory dominates this area of research, it is agency theory (Merkl-Davies & Brennan, 2007). This theory states that, in the presence of incomplete information and conflicts between principal and agent, can be minimized through providing additional information to reduce agency costs (Jensen & Meckling, 1976)[2].

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[2] Other notable theories worth highlighting are: (1) signaling theory, which suggests that asymmetric information between firms and investors causes adverse selection that companies try to avoid by sending "signals" to the market that consist in disclosing more information (Rutherford, 2003); (2) stakeholders theory, which shows that the disclosure of information can become a tool in the power of companies to win the support of stakeholders (Freeman, 1994); (3) legitimacy theory, which states that companies are immersed in society and their existence depends on the will of society to support them, for this they disclose information aimed

However, the empirical evidence does not consistently support these theories, especially given that results are often contradictory, creating confusion (Chavent, Ding, Fu, Stolowy, & Wang, 2006; Michelon et al., 2016; Urquiza et al., 2010). As an example, Urquiza et al. (2010) point out two factors as causing these contradictory results: (1) the concept of disclosure used by theories has not been specifically defined and (2) different empirical studies employ different measures of disclosure. Beattie & Thomson (2007) also point out that the data in this type of analysis are collected mostly by hand, since there are no databases, so that the results may differ between researchers.

Moreover, the literature has yet to agree on a definition of narrative information that is generally accepted by a large majority[3] and shows the difficulties of measuring narrative information, both in terms of the quantity of the disclosure and its quality, which constitutes a significant challenge for researchers in their empirical studies.

To this end, we study the most important accounting documents of narrative information in Spanish, such as the Spanish companies' management reports, with the main objective of analyzing the two fundamental issues: the quantity of information and its quality.

Spanish companies' management reports comprising those documents that accompany audit reports and annual accounts and constitute their annual financial statements. Directors are responsible for the content of management reports and, according to Article 262 of the Consolidated Text of the Spanish Companies Act, as well as Article 49 of the Commercial Code applicable to companies required to consolidate, these reports include "a faithful statement on the evolution of business and the situation of the company, together with the description of its main risks and uncertainties [...] information on environmental and personnel issues [as well as] important events for the company that occurred after the end of the year, foreseeable evolution, research and development activities, and acquisitions of own shares". However, until 2013, these regulations did not clarify the scope that the management report should have nor did it improve its quality and comparability. To deal with this situation, the CNMV published the Guide for the preparation of management report in listed firms (2013), becoming a useful tool for companies seeking to improve the transparency, comparability and quality of the information it contains.

Regarding the quantity of disclosure contained in narrative information documents, Hopwood (2007) has identified a radical transformation, evolving from minimalist legal documents to creative documents that often combine text, images, graphics and other elements. Based on management reports, we study the two attributes that configure the quantity of narrative information: amount of text and visual elements. Indeed, unlike other researchers who have only quantified the text (Li, 2008; Rutherford, 2003; You & Zhang, 2009), the text and the number of visual elements (Van Beest et al., 2009), the text in sentences and tables counting each row as one sentence (McMillan, 2000; Milne & Adler, 1999; Smith & Taffler, 2000), or acknowledging the difficulty of quantifying the information contained in the photographs (Guthrie, Petty, Yongvanich, & Ricceri, 2004); we consider all of the narrative information contained in the text and visual elements or graphic resources[4]. In particular, we do not consider the number of visual elements that appear in the document but go a step further by transforming the space that the visual elements occupy to the corresponding number of text words, which we label 'equivalent words of visual elements' (EWVE). In addition, we compute the total quantity, as the quantity of text plus the quantity of visual elements, as well

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at convincing it that they are legitimate institutions (Suchman, 1995), and, finally, institutional theory, which is related to legitimacy theory, since said legitimacy is acquired through conformity with other similar social institutions (institutional legitimacy), that is, practices are homogenized to increase the chances of success, so that voluntary disclosure is becomes legitimate by becoming a routine norm (Michelon et al., 2016).

[3] Some definitions are: it is constituted by all of the pages that make up the annual report of audited financial statements (Deloitte, 2008); it is the information for shareholders and other stakeholders that is not defined by an accounting standard or by the calculation of a measure based on an accounting standard (Eccles & Krzus, 2010); it is formed by reporting on sustainability, governance and remuneration of the management bodies, as well as the management report (IIRC, 2011).

[4] Such as tables, charts, figures, graphs, maps, charts and flowcharts.

as the quantity of visual elements measured in relative terms with respect to the rest of the narrative information, as is the text quantity or the total quantity.

Moreover, research on narrative disclosure has also analyzed quality through so-called quality indices or disclosure indices. A quality index incorporates a list of information items that must appear in the reports to be considered quality. Then a binary scoring method is designed (0 does not disclose and 1 does disclose) or with more complex scales, which serves to classify the information (Beattie et al., 2004; Hooks & Van Staden, 2011; Joseph & Taplin, 2011). These quality indices are not without criticism either, for two reasons: (1) they do not capture the full amount of disclosure, as only one disclosure is counted for any item in the index, or at most they compute its greater or lesser disclosure intensity through an ordinal coding system, ignoring additional disclosures that add emphasis to the same item (Joseph & Taplin, 2011); and (2) the scoring method with complex scales is subjective (Botosan, 1997, 2004; Firer & Williams, 2005; Joseph & Taplin, 2011). Given the lack of consensus to measure quality of narrative information, we develop a quality index or indicator –hereinafter quality indicator– identifying the most important categories of items, in accordance with the CNMV guide, and we apply it to management reports. With this indicator we try to solve the two problems mentioned, since we take into account the number of times that these items appear disclosed and we eliminate subjective scores.

These variables that try to measure the quality and quality of narrative disclosure will enable us to analyze whether both qualities are increasing, as the literature suggests (Beattie & Davison, 2015; Beattie et al., 2008; Beattie et al., 2004; Beattie & Smith, 2013; Havemo, 2018; Lee, 1994; Seah & Tarca, 2013). Thus, according to the above, we propose the first hypothesis:

H1: Non-financial information is increasing both in terms of information quantity (H1a) and information quality (H1b).

Concerning the amount of information disclosed and its relationship with the company size, international regulatory organisations, such as IASB (2010), IOSCO (2003) and CNMV (2013)[5], expressly state that, in the production of this information, the size and complexity of the companies should be taken into account. Thus, Li (2008) shows a positive relationship between the size of the company and the amount of text, although this relationship has not been studied with the visual elements. In addition, authors such as Robb et al. (2001) and Vanstraelen et al. (2003) analyzing the informative quality also find a positive relationship between the size of the company and the quality of the disclosure. Otherwise, the *Guide for the Preparation of the Management Report of Listed Companies* (CNMV, 2013) not only gives recommendations about the extension of the management reports and the use of visual resources but also establishes a structure of the management report with nine epigraphs, to ensure that companies that follow its guidelines publish more complete and higher quality information, attending the needs of the stakeholders. Therefore, we propose the following hypotheses:

H2: The size of the company (H2a) and companies' use of the CNMV guide for the preparation of the management report (H2b) has a positive influence on the quantity of information.

H3: The size of the company (H3a) and companies' use of the CNMV guide for the preparation of the management report (H3b) has a positive influence on the quality of information.

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[5] The National Stock Market Commission (CNMV, 2013), in accordance with other international organizations (IASB, 2006, 2010; IOSCO, 2003), recommends that the content of management reports be "weighted, appropriate to the activity carried out by the company and to the magnitude and complexity of its operations".

3. Study design and methodology

3.1. Data

Our database is formed by the management reports of listed firms on the Continuous Market of the Madrid Stock Exchange during the period 2010–2016. The selection of listed companies for the composition of the sample was motivated by a greater concern about the disclosure of voluntary information in listed companies than in unlisted ones. Of the companies, all those belonging to the financial and real estate sectors –namely banks, insurance companies, real estate companies and investment companies– were eliminated. The use of this first filter was justified by the special characteristics that these types of firms have, given that the CNMV guide makes specific recommendations for them that are different from the general recommendations it gives to the other companies analyzed in this paper. Then the firms that were subjected to liquidation in the years examined were eliminated, because this situation could lead to abnormal behavior in the publication of their information. Finally, companies that did not have information on their consolidated annual accounts were deleted, either because they presented only the individual annual accounts or because they were foreign companies without the obligation to publish accounts in Spain.

In addition, we considered only companies with at least five consecutive years of available information because this information is needed to build the m_2 statistic for testing the absence of second-order serial correlation in the first-differences residuals to use the Generalized Method of Moments (GMM). As a result, we had an unbalanced panel of 87 listed Spanish companies with 595 observations of the consolidated management reports for the period 2010–2016 (see Table 1). The use of an unbalanced panel for a long period is the best way to solve the attrition bias caused by the fact that some companies may be delisted and, consequently, removed from the database.

[Insert Table 1]

Although the management report is one of the main documents with narrative information that Spanish firms produce, its content and structure is practically voluntary, owing to the lack of laws or standards to standardize its format and regulate its extent, epigraphs, degree of detail, and inclusion of tables and graphs, among other things. For this reason, the management report becomes the perfect document of narrative information to analyze the disclosure policy in Spanish companies. As a result, management reports were analyzed, making a total of 11,643 pages and 4,384,708 text words.

It is important to consider that publication of the *Guide for the Preparation of the Management Report of Listed Companies* (CNMV, 2013) was implemented in 2014. Therefore, the past three years were subsequent to the publication of the guide.

3.2. Variables measurement

3.2.1. Dependent variables

To measure the amount of information contained in the management reports, we contemplate the two the attributes that define it: the amount of text and the quantity of visual elements.

To measure the amount of text, based on previous research such as that conducted by Rutherford (2003), Li (2008), and You & Zhang (2009), we compute the number of words contained in each management report (text words), because the number of words is considered more accurate than the number of pages. In addition, using the number of words avoids problems related to font size, margins, blank space and so on.

Regarding the amount of visual elements, we approached this concept through the quantification of information given in those visual elements, which are contained in the management reports to facilitate their ease of reading and comprehensibility. These visual elements help the reader to better process the information (Van Beest et al., 2009) and to organize the ideas in a clearer way. Thus, in management reports we can find tables, charts,

graphs, figures, maps, flowcharts and other graphics, which cannot be treated as plain text, but are elements that facilitate the understanding of the document as a whole. In addition, the main regulatory organizations (CNMV, 2013; IASB, 2010; IOSCO, 2003; SEC, 1998, among others) recommend the use of these elements as tools to improve the reports' comprehensibility.

To measure the quantity of visual elements we did not contemplate the number of visual elements that appear in the document, but went a step further, transforming the space that the visual elements occupy to its equivalent number of text words, which we named equivalent words of visual elements (EWVE). So, it is easy to compare with the amount of text for each management report. In addition, this measure also allows us to assign greater importance to those visual elements that offer a greater amount of information and, therefore, take up more space in the document. In this way, we disagree with previous studies where the number of visual elements was used, assigning the same importance to each visual element regardless of its informative quantity. The appendix contains a more detailed description of how to quantify the equivalent words of the visual elements.

In addition, this variable allowed us to construct a new variable with both the quantity of text and visual elements, named total words (i.e., text words plus EWVE). In this way, we presented a measure not only of the amount of text contained in the management reports, but also a measure of the graphic resources that accompany the text and help the reader understand it. That is, we measured the total amount of information that the management reports offer and can be processed by the reader.

These three variables were incorporated in the regressions as dependent variables through their logarithms. That is, log text words, log (1+EWVE)[6] and log total words (text words plus EWVE).

We also considered two new variables that arise from measuring the amount of visual elements in relative terms with respect to the rest of the narrative information. These variables were the equivalent words of visual elements relative to the text words (EWVE-to-text words) and the equivalent words of visual elements relative to the total words (EWVE-to-total words). Table 2 contains a statistical description of all these variables by years, as will be seen later.

Regarding the quality of disclosure contained in the management reports and its measure, in accordance with the CNMV guide, we consider the most important quality items grouped into nine categories: organizational structure (Q1), strategy (Q2), performance (Q3), environment (Q4), human resources (Q5), risk management (Q6), opportunities (Q7), R+D+I (Q8) and financial information (Q9). For each item category, we contemplate different items (words) that are related to it and define it. These are: organizational structure (organizational structure and decision-making), strategy (strategic objectives, strategies, action plans and strategic environment), performance (past and future performance, returns, results, evolution of results, financial indicators and non-financial indicators), environment (environment, environmental resources, environmental protection and environmental management), human resources (human resources, human factor, company staff and workers), risk management (risk management, risk exposure, types of risk, risks and uncertainties), opportunities (opportunities, advantages and future perspectives), R+D+I (R+D+I, R+D, research, development and innovation) and financial information (stock market evolution, dividends, credit quality, credit rating and liquidity). Next, we quantify each item category by calculating the number of items (words) contained in each management report that belong to that category. Finally, the quality indicator (QI) summarizes these categories, and it is the mean

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[6] As some management reports do not contain visual elements and the log of zero is not defined, we will take the logarithm of one plus the number of equivalent words of visual elements.

value of the nine categories. This is, the average number of items (words) related to the nine categories of items contained in each management report[7].

Finally, the ten variables were incorporated in the regressions as dependent variables through their logarithms[8].

3.2.2. Independent variables

The first variable to be considered was the lagged dependent variable because we expect that the current level of the dependent variable be heavily determined by its past level. This is confirmed through the pairwise correlation coefficients between the dependent variables and their lags, with values between 0.88 and 0.93, depending on the variable considered. For this, not including the lagged dependent variable will lead to omitted variable bias and our results might be unreliable. Specifically, when we analyze the management reports of each company, we find that they were written based on the previous management report, so they present very similar sections to each other.

Regarding the size of a company, the main international organizations point out that the reports that the companies elaborate must be in line with their size (CNMV, 2013; IASB, 2006, 2010; IOSCO, 2003). Therefore, ex ante, we expected that larger companies will issue longer reports with more text (Li, 2008) and visual elements, so these relationships with respect to the dependent variables will be positive. Likewise, if larger companies communicate information that is more complex, they will issue more varied information and, according to our considered quality indicator, with higher quality, according to Robb et al. (2001) and Vanstraelen et al. (2003) who found a positive relationship between company size and quality. The log of the total assets of the company was used as a measure.

In the use of the CNMV guide when it prepares the management report and which establishes a structure of the management report with nine epigraphs, we used a dichotomous variable to separate the companies that follow the CNMV guide from those that do not. We expected positive relationships with information quantity (text and graphic resources quantity) and information quality, since following the nine epigraphs of the guide supposes to publish a more complete and exhaustive information of the company.

3.2.3. Control variables

The control variables used in the study are the book-to-market ratio, the age of the company, the level of indebtedness, the ownership dispersion and the dichotomous variables related to the existence of corporate actions on the shares of the company (i.e., public offerings and takeover bids) and qualifications in the audit report. Finally, sector and time dummies were also included to control the industry and temporal effects.

The book-to-market can be defined as the ratio between the book value of the company and its market value. To compute the book value, the equity was used. For the market value of the company, the value of its market capitalization was taken, that is, the number of shares multiplied by their unit quotation value. Companies with a low ratio present greater opportunities for potential growth and, therefore, in principle, we expected that their management reports to be more extensive (Li, 2008; Loughran & McDonald, 2014), make greater use of visual elements and to be higher quality.

Older companies have fewer information asymmetries and, therefore, less uncertainty in the elaboration of information owing to accumulated experience, so their reports may be brief

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[7] The quality indicator was also calculated as a sum of the nine categories, instead of an average. The results obtained that are not shown in the document were similar to those shown in the paper.

[8] More specifically, as with the visual elements, as some management reports do not contain items (words) related to the item categories of organizational structure (Q1), strategy (Q2), environment (Q4), human resources (Q5), risk management (Q6), opportunities (Q7), R+D+I (Q8) and financial information (Q9), we will take the logarithm of one plus the number of items words contained in each management report that belong to that category.

and simple. However, it is also true that older companies tend to be larger and have more complex operations, so they might produce more extensive reports, use more graphic resources to clarify and compensate for this complexity and publish higher quality information with issues of all kinds due to this greater complexity. Consequently, we expected both negative and positive relationships depending on whether information asymmetries or the complexity of operations prevail. To incorporate this control variable, the log of the age of the company was used as a measure (Li, 2008).

The level of indebtedness, measured by the ratio between the company's debt and its assets, was another variable to be considered as a control variable (Ajina et al., 2016; DeFond & Jiambalvo, 1994; Zéghal, Chtourou, & Sellami, 2011). More indebted companies will present a higher level of financial risk and, in principle, will present broader management reports and make greater use of visual elements, so we expected positive relationships with respect to the information quantity and quality.

Ownership dispersion is defined as the percentage of shares held by the public. Following the agency theory, if the ownership structure is more dispersed, agency costs increase because of the increased probability of conflict of interest between owners (Jensen & Meckling, 1976). Therefore, the firms that present high ownership dispersion will likely issue larger management reports and more visual elements. Tarca & Seah (2006) examine the effect of ownership dispersion on the voluntary disclosures and conclude that firms with greater ownership dispersion provide more voluntary disclosures of intangible assets. According to these authors, we also expect these companies to issue more varied and, therefore, higher quality information.

To reflect the effect that corporate actions may have on the management report, public offerings and takeover bids were considered. For this purpose, a dichotomous variable was created that takes the value 1 if the company has made a public offer or received a takeover bid during the corresponding year, and the value 0 otherwise. Ex ante, it was understood that these types of complex operations, to which the shares of the company have been subjected, require greater effort to explain the company's performance in that year and, therefore, we expected more extensive management reports (Li, 2008), clarifying the situation through the use of more graphic resources, and higher quality reports.

In addition, we included the dichotomous variable of a qualified audit report, which was given the value of 1 if the company receives the audit report with qualifications, and the value 0 if it was an unqualified audit report. It is possible that companies have obtained a qualified audit as a result of not having published enough information. Therefore, we expected a negative relationship between this variable and both the amount of narrative information and the quality of that information.

Finally, we considered sector and time dummies, as control variables, to measure the industry and temporal effects in all the proposed regressions.

3.3. Models and methodology

Several models were developed for the analysis. Initially we carried out five regressions, where the dependent variables were the text quantity (1), the quantity of visual elements (2), the total quantity (3), the quantity of visual elements relative to the text quantity (4) and the quantity of visual elements relative to the total quantity (5). These five models, which allowed us to test hypothesis H2, are as follows:

$$LTW_{it} = \beta_0 + \beta_1 \cdot LTW_{it-1} + \beta_2 \cdot FS_{it} + \beta_3 \cdot CNMVG_{it} + \Sigma \beta_j \cdot CV_{jit} + \varepsilon_{it} \qquad (1)$$

$$LEWVE_{it} = \beta_0 + \beta_1 \cdot LEWVE_{it-1} + \beta_2 \cdot FS_{it} + \beta_3 \cdot CNMVG_{it} + \Sigma \beta_j \cdot CV_{jit} + \varepsilon_{it} \qquad (2)$$

$$LTOTW_{it} = \beta_0 + \beta_1 \cdot LTOTW_{it-1} + \beta_2 \cdot FS_{it} + \beta_3 \cdot CNMVG_{it} + \Sigma \beta_j \cdot CV_{jit} + \varepsilon_{it} \qquad (3)$$

$$EWVETTW_{it} = \beta_0 + \beta_1 \cdot EWVETTW_{it-1} + \beta_2 \cdot FS_{it} + \\ + \beta_3 \cdot CNMVG_{it} + \Sigma \beta_j \cdot CV_{jit} + \varepsilon_{it} \qquad (4)$$

$$EWVETTOTW_{it} = \beta_0 + \beta_1 \cdot EWVETTOTW_{it-1} + \beta_2 \cdot FS_{it} +$$
$$+ \beta_3 \cdot CNMVG_{it} + \Sigma \beta_j \cdot CVj_{it} + \varepsilon_{it} \quad\quad\quad (5)$$

where LTW_{it} (Log text words) is the log of the number of text words contained in the management report of company i in the year t; $LEWVE_{it}$ (Log (1+EWVE)) is the log of one plus the number of equivalent words of visual elements contained in the management report of company i in the year t; $LTOTW_{it}$ (Log total words) is the log of the number of total words contained in the management report (i.e., text words plus EWVE) of company i in the year t; $EWVETTW_{it}$ (EWVE-to-text words) is the number of equivalent words of visual elements in relative to the number of text words contained in the management report of company i in the year t; $EWVETTOTW_{it}$ (EWVE-to-total words) is the number of equivalent words of visual elements in relative to the number of total words contained in the management report of company i in the year t; FS_{it} (Firm Size) is the log of the total assets of company i in the year t; $CNMVG_{it}$ (CNMV Guide) is a dichotomous variable, which takes value 1 if company i in the year t follows the guide, and 0 if it does not; and CVj_{it} (Control Variable) is the corresponding control variable j of company i in the year t, which have been previously described. Finally, ε_{it} is the error term, which is split into three components: the individual effect (η_i), the temporal effect (d_t), and the white noise or random disturbance (v_{it}).

To test hypothesis H3, we developed the following ten models, applied to the quality indicator and its nine categories of items:

$$QI_{it} = \beta_0 + \beta_1 \cdot QI_{it-1} + \beta_2 \cdot FS_{it} + \beta_3 \cdot CNMVG_{it} + \Sigma \beta_j \cdot CVj_{it} + \varepsilon_{it} \quad\quad (6)$$

$$LQ1_{it} = \beta_0 + \beta_1 \cdot Q1_{it-1} + \beta_2 \cdot FS_{it} + \beta_3 \cdot CNMVG_{it} + \Sigma \beta_j \cdot CVj_{it} + \varepsilon_{it} \quad\quad (7)$$

…

$$LQ9_{it} = \beta_0 + \beta_1 \cdot Q9_{it-1} + \beta_2 \cdot FS_{it} + \beta_3 \cdot CNMVG_{it} + \Sigma \beta_j \cdot CVj_{it} + \varepsilon_{it} \quad\quad (15)$$

where LQI_{it} (Log quality indicator) is the log of the average number of items (words) related to the nine categories of quality items contained in the management report of company i in the year t; and LQJ_{it} (Log quality J) is the log of the number items (words) belonging to the J quality category contained in the management report of company i in the year t. In particular, the item categories considered are: organizational structure (Q1), strategy (Q2), performance (Q3), environment (Q4), human resources (Q5), risk management (Q6), opportunities (Q7), R+D+I (Q8) and financial information (Q9). In addition, for all item categories with the exception of performance (Q3), we will take the logarithm of one plus the number of words contained in each management report that belong to that category (i.e. Log (1+QJ)). The rest of the variables have already been defined above.

These dynamic models with predetermined variables were estimated using panel data methodology and the GMM, specifically using the two-step system GMM estimator (Blundell & Bond, 1998). The use of the system GMM estimator avoids unobservable heterogeneity and endogeneity problems. We controlled this heterogeneity in companies to avoid biased results by modeling it as individual effects, η_i. Also, this estimator can remove endogeneity problem, when the error term is correlated with any of the explanatory variables. This correlation violates one of the main assumptions of ordinary least squares (OLS) methodology. The system GMM accounts for endogeneity by using instruments. More specifically, Arellano & Bover (1995) propose using two types of instruments: instruments in levels for equations in first differences and instruments in first differences for equations in levels. Thus, system GMM overcome the weak instruments problem that suffer the difference GMM.

Moreover, once we estimated the models, we ran several tests to verify the degree of consistency and robustness of the results obtained. More specifically, we ran the Hansen test of over-identifying restrictions, which tests the lack of correlation between the instruments and the random disturbance, v_{it}. We also ran the m_1 and m_2 tests (Arellano & Bond, 1991), which test respectively the no lack of first-order serial correlation of the first-difference residuals and

lack of second-order serial correlation of the first-difference residuals. Finally, we ran the Wald tests of joint significance of reported coefficients.

4. Results

4.1. Expansion of narrative information: informative quantity and quality

Table 2 contains the statistical description of the two attributes that constitute the quantity of narrative information (amount of text and visual elements), presented both in absolute terms and in relative terms and grouped by years. That is, text words, equivalent words of visual elements (EWVE), total words (text words plus EWVE), EWVE-to-text words (equivalent words of visual elements in relation to text words) and EWVE-to-total words (equivalent words of visual elements in relation to total words). The non-parametric contrasts of the Kendall test are reported.

[Insert Table 2]

Clearly, the data reveal that the quantity of text contained in the management reports of listed companies has been increasing year by year. The variability of text quantity of these documents is wide. Some reports are composed of less than 1,000 words, which are two or three pages long, and others are much longer, exceeding 45,000 words and consisting of more than 100 pages. These results are in line with the previous literature, which affirms that the narrative information that companies develop is more and more extensive (Banegas, Manzaneque, & Priego, 2013; Beattie et al., 2004; Beattie & Davison, 2015; Beattie & Smith, 2013; Deloitte, 2008; PricewaterhouseCoopers, 2007b, 2007a; Suárez & Babío, 2014; Tarca & Seah, 2006). It is also important to highlight the magnitude of the study, in which more than 4,000,000 text words were counted.

If we look at the variable that measures the quantity of visual elements, that is, the number of equivalent words of the visual elements, we see again a remarkable increase between 2010 and 2016. Again, a wide range of reports is obtained about visual elements, with several reports having no visual element accompanying the text and others in which tables, graphs, and other figures are abundant. These results are in line with many studies (Beattie et al., 2008; Havemo, 2018; Hopwood, 2007; Lee, 1994), who found a transformation in reports that evolve into creative documents containing text, images and graphics.

Therefore, we can state that non-financial information is expanding, in terms of both text and visual elements, as confirmed by the joint variable that measures the total amount of information in the management reports. This increase in the non-financial information contained in the management reports is corroborated by the Kendall test and can be visually observed in Figure 1.

[Insert Figure 1]

Finally, for the two variables of visual elements measured in relative terms with respect to the remainder of the narrative information −equivalent words of visual elements relative to the text words (EWVE-to-text words) and equivalent words of visual elements relative to the total words (EWVE-to-total words)− we confirm that the use of elements of visual elements gains ground to the amount of text. That is, graphic resources (i.e., tables, charts, graphs, figures, maps, flowcharts and other graphics) are used more intensively with respect to the text quantity. Again, the Kendall test and the figure 2 also shows these same results.

[Insert Figure 2]

Therefore, we can conclude that the quantity of narrative information is expanding, so hypothesis H1a is corroborated.

Table 3 shows the statistical description of the quality indicator and its nine categories of items that constitute the quality of narrative information, grouped by years. These item categories are: organizational structure (Q1), strategy (Q2), performance (Q3), environment

(Q4), human resources (Q5), risk management (Q6), opportunities (Q7), R+D+I (Q8) and financial information (Q9). The non-parametric contrasts of the Kendall test are reported.

[Insert Table 3]

The data reveal that the quality of narrative information contained in the management reports of listed companies has been increasing year by year, measured by the quality indicator its nine quality categories of items. The variability of quality of these documents is wide. Thus, for example, the category of item less present in management reports, as is the organizational structure category (Q1), shows a variability ranging from 0 to 93 words, while the category most present in management reports, as is the performance category (Q3), it shows a variability that goes from 1 to 331 words. In addition, the quality indicator (QI), which collects the average number of words related to the nine categories of items, reveals a variability ranging from 1 to 131 words. Furthermore, in order of importance, number of words related to the categories of items of performance (Q3), risk management (Q6), R+D+I (Q8) and Strategy (Q2) stand out over other categories. Again, the Kendall test and the figure 3 illustrates these same results.

[Insert Figure 3]

Therefore, we can conclude that the quality of narrative information is expanding, so hypothesis H1b is corroborated.

4.2. Determinants of the informative quantity of management reports: amount of text and visual elements

In accordance with the independent variables contemplated above, we analyze the relationship between company size and extension of management reports, in terms of both text quantity and quantity of visual elements of non-financial information, after controlling for various factors. In addition, we will examine whether companies' use of the CNMV guide (CNMV, 2013) positively affects both the text quantity and quantity of visual elements. These relationships were previously specified in the regression models (1) – (5), and allow us to test hypotheses H2.

Table 4 provides the correlation matrix of the variables used in the models and the variance inflation factors (VIFs). We examine the possible problems of multicollinearity between independent and control variables through Pearson correlation coefficients and VIFs. The results allow us to rule out the possible existence of multicollinearity and its consequences on the regression analysis, because although there are some significant correlations between independent and control variables, all are well below 0.7 (Tabachnick & Fidell, 1996). In particular, they are between -0.339 and 0.180. In addition, all the VIFs of the explanatory variables (independent and control) are close to one.

[Insert Table 4]

Table 5 presents the results of the system GMM regressions for the dependent variables of amount of text words (column 1), amount of visual elements measured in absolute terms (column 2) and in relative terms (columns 4 and 5), and total words (column 3). We applied the Windmeijer (2005) finite sample correction for standard errors. To avoid instrument proliferation, we restricted the number of instruments for predetermined variables using the "collapse" option to compute the GMM instrument matrix. This suboption creates one instrument for each variable and lag distance, rather than one for each period, variable and lag distance. This avoids the bias that arises as the number of instruments climbs toward the number of observations.

[Insert Table 5]

Concerning the first independent variable, the results show a positive and statistically significant relationship between the size of the company and the amount of narrative information contained in the management report through the text and visual elements. Thus,

larger companies publish broader management reports with more text (Li, 2008) and management reports with more quantity of visual elements. Therefore, as expected, when we look at the dependent variable of total words, the results are similar to those obtained in the two previous regressions. That is, the company's size positively affect the amount of non-financial information as a whole. Following with the analysis of the visual elements contained in the management reports, models (4) and (5) show the results of these regressions for the equivalent words of visual elements, measured through the number of equivalent words of visual elements in relative to the number of text words (log EWVE-to-text words) and the number of equivalent words of visual elements in relative to the number of total words (log EWVE-to-total words). The results reveal that there is a positive and statistically significant relationship between firm size and the quantity of visual elements measured in relative terms. Therefore, larger companies publish management reports that use graphic resources more intensively to the detriment of the amount text. Taking into account these displayed results we conclude that hypothesis H2a is totally corroborated.

Regarding the CNMV guide independent variables, there is also a positive and statistically significant relationship between this variable and the text quantity of the management report. This demonstrates that companies following the CNMV guide produce more extensive management reports, employing all of the headings proposed in that guide. This relationship also extend to the total words in the management report. Nevertheless, we did not find a statistically significant relationship between the companies that follow the CNMV's recommendations in its guide and the amount of visual elements, measured both in absolute and relative terms. Therefore, hypothesis H2b is partially verified for amount of text and the total words in the report as a whole.

In addition, Figure 4 displays the evolution of the dependent variables text quantity, quantity of visual elements and total quantity, distinguishing between management reports that follow CNMV guide and those do not. This figure corroborates the results obtained for the CNMV guide variable in the regression models of Table 5. That is, companies following the CNMV guide produce management reports with more text. However, there are no statistically significant differences in the quantity of visual elements among firms that follow the CNMV guide and those that do not.

[Insert Figure 4]

Furthermore, regarding the control variables contemplated, the leverage ratio positively affects the amount of text and the amount of visual elements in absolute terms. Thus, most indebted companies tend to issue more extensive texts and to make more frequent use of visual elements in their management reports. Moreover, the corporate actions positively affect the EWVE-to-text words variable and with respect to the EWVE-to-total words is about to be significant.

Finally, the results show that the coefficients of the delayed dependent variables are positives and statistically significant. Moreover, the tests z_1 (joint significance of the regression coefficients), m_1 (no lack of first-order correlation in the first-difference residuals), m_2 (lack of second-order correlation in the first-difference residuals), and the Hansen test (absence of correlation between the instruments and the error term) verify the consistency and robustness of the estimated regression models.

4.3. Determinants of the informative quality of management reports: quality indicator and items

The objective of this section is to analyze the determinants of the informative quality, measured through the quality indicator explained before and its categories. This will allow us to test hypothesis H3. Thus, Table 6 shows the relationships between firm size (H3a) and informative quality, and between compliance with the CNMV guide (H3b) and informative quality. The quality indicator (QI) is analyzed in column (1) and it has been broken down among its different item categories through columns (2) – (10).

[Insert Table 6]

Based on the quality indicator (QI), the results show that larger firms publish higher quality management reports, as evidenced by the positive and significant coefficient on firm size independent variable (Robb et al., 2001; Vanstraelen et al., 2003). Therefore, hypothesis H3a is corroborated. Furthermore, the CNMV guide variable is also positively associated with the quality indicator (QI). In this sense, the recommendations made by the CNMV to these listed companies, encouraging them to follow a predetermined format when preparing the management report, seem to be on the right track, since the companies that follow these recommendations manage to publish higher quality management reports. Therefore, it can be confirmed that hypothesis H3b also holds.

Analyzing separately the item categories that make up the quality indicator, it can be seen quite similar results. On the one hand, firm size positively influences the quality of information on categories of performance (Q3), environment (Q4), human resources (Q5), risk management (Q6), opportunities (Q7), and R+D+I (Q8); while there is no statistically significant influence on categories of structural organization (Q1), strategy (Q2) and financial information (Q9). On the other hand, those companies that follow the guidelines, proposed by the CNMV through its guide, issue higher quality information on all the item categories, except on risk management (Q6) and R+D+I (Q8). The reason is probably that these two item categories are so important in the publication of non-financial information, that companies had already been issuing information about them before the publication of the CNMV guide.

Concerning the control variables, the age of the company positively affects the quality indicator, so more experienced companies issue higher quality. In terms of its different categories, leverage and ownership dispersion exert a positive influence on some of them, while the variable qualified audit report is negatively related to the dependent variables. The book-to-market ratio and the binary variable corporate actions show relationships in both directions, depending on the category of the quality indicator analyzed.

Moreover, the coefficients of the delayed dependent variables are positives and statistically significant, which means that the quality of the management report for one year depends on the quality of the management report in the previous year. Again, the results shown in the different tests of the regression models confirm the validity of these models.

Finally, the results obtained in terms of the CNMV guide are reinforced by the results shown in Figure 5. By way of illustration and for the quality indicator this figure displays a growth in the quality of management reports that is different among the companies that follow this guide, where growth is much more pronounced, and the companies that did not follow it, where growth is lower.

[Insert Figure 5]

5. Conclusions

In this paper we have analyzed the informative quantity and quality of management reports of Spanish companies listed on the Continuous Market of the Madrid Stock Exchange during the period 2010-2016.

For this purpose, we have defined different variables that try to measure the quantity and quality information in an attempt to determine whether non-financial information is expanding, both in terms of quantity and quality, and whether the size of a company and the compliance with the CNMV guide affects them after controlling for several factors.

Our results reveal significant increases in absolute terms of two attributes that constitute the quantity of narrative information (quantity of text and visual elements) between 2010 and 2016. This confirms that the quantity of narrative information is expanding, as the literature

points out. However, the use of graphic resources has gained ground to the amount of text. That is, the proportion of graphic resources (i.e., tables, charts, graphs, figures, maps, flowcharts and other graphics) contained in the management reports has increased to the detriment of the text quantity. In addition, the quality indicator and its nine categories of items that compose it also reveal that the quality of narrative information is expanding. Another feature is that the quality indicator displays a growth in the quality of management reports that is different among the companies that follow the CNMV guide, where growth is much more pronounced, and the companies that did not follow it, where growth is lower. Thus, the publication of the *Guide for the Preparation of the Management Report of Listed Companies* (CNMV, 2013) in Spain has been positive, since it has served as a basis for companies to disclose management reports of quality, as intended the CNMV.

Regarding the explanation of the amount of information, we corroborate that the size of the company has a positive impact on the text quantity and the quantity of visual elements. However, companies' use of the CNMV guide for the preparation of management reports, proposed by the National Stock Market Commission (CNMV, 2013), proves that it only affects positively the text quantity of narrative information, not the quantity of visual elements. We also confirm that large companies use graphic resources more intensively with respect to the amount of text and that the compliance with the CNMV guide has no impact on the use of these graphic resources.

In relation to the explanation of the informational quality, we show that larger companies and those that comply with the CNMV guide present, in general, a higher quality of information. That is, they publish more complete and higher quality information, attending the needs of the stakeholders. Therefore, compliance with the CNMV guide by companies has allowed them to elaborate higher quality management reports.

References

AICPA. (1994). *Improving business reporting - A customer Focus: Meeting the Information Needs of Investors and Creditors, Comprehensive Report of the Special Committee on Financial Reporting (The Jenkins Report)*. New York, NY: American Institute of Certified Public Accountants.

Ajina, A., Laouiti, M., & Msolli, B. (2016). Guiding through the Fog: Does annual report readability reveal earnings management? *Research in International Business and Finance*, *38*, 509–516. https://doi.org/10.1016/j.ribaf.2016.07.021

Arellano, M., & Bond, S. (1991). Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations. *The Review of Economic Studies*, *58*(2), 277. https://doi.org/10.2307/2297968

Arellano, M., & Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of Econometrics*, *68*(1), 29–51. https://doi.org/10.1016/0304-4076(94)01642-D

Banegas, R., Manzaneque, M., & Priego, A. M. (2013). Informe anual de gobierno corporativo como fuente de transparencia empresarial. Especial referencia a las empresas cotizadas españolas. *Revista de Contabilidad y Dirección*, *16*, 29–62.

Beattie, V. (2005). Moving the financial accounting research front forward: The UK contribution. *British Accounting Review*. https://doi.org/10.1016/j.bar.2004.09.004

Beattie, V., & Davison, J. (2015). Accounting narratives: Storytelling, philosophising and quantification. *Accounting and Business Research*, *45*(6–7), 655–660. https://doi.org/10.1080/00014788.2015.1081520

Beattie, V., Dhanani, A., & Jones, M. J. (2008). Investigating presentational change in U.K.

annual reports: A longitudinal perspective. *Journal of Business Communication*, *45*(2), 181–222. https://doi.org/10.1177/0021943607313993

Beattie, V., McInnes, B., & Fearnley, S. (2004). A methodology for analysing and evaluating narratives in annual reports: A comprehensive descriptive profile and metrics for disclosure quality attributes. *Accounting Forum*, *28*(3), 205–236. https://doi.org/10.1016/j.accfor.2004.07.001

Beattie, V., & Smith, S. J. (2013). Value creation and business models: Refocusing the intellectual capital debate. *British Accounting Review*, *45*(4), 243–254. https://doi.org/10.1016/j.bar.2013.06.001

Beretta, S., & Bozzolan, S. (2004). A framework for the analysis of firm risk communication. *The International Journal of Accounting*, *39*(3), 265–288. https://doi.org/https://doi.org/10.1016/j.intacc.2004.06.006

Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, *87*(1), 115–143. https://doi.org/10.1016/S0304-4076(98)00009-8

Botosan, C. A. (1997). Disclosure level and the cost of equity capital. *Accounting Review*, *72*(3).

Botosan, C. A. (2004). Discussion of a framework for the analysis of firm risk communication. *The International Journal of Accounting*, *39*(3), 289–295. Retrieved from https://econpapers.repec.org/RePEc:eee:accoun:v:39:y:2004:i:3:p:289-295

Chavent, M., Ding, Y., Fu, L., Stolowy, H., & Wang, H. (2006). Disclosure and determinants studies: An extension using the Divisive Clustering Method (DIV). *European Accounting Review*, *15*(2), 181–218. https://doi.org/10.1080/09638180500253092

CICA. (1991). *Information to be included in the annual report to shareholders*. Toronto, Ontario: Canadian Institute of Chartered Accountants.

CNMV. (2013). *Guía para la elaboración del informe de gestión de las entidades cotizadas*.

Davison, J. (2015). Visualising accounting: An interdisciplinary review and synthesis. *Accounting and Business Research*, *45*(2), 121–165. https://doi.org/10.1080/00014788.2014.987203

DeFond, M. L., & Jiambalvo, J. (1994). Debt covenant violation and manipulation of accruals. *Journal of Accounting and Economics*, *17*(1–2), 145–176. https://doi.org/10.1016/0165-4101(94)90008-6

Deloitte. (2008). Write from the Start. Surveying Narrative Reporting in Annual Reports. *Deloitte and Touche LLP*.

Eccles, R. G., & Krzus, M. P. (2010). *Integrated Rreporting for a sustainable strategy. Financial Executive* (Vol. 26). Wiley.

Firer, S., & Williams, S. M. (2005). Firm ownership structure and intellectual capital disclosures. *South African Journal of Accounting Research*, *19*(1), 1–18. https://doi.org/10.1080/10291954.2005.11435116

Freeman, R. E. (1994). The Politics of Stakeholder Theory: Some Future Directions. *Business Ethics Quarterly*, *4*(4), 409–421. https://doi.org/10.2307/3857340

Guthrie, J. (1982). *Social Accounting in Australia: Social Responsibility Disclosure in the Top 150 Listed Australian Companies 1980 Annual Reports*. W.A.I.T.

Guthrie, J., Petty, R., Yongvanich, K., & Ricceri, F. (2004). Using content analysis as a research method to inquire into intellectual capital reporting. *Journal of Intellectual Capital*, *5*(2), 282–293. https://doi.org/10.1108/14691930410533704

Hasseldine, J., Salama, A. I., & Toms, J. S. (2005). Quantity versus quality: the impact of environmental disclosures on the reputations of UK Plcs. *The British Accounting Review*, *37*(2), 231–248. https://doi.org/https://doi.org/10.1016/j.bar.2004.10.003

Havemo, E. (2018). Visual trends in the annual report: the case of Ericsson 1947-2016. *Corporate Communications: An International Journal*, *23*(3), 312–325. https://doi.org/10.1108/CCIJ-03-2017-0015

Hooks, J., & Van Staden, C. J. (2011). Evaluating environmental disclosures: The relationship between quality and extent measures. *British Accounting Review*, *43*(3), 200–213. https://doi.org/10.1016/j.bar.2011.06.005

Hopwood, A. G. (2007). Whither accounting research? *Accounting Review*, *82*(5), 1365–1374. https://doi.org/10.2308/accr.2007.82.5.1365

IASB. (2006). *Preliminary views on an improved conceptual framework for Financial Reporting: the objective of Financial Reporting and qualitative characteristics of decision-useful Financial Reporting Information*.

IASB. (2010). *Management Commentary. A framework for presentation*.

IIRC. (2011). Towards Integrated Reporting. Communicating Value in the 21st Century. *Integrated Reporting*, (September), 17.

IOSCO. (2003). *General Principles Regarding Disclosure of Management's Discussion and Analysis of Financial Condition and Results of Operations*.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, *3*(4), 305–360. https://doi.org/10.1016/0304-405X(76)90026-X

Joseph, C., & Taplin, R. (2011). The measurement of sustainability disclosure: Abundance versus occurrence. *Accounting Forum*, *35*(1), 19–31. https://doi.org/10.1016/j.accfor.2010.11.002

Lee, T. (1994). The Changing Form of the Annual Report. *Accounting Historians Journal*, *21*(1), 215–232.

Li, F. (2008). Annual report readability, current earnings, and earnings persistence. *Journal of Accounting and Economics*, *45*(2–3), 221–247. https://doi.org/10.1016/j.jacceco.2008.02.003

Linsley, P. M., & Shrives, P. J. (2006). Risk reporting: A study of risk disclosures in the annual reports of UK companies. *The British Accounting Review*, *38*(4), 387–404. https://doi.org/10.1016/j.bar.2006.05.002

Loughran, T., & McDonald, B. (2014). Measuring readability in financial disclosures. *Journal of Finance*, *69*(4), 1643–1671. https://doi.org/10.1111/jofi.12162

McMillan, S. J. (2000). The Microscope and the Moving Target: The Challenge of Applying Content Analysis to the World Wide Web. *Journalism & Mass Communication Quarterly*, *77*(1), 80–98. https://doi.org/10.1177/107769900007700107

Merkl-Davies, D., & Brennan, N. (2007). Discretionary disclosure strategies in corporate narratives: incremental information or impression management? *Journal of Accounting Literature*, *26*, 96–116. Retrieved from https://econpapers.repec.org/RePEc:rru:oapubs:10197/2907

Michelon, G., Pilonato, S., Ricceri, F., & Roberts, R. W. (2016). Behind camouflaging: traditional and innovative theoretical perspectives. *Sustainability Accounting, Management and Policy Journal*, *7*(1), 2–25. https://doi.org/10.1108/EL-01-2014-0022

Milne, M. J. (2002). Positive accounting theory, political costs and social disclosure analyses: A critical look. *Critical Perspectives on Accounting*, *13*(3), 369–395.

https://doi.org/10.1006/cpac.2001.0509

Milne, M. J., & Adler, R. (1999). Exploring the reliability of social and environmental disclosures content analysis. *Accounting, Auditing & Accountability Journal*, *12*, 237–256.

Nielsen, C. (2008). A content analysis of analyst research: health care through the eyes of analysts. *Journal of Health Care Finance*, *34 3*, 66–90.

PricewaterhouseCoopers. (2007a). Business Review : has it made a difference ? *PricewaterhouseCoopers.*

PricewaterhouseCoopers. (2007b). Corporate reporting – a time for reflection A survey of the Fortune Global 500 companies' narrative reporting. *PricewaterhouseCoopers*, (April).

Robb, S. W. G., Single, L. E., & Zarzeski, M. T. (2001). Nonfinancial disclosures across Anglo-American countries. *Journal of International Accounting, Auditing and Taxation*, *10*(1), 71–83.

Rutherford, B. A. (2003). Obfuscation, textual complexity and the role of regulated narrative accounting disclosure in corporate governance. *Journal of Management and Governance*, *7*(2), 187–210. https://doi.org/10.1023/A:1023647615279

Seah, S., & Tarca, A. (2013). An Investigation of the International Comparability of Management Commentary Reports. *SSRN ELibrary*, (August). https://doi.org/10.2139/ssrn.962628

SEC. (1998). A plain English handbook. How to create clear SEC.

Smith, M., & Taffler, R. J. (2000). The chairman's statement - A content analysis of discretionary narrative disclosures. *Accounting, Auditing & Accountability Journal*, *13*(5), 624–647. https://doi.org/10.1108/09513570010353738

SRI International. (1987). *Investor information needs and the annual report*. Morristown, NJ: Financial Executives Research Foundation.

Suárez, Ó. (2015). La divulgación de buenas y malas noticias por parte de las empresas cotizadas españolas. *Innovar: Revista de Ciencias Administrativas y Sociales*, *25*(1Spe), 33–46. https://doi.org/10.15446/innovar.v25n1Spe.53192

Suárez, Ó., & Babío, M.-R. (2014). La necesidad de mejorar la claridad de la información narrativa. *Revista de La Asociación Española de Contabilidad y Administración de Empresas*, *6*, 14–16.

Suchman, M. C. (1995). Managing Legitimacy: Strategic and Institutional Approaches. *The Academy of Management Review*, *20*(3), 571–610. https://doi.org/10.2307/258788

Tabachnick, B., & Fidell, L. (1996). *Using Multivariate Statistics* (3rd ed.). New York: HarperCollins.

Tarca, A., & Seah, S. (2006). *The Impact of Regulatory Framework on Management Commentary Reports. SSRN eLibrary*. https://doi.org/10.2139/ssrn.962628

Trotman, K. T. (1979). Social Responsibility Disclosures by Australian Companies. *Chartered Accountant in Australia*, *49*, 24–28.

Unerman, J. (2000). Methodological issues - Reflections on quantification in corporate social reporting content analysis. *Accounting, Auditing & Accountability Journal*, *13*(5), 667–681. https://doi.org/10.1108/09513570010353756

Urquiza, F. B., Navarro, M. C. A., & Trombetta, M. (2010). Disclosure theories and disclosure measures. *Revista Española de Financiacion y Contabilidad*, *39*(147), 393–415. https://doi.org/10.1080/02102412.2010.10779686

Van Beest, F., Braam, G., & Boelens, S. (2009). Quality of Financial Reporting: measuring qualitative characteristics. *NiCE Working Paper 09-108*, (April), 1–41.

Vanstraelen, A., Zarzeski, M. T., & Robb, S. W. G. (2003). Corporate Nonfinancial Disclosure Practices and Financial Analyst Forecast Ability Across Three European Countries. *Journal of International Financial Management & Accounting*, *14*(3), 249–278. https://doi.org/https://doi.org/10.1111/1467-646X.00098

Verrecchia, R. E. (1983). Discretionary disclosure. *Journal of Accounting and Economics*, *5*, 179–194. https://doi.org/https://doi.org/10.1016/0165-4101(83)90011-3

Watts, R. L., & Zimmerman, J. L. (1986). *Positive accounting theory*. Englewood Cliffs, N.J.: Prentice-Hall.

Windmeijer, F. (2005a). *A finite sample correction for the variance of linear efficient two-step GMM estimators*. *Journal of Econometrics* (Vol. 126). https://doi.org/10.1016/j.jeconom.2004.02.005

Windmeijer, F. (2005b). A Finite Sample Correction for the Variance of Linear Two-Step Estimators. *Journal of Econometrics*, *126*(1), 25–51.

You, H., & Zhang, X. J. (2009). Financial reporting complexity and investor underreaction to 10-k information. *Review of Accounting Studies*, *14*(4), 559–586. https://doi.org/10.1007/s11142-008-9083-2

Zéghal, D., Chtourou, S., & Sellami, Y. M. (2011). An analysis of the effect of mandatory adoption of IAS/IFRS on earnings management. *Journal of International Accounting, Auditing and Taxation*, *20*(2), 61–72. https://doi.org/10.1016/j.intaccaudtax.2011.06.001

Appendix

Quantification of visual elements

To measure the amount of visual elements in each management report, through what we call equivalent words of the visual elements, we carry out the following steps:

- In each report, we incorporate the grid lines to show the content of each document (excluding margins) delimited by grids. These grids will be between 1 and 2 cm, depending on each document, to adjust that both the horizontal and vertical grids are a whole number.
- We quantify the number of grids containing text and the number of grids containing visual elements, ignoring the empty grids.
- We compute the number of words contained in the text grids and establish the following rule of three: if the number of text grids corresponds to a number of words, the number of element grids will correspond to a number of equivalent words, that we have called equivalent words of the visual elements.

Therefore, we transform the space occupied by the visual elements into equivalent words. This way of quantifying the visual elements makes it possible to homogeneously compare the amount of text with the quantity of visual elements and, in addition, give greater weight to those visual elements that occupy a greater space in relation to the text.

To show this quantification, we enclose an example that illustrates this way of proceeding. For simplicity and brevity, we do not show it for a full report, but for a page containing visual elements. Specifically, page 4 of the Iberpapel Gestión Management Report for the 2015 financial year has been selected. As this page presents 88 text grids (in red color) with 198 words, the 66 visual elements grids (in blue color) will correspond to 149 equivalent words of visual elements (66 * 198/87 = 149). The 11 empty grids (in green color) are not computed.

INFORME DE GESTION

Efectivamente, el resultado neto del ejercicio 2015, en comparación con el 2014 se ha incrementado en un 77%, ello ha sido posible gracias a una clara mejora en la estructura de costes, la eficiencia de la planta de celulosa, así como a una positiva evolución del área forestal, eléctrico y a la reestimación de las vidas útiles de una serie de activos de la planta productiva de su filial Papelera Guipuzcoana de Zicuñaga, S. A. conforme a lo establecido en la NIC 16 y aprobado por el Departamento de Hacienda de la Excelentísima Diputación Foral de Guipúzcoa.

2.1. Principales magnitudes.

El Importe Neto de la Cifra de [...] les de euros, se ha incrementado en un 9,05% con respecto al mismo perio[...] (2014: 200.131).

El EBITDA 31.516 miles de euros (2014: 26.220) **aumenta un 20,20%**. El margen bruto operativo alcanzando es el 14,44% (2014: 13,10%).

El Beneficio Neto correspondiente al ejercicio 2015 asciende a 16.111 **miles de euros** (2014: 9.111 miles de euros), **ello significa un incremento del 76,83%**.

2.2. Pérdidas y ganancias 2015 versus 2014.

La siguiente tabla 1 recoge las principales partidas en miles de euros de la cuenta de resultados consolidada.

	31/12/2015	31/12/2014	Variación
Importe neto de la cifra de negocios	218.237	200.131	9,05%
Otros ingresos	6.149	6.407	-4,03%
Ingresos	**224.386**	**206.538**	**8,64%**
Var. existencias productos terminados y en curso	(10.688)	4.288	
Aprovisionamientos	(79.319)	(82.926)	-4,35%
Gastos de personal	(18.778)	(19.102)	-1,70%
Otros gastos	(84.085)	(82.579)	1,82%
EBITDA	**31.516**	**26.219**	**20,20%**
Dotación de la amortización		(14.325)	-30,91%
Resultado por enajenación de inmovilizado	(3)	792	
EBIT	**21.616**	**12.686**	**70,39%**
Resultado financiero	402	66	
Beneficio antes de los impuestos	**22.018**	**12.752**	**72,66%**
Impuestos	(5.907)	(3.641)	62,24%
BENEFICIO NETO	**16.111**	**9.111**	**76,83%**

Tabla 1

4

Figure 1. Evolution of the quantity of narrative information: words and visual elements
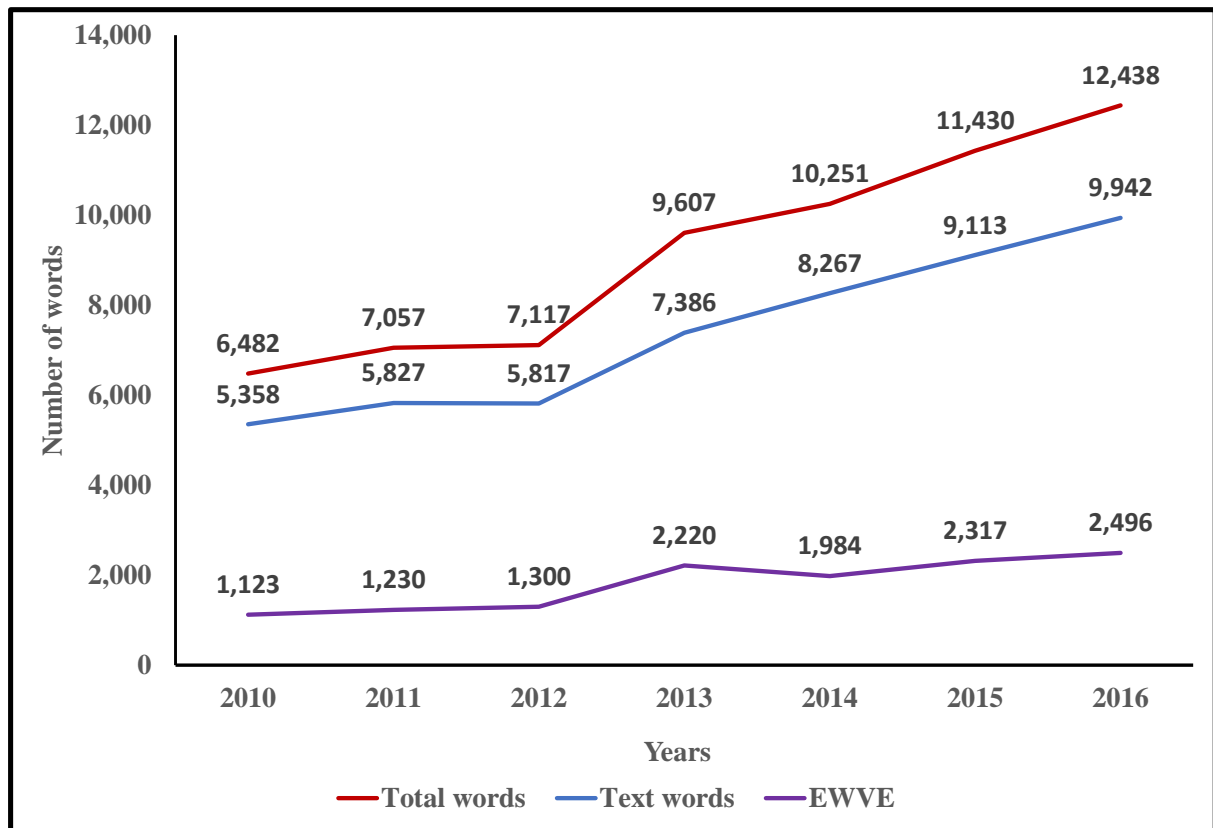
This figure shows the average values of evolution of the amount of text and visual elements contained in the management reports by years. That is, text words, equivalent words of visual elements (EWVE) and total words (text words plus EWVE).

Figure 2. Evolution of the quantity of visual elements measured in relative terms
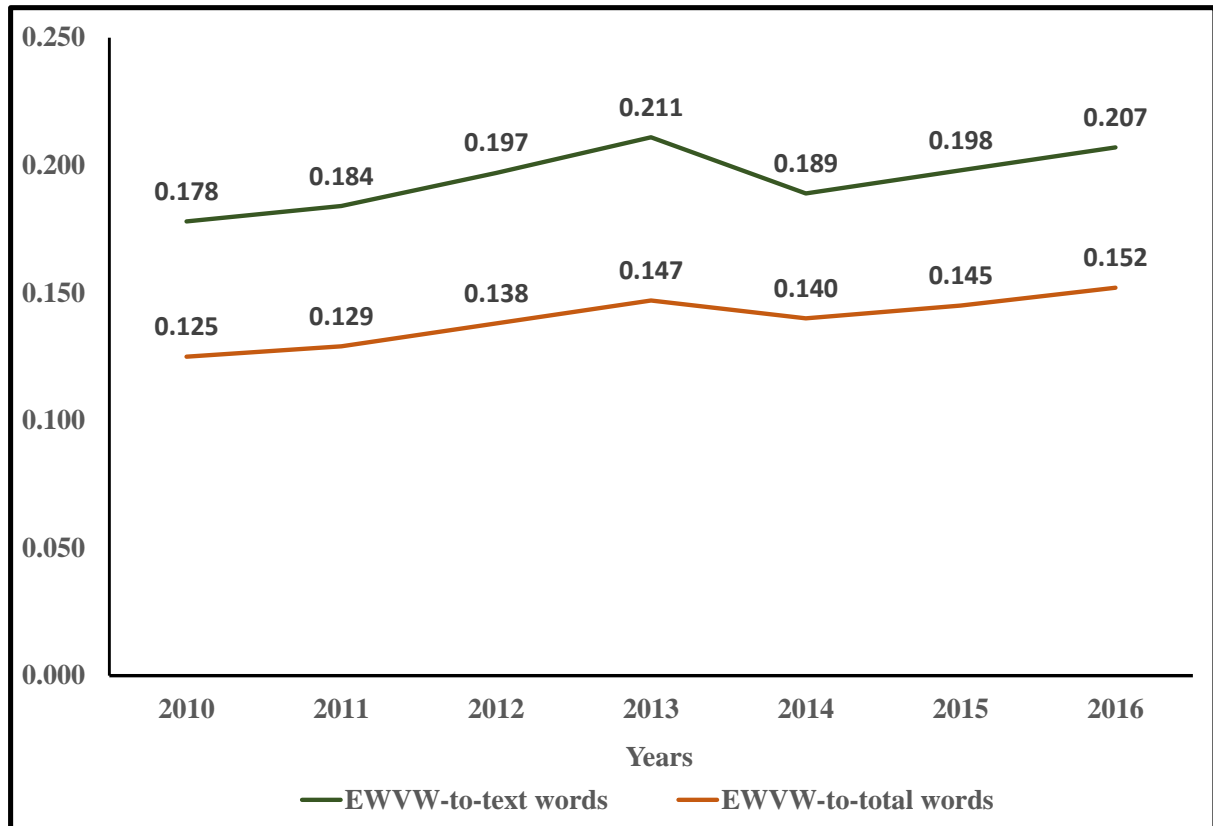
This figure presents the average values of evolution of the amount of visual elements measured in relative terms and contained in the management reports by years. That is, EWVE-to-text words (equivalent words of visual elements in relation to text words) and EWVE-to-total words (equivalent words of visual elements in relation to total words).

Figure 3. Evolution of the quality of narrative information: quality indicator and items by years
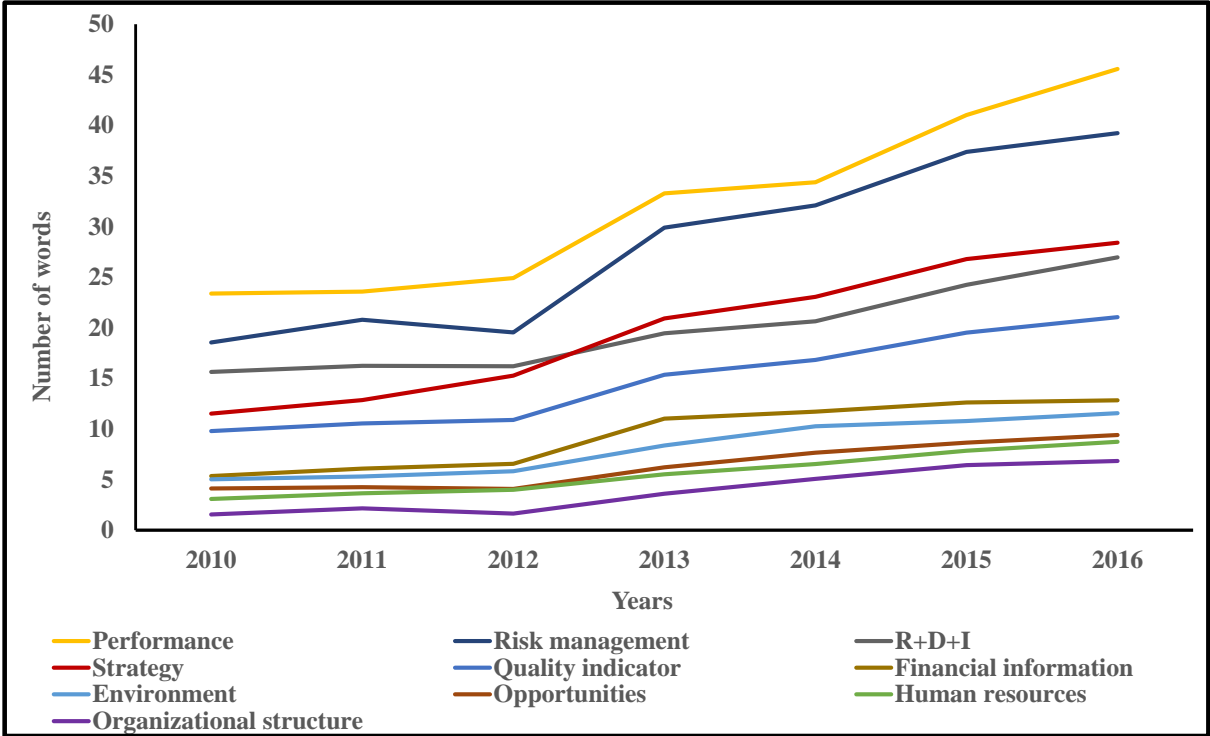
This figure shows the average values of evolution of the quality indicator and its nine categories of items contained in the management reports by years. That is, quality indicator (QI), organizational structure (Q1), strategy (Q2), performance (Q3), environment (Q4), human resources (Q5), risk management (Q6), opportunities (Q7), R+D+I (Q8) and financial information (Q9).

Figure 4. Evolution of the quantity of text and visual elements by years, distinguishing between management reports that meet with the CNMV guide and those that do not
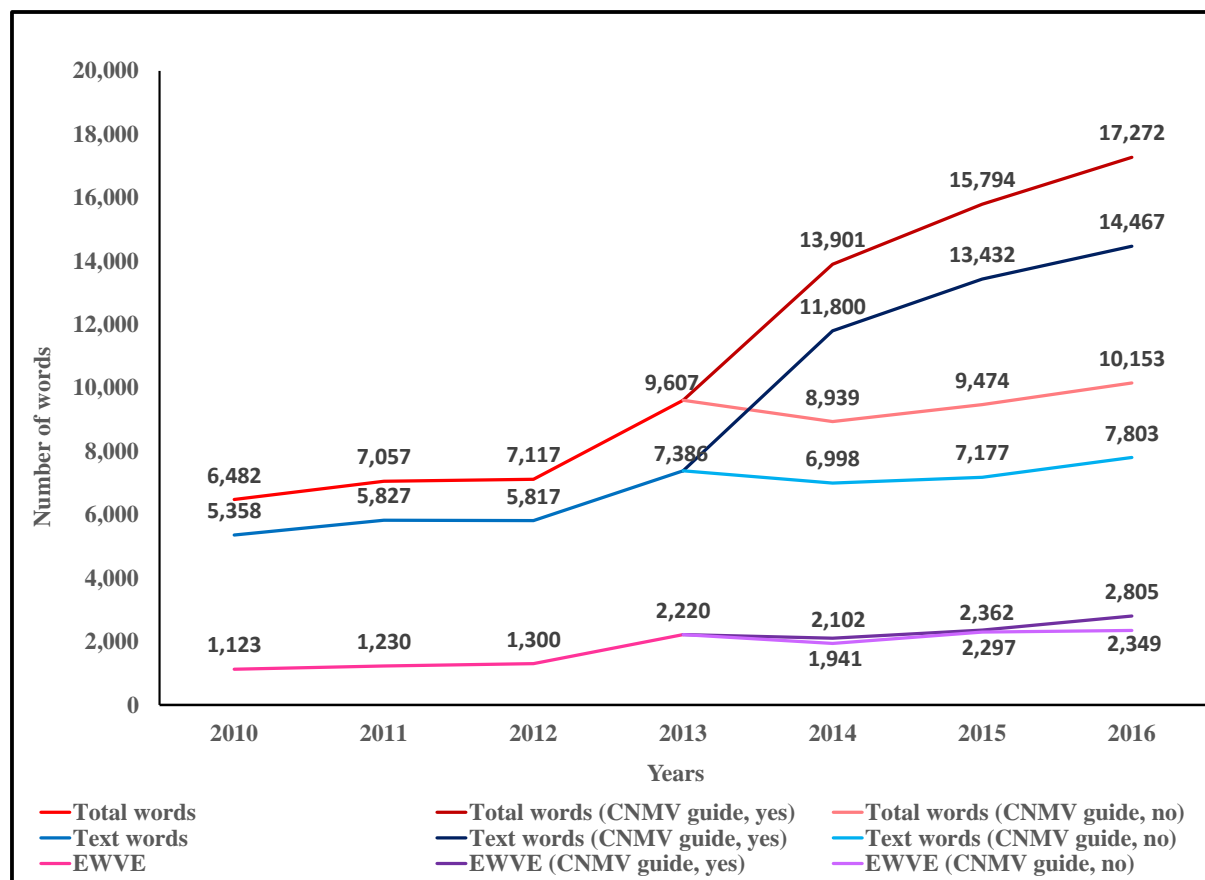
This figure presents the average values of evolution of the amount of text and visual elements contained in the management reports by years, distinguishing between management reports that meet the CNMV guide and those that do not. That is, text words, equivalent words of visual elements (EWVE) and total words (text words plus EWVE).

Figure 5. Evolution of the quality indicator by years, distinguishing between management reports that meet with the CNMV guide and those that do not
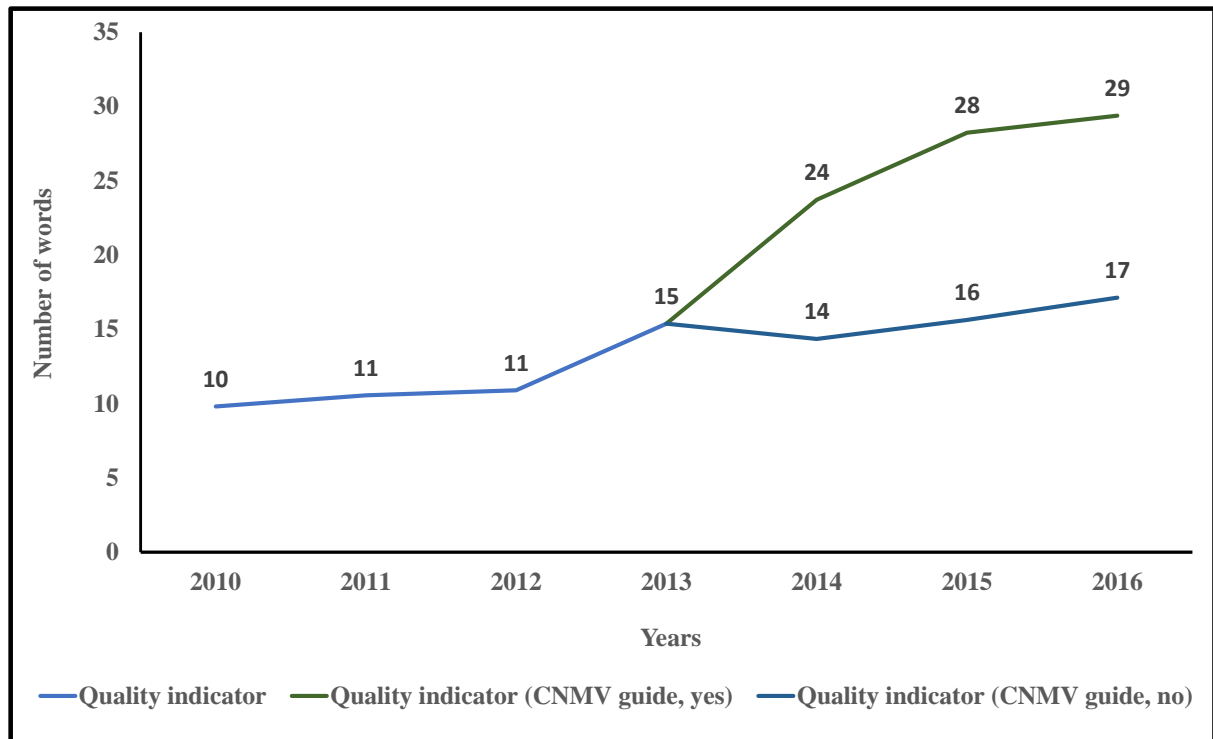
This figure shows the average values of evolution of the quality indicator contained in the management reports by years, distinguishing between management reports that meet the CNMV guide and those that do not.

Table 1. Companies that constitute the sample

Step	Filter	Number of firms						
		2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Initial sample	Total Spanish listed companies	141	146	141	137	153	152	148
First filter	Financial and real estate companies	-39	-41	-37	-36	-44	-42	-38
Second filter	Liquidated companies	-4	-4	-3	-3	-3	-1	0
Third filter	Companies without consolidated data	-8	-10	-10	-9	-13	-14	-16
Fourth filter	Companies with less than 5 consecutive observations	-7	-5	-4	-2	-6	-11	-13
Final sample		83	86	87	87	87	84	81

This table shows the process used to debug the database for the period 2010-2016.

Table 2. Summary statistics of the amount of text and visual elements by years

Dependent variable	Year	Mean	Std. Dev.	Min	1st Q	Median	3rd Q	Max	N	Kendall test
Text words (1)	2010	5,358	6,101	546	2,043	4,187	5,908	41,918	83	0.70*** (0.000)
	2011	5,827	6,420	990	2,495	4,225	6,474	49,326	86	
	2012	5,817	6,281	1,207	2,377	4,130	6,533	46,813	87	
	2013	7,386	7,312	815	2,759	4,886	8,633	37,953	87	
	2014	8,267	8,495	976	3,210	5,387	9,447	42,652	87	
	2015	9,113	9,948	1,374	3,134	5,755	10,199	46,497	84	
	2016	9,942	10,895	1,325	3,123	6,104	10,806	53,298	81	
Equivalent words of visual elements (EWVE) (2)	2010	1,123	1,746	0	0	285	1,348	7,444	83	0.70*** (0.000)
	2011	1,230	1,811	0	0	392	1,873	8,068	86	
	2012	1,300	1,910	0	0	466	1,890	8,648	87	
	2013	2,220	4,784	0	0	661	2,402	37,404	87	
	2014	1,984	3,515	0	168	870	2,660	24,283	87	
	2015	2,317	4,307	0	204	809	2,657	30,386	84	
	2016	2,496	3,901	0	268	1,007	3,245	22,563	81	
Total words (3) = (1) + (2)	2010	6,482	7,415	546	2,398	4,555	6,657	48,436	83	0.70*** (0.000)
	2011	7,057	7,826	990	2,680	5,083	7,752	57,204	86	
	2012	7,117	7,623	1,207	2,655	4,721	8,347	51,773	87	
	2013	9,607	10,964	815	3,008	5,559	10,874	57,581	87	
	2014	10,251	11,394	976	3,843	6,120	11,684	64,567	87	
	2015	11,430	13,333	1,374	3,539	6,793	12,585	66,680	84	
	2016	12,438	14,015	1,325	3,612	6,966	13,567	70,209	81	
EWVE-to-text words (4) = (2) / (1)	2010	0.178	0.244	0.000	0.000	0.109	0.244	1.552	83	0.69*** (0.000)
	2011	0.183	0.246	0.000	0.000	0.119	0.258	1.469	86	
	2012	0.196	0.238	0.000	0.000	0.120	0.318	1.022	87	
	2013	0.211	0.261	0.000	0.000	0.156	0.311	1.854	87	
	2014	0.189	0.191	0.000	0.037	0.135	0.300	0.900	87	
	2015	0.198	0.204	0.000	0.036	0.142	0.280	1.121	84	
	2016	0.206	0.199	0.000	0.048	0.165	0.300	0.915	81	
EWVE-to-total words (5) = (2) / (3)	2010	0.124	0.135	0.000	0.000	0.098	0.196	0.608	83	0.70*** (0.000)
	2011	0.129	0.134	0.000	0.000	0.107	0.205	0.595	86	
	2012	0.138	0.139	0.000	0.000	0.107	0.241	0.505	87	
	2013	0.147	0.134	0.000	0.000	0.135	0.238	0.650	87	
	2014	0.140	0.120	0.000	0.036	0.119	0.231	0.474	87	
	2015	0.145	0.123	0.000	0.035	0.124	0.219	0.528	84	
	2016	0.152	0.121	0.000	0.046	0.141	0.231	0.478	81	

This table presents the summary statistics of the amount of text and visual elements contained in the management reports by years. That is, text words, equivalent words of visual elements (EWVE), total words (text words plus EWVE), EWVE-to-text words (equivalent words of visual elements in relation to text words) and EWVE-to-total words (equivalent words of visual elements in relation to total words). Kendall test allows us to test whether the median is equal in all years. *** Significant at 1%.

Table 3. Summary statistics of the quality indicator and items by years

Dependent variable	Year	Mean	Std. Dev.	Min	1st Q	Median	3rd Q	Max	N	Kendall test
Quality indicator (QI)	2010	9.809	8.846	1	4	7	12	61	83	0.80*** (0.000)
	2011	10.552	9.405	1	5	8	12	69	86	
	2012	10.898	9.923	1	5	8	13	66	87	
	2013	15.372	15.826	1	6	10	16	72	87	
	2014	16.829	19.126	1	6	11	18	115	87	
	2015	19.534	21.923	1	6	12	24	109	84	
	2016	21.067	23.767	2	7	13	26	131	81	
Organizational structure (Q1)	2010	1.554	2.032	0	0	1	2	9	83	0.55*** (0.000)
	2011	2.163	2.865	0	0	1	3	11	86	
	2012	1.644	2.096	0	0	1	2	12	87	
	2013	3.621	4.970	0	1	2	4	20	87	
	2014	5.069	10.719	0	0	2	5	90	87	
	2015	6.429	11.344	0	1	2	7	84	84	
	2016	6.852	12.326	0	1	3	7	93	81	
Strategy (Q2)	2010	11.530	12.988	0	4	8	16	95	83	0.79*** (0.000)
	2011	12.872	14.649	0	4	10	17	98	86	
	2012	15.276	21.420	0	4	11	18	174	87	
	2013	20.920	23.225	0	6	12	27	99	87	
	2014	23.057	30.479	0	6	12	26	160	87	
	2015	26.798	33.285	0	6	14	36	193	84	
	2016	28.420	36.952	0	6	15	36	192	81	
Performance (Q3)	2010	23.386	27.092	1	9	15	23	145	83	0.80*** (0.000)
	2011	23.570	26.421	2	10	16	26	161	86	
	2012	24.920	26.937	1	10	16	27	187	87	
	2013	33.287	40.323	4	11	20	35	209	87	
	2014	34.379	38.832	3	12	22	39	231	87	
	2015	41.024	53.643	2	13	23	41	320	84	
	2016	45.568	57.381	3	13	27	47	331	81	
Environment (Q4)	2010	5.024	8.874	0	0	2	6	64	83	0.76*** (0.000)
	2011	5.314	7.661	0	0	2	8	43	86	
	2012	5.828	9.021	0	0	2	8	40	87	
	2013	8.379	12.227	0	0	3	11	60	87	
	2014	10.264	15.793	0	1	4	11	96	87	
	2015	10.786	16.874	0	0	4	15	83	84	
	2016	11.568	17.573	0	1	6	14	94	81	
Human resources (Q5)	2010	3.096	4.576	0	1	2	4	30	83	0.63*** (0.000)
	2011	3.663	4.744	0	1	2	4	29	86	
	2012	4.000	5.104	0	1	3	5	29	87	
	2013	5.529	6.680	0	1	3	7	34	87	
	2014	6.552	12.853	0	1	3	6	102	87	
	2015	7.869	11.910	0	1	3	11	71	84	
	2016	8.741	14.142	0	2	4	9	93	81	
Risk management (Q6)	2010	18.554	15.041	0	9	16	23	69	83	0.71*** (0.000)
	2011	20.791	16.260	0	10	17	25	72	86	
	2012	19.552	15.780	0	7	15	27	73	87	
	2013	29.897	32.755	0	10	22	37	217	87	
	2014	32.092	32.178	0	13	25	39	199	87	
	2015	37.381	39.055	0	15	26	43	211	84	
	2016	39.235	39.210	0	16	31	45	223	81	

This table shows the summary statistics of the informative quality contained in the management reports by years. That is, quality indicator (QI), organizational structure (Q1), strategy (Q2), performance (Q3), environment (Q4), human resources (Q5), risk management (Q6), opportunities (Q7), R+D+I (Q8) and financial information (Q9). Kendall test allows us to test whether the median is equal in all years. *** Significant at 1%.

Table 3. Summary statistics of the quality indicator and items by years (Continued)

Dependent variable	Year	Mean	Std. Dev.	Min	1st Q	Median	3rd Q	Max	N	Kendall test
Opportunities (Q7)	2010	4.120	5.241	0	1	2	5	35	83	
	2011	4.256	6.069	0	1	3	5	45	86	
	2012	4.092	6.116	0	1	2	5	42	87	0.71***
	2013	6.218	8.718	0	1	3	7	46	87	(0.000)
	2014	7.667	11.388	0	2	3	8	60	87	
	2015	8.655	13.562	0	2	4	9	69	84	
	2016	9.420	13.940	0	2	4	11	74	81	
R+D+I (Q8)	2010	15.651	21.382	0	5	10	17	164	83	
	2011	16.244	23.181	0	6	10	19	175	86	
	2012	16.207	21.022	0	4	10	20	141	87	0.79***
	2013	19.471	22.529	0	6	14	22	120	87	(0.000)
	2014	20.655	25.904	0	6	14	23	158	87	
	2015	24.250	30.265	0	5	15	28	165	84	
	2016	26.963	34.710	0	7	16	33	186	81	
Financial information (Q9)	2010	5.361	5.784	0	1	4	7	26	83	
	2011	6.093	6.870	0	1	4	8	35	86	
	2012	6.563	7.796	0	2	4	8	45	87	0.72***
	2013	11.023	13.219	0	2	7	14	65	87	(0.000)
	2014	11.724	15.780	0	3	7	14	96	87	
	2015	12.619	14.782	0	3	8	16	82	84	
	2016	12.840	13.546	0	3	9	16	71	81	

This table shows the summary statistics of the informative quality contained in the management reports by years. That is, quality indicator (QI), organizational structure (Q1), strategy (Q2), performance (Q3), environment (Q4), human resources (Q5), risk management (Q6), opportunities (Q7), R+D+I (Q8) and financial information (Q9). Kendall test allows us to test whether the median is equal in all years. *** Significant at 1%.

Table 4. Correlation matrix and variance inflation factors between the independent and control variables

Variables	1	2	3	4	5	6	7	8
1. Firm size	1.000							
2. CNMV guide	0.143 ***	1.000						
3. Book-to-market	0.004	-0.123 ***	1.000					
4. Age	-0.218 ***	0.074 *	0.012	1.000				
5. Leverage	0.017	0.056	-0.339 ***	-0.149 ***	1.000			
6. Ownership dispersion	0.154 ***	0.036	-0.141 ***	-0.004	0.180 ***	1.000		
7. Corporate actions	0.025	0.061	-0.012	-0.038	0.031	-0.054	1.000	
8. Qualified audit reports	-0.226 ***	0.029	-0.005	0.124 ***	0.154 ***	-0.035	-0.028	1.000
Variance inflation factor (VIF)	1.16	1.06	1.16	1.11	1.23	1.08	1.01	1.10

This table contains the Pearson correlation coefficients between the independent and control variables, and the variance inflation factors (VIFs) between the independent and control variables. These variables are: firm size (logarithm of total assets), CNMV guide (binary variable equal to one if the management report of firm is disclosure according to the guide proposed by the CNMV and zero otherwise), book-to-market (book value in relation to market value of equity), age (logarithm of age), leverage (total debt in relation to total assets), ownership dispersion (percentage of shares held by the public), corporate actions (binary variable equal to one if the firm has made a public offering or has received a takeover bid and zero otherwise) and qualified audit report (binary variable equal to one if the audit report is issued with qualifications and zero otherwise). The VIF close to one reveals that there are no collinearity problems among the independent and control variables. * Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Table 5. Determinants of the informative quantity of management reports

Dependent variable		(1) Log text words	(2) Log (1+EWVE)	(3) Log total words	(4) EWVE-to-text words	(5) EWVE-to-total words
Independent variable	**Predicted sign**	**Coefficient (p-value)**	**Coefficient (p-value)**	**Coefficient (p-value)**	**Coefficient (p-value)**	**Coefficient (p-value)**
l.Log text words	+	0.672*** (0.000)				
l.Log (1+EWVE)	+		0.767*** (0.000)			
l.Log total words	+			0.688*** (0.000)		
l.EWVE-to-text words					0.517*** (0.001)	
l.EWVE-to-total words						0.504*** (0.001)
Firm size	+	0.080** (0.030)	0.209* (0.054)	0.061* (0.067)	0.027*** (0.005)	0.017** (0.025)
CNMV guide	+	0.210*** (0.000)	0.268 (0.382)	0.240*** (0.004)	-0.002 (0.960)	0.010 (0.741)
Control variables						
Book-to-market	−	0.002 (0.829)	0.138 (0.216)	0.001 (0.990)	0.004 (0.630)	-0.004 (0.451)
Age	− / +	0.006 (0.897)	-0.075 (0.553)	-0.023 (0.566)	0.001 (0.954)	-0.001 (0.879)
Leverage	+	0.138* (0.097)	0.499* (0.051)	0.094 (0.150)	0.019 (0.589)	0.007 (0.788)
Ownership dispersion	+	0.200 (0.263)	-0.623 (0.351)	0.300 (0.101)	-0.022 (0.801)	-0.007 (0.887)
Corporate actions	+	-0.063 (0.689)	-0.231 (0.826)	0.000 (0.999)	0.362* (0.072)	0.175 (0.110)
Qualified audit report	−	-0.117 (0.194)	0.347 (0.583)	-0.135 (0.346)	0.081 (0.356)	0.051 (0.197)
Sector dummies		Yes	Yes	Yes	Yes	Yes
Year dummies		Yes	Yes	Yes	Yes	Yes
Observations/Groups		508/87	508/87	508/87	508/87	508/87
Number of instruments		68	66	68	52	52
z_1		459.19*** (0.000)	239.95*** (0.000)	502.37 (0.000)	80.37*** (0.000)	132.46*** (0.000)
m_1		-4.11*** (0.000)	-3.10*** (0.002)	-4.14*** 0.000	-1.73* (0.083)	-2.80*** (0.005)
m_2		0.92 (0.358)	0.16 (0.875)	0.33 (0.741)	0.71 (0.478)	0.19 (0.852)
Hansen test		40.65 (0.695)	49.61 (0.295)	44.70 (0.527)	28.23 (0.609)	27.28 (0.658)

This table shows the regression results of text quantity, quantity of visual elements and total quantity of management reports, measured by the logarithms of text words, one plus EWVE (equivalent words of visual elements) and total words (text words plus EWVE), and EWVE-to-text words (equivalent words of visual elements in relation to text words) and EWVE-to-total (equivalent words of visual elements in relation to total words). In each of the regressions the lagged dependent variable is included as independent variable. The rest of variables (i.e., firm size, CNMV guide, book-to-market, age, leverage, ownership dispersion, corporate actions and qualified audit report) have been defined in table 4. All the regressions include sector and year dummies. z1 is the chi-square statistics of Wald tests to check for the joint significance of reported coefficients. m1 and m2 tests verify the lack of first and second-order correlation in the first difference residuals. Hansen statistic tests absence of correlation between the instruments and the error term. The GMM instrument matrix is collapsed in all the regressions. Two steps system GMM is the method used. P-values reported for the regression coefficients consider the Windmeijer (2005) correction for standard errors. * Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Table 6. Determinants of the informative quality of management reports

Dependent variable		(1) Log QI	(2) Log (1+Q1)	(3) Log (1+Q2)	(4) Log Q3	(5) Log (1+Q4)
Independent variable	Predicted sign	Coefficient (p-value)	Coefficient (p-value)	Coefficient (p-value)	Coefficient (p-value)	Coefficient (p-value)
l.Log QI	+	0.638*** (0.000)				
l.Log (1+Q1)	+		0.255** (0.023)			
l.Log (1+Q2)	+			0.386** (0.037)		
l.Log Q3	+				0.429* (0.075)	
l.Log (1+Q4)	+					0.597*** (0.000)
Firm size	+	0.118*** (0.000)	0.055 (0.471)	0.082 (0.362)	0.136*** (0.008)	0.182*** (0.006)
CNMV guide	+	0.171** (0.030)	0.747*** (0.000)	0.599*** (0.003)	0.278** (0.046)	0.341** (0.049)
Control variables						
Book-to-market	−	0.010 (0.251)	-0.038** (0.017)	0.002 (0.882)	-0.009 (0.609)	0.032** (0.014)
Age	− / +	0.089* (0.084)	0.009 (0.940)	-0.063 (0.608)	0.057 (0.455)	0.060 (0.367)
Leverage	+	0.101 (0.181)	-0.142 (0.449)	-0.248 (0.303)	0.062 (0.654)	0.362* (0.064)
Ownership dispersion	+	0.301 (0.182)	0.940* (0.054)	0.548 (0.311)	0.161 (0.599)	0.297 (0.403)
Corporate actions	+	0.046 (0.675)	-0.038 (0.842)	-0.284 (0.261)	0.102 (0.517)	0.230 (0.246)
Qualified audit report	−	-0.062 (0.414)	-0.031 (0.875)	-0.006 (0.979)	-0.111 (0.513)	-0.038 (0.776)
Sector dummies		Yes	Yes	Yes	Yes	Yes
Year dummies		Yes	Yes	Yes	Yes	Yes
Observations/Groups		508/87	508/87	508/87	508/87	508/87
Number of instruments		71	67	67	67	68
z_1		610.10*** (0.000)	155.34*** (0.000)	158.52 (0.000)	98.59*** (0.000)	190.48*** (0.000)
m_1		-4.25*** (0.000)	-3.54*** (0.000)	-3.08*** (0.002)	-3.11*** (0.002)	-4.07*** (0.000)
m_2		0.50 (0.617)	1.39 (0.165)	1.21 (0.226)	1.49 (0.137)	0.35 (0.726)
Hansen test		45.93 (0.637)	52.35 (0.241)	46.39 (0.456)	44.35 (0.541)	47.91 (0.436)

This table shows the regression results of quality indicator and items of management reports, measured by the logarithms of the quality indicator (QI) and its nine categories of items (i.e. one plus organizational structure (Q1), one plus strategy (Q2), performance (Q3), one plus environment (Q4), one plus human resources (Q5), one plus risk management (Q6), one plus opportunities (Q7), one plus R+D+I (Q8) and one plus financial information (Q9)). In each of the regressions the lagged dependent variable is included as independent variable. The rest of variables (i.e., firm size, CNMV guide, book-to-market, age, leverage, ownership dispersion, corporate actions and qualified audit report) have been defined in table 4. All the regressions include sector and year dummies. z1 is the chi-square statistics of Wald tests to check for the joint significance of reported coefficients. m1 and m2 tests verify the lack of first and second-order correlation in the first difference residuals. Hansen statistic tests absence of correlation between the instruments and the error term. The GMM instrument matrix is collapsed in all the regressions. Two steps system GMM is the method used. P-values reported for the regression coefficients consider the Windmeijer (2005) correction for standard errors. * Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Table 6. Determinants of the informative quality of management reports (Continued)

Dependent variable		(6) Log (1+Q5)	(7) Log (1+Q6)	(8) Log (1+Q7)	(9) Log (1+Q8)	(10) Log (1+Q9)
Independent variable	Predicted sign	Coefficient (p-value)	Coefficient (p-value)	Coefficient (p-value)	Coefficient (p-value)	Coefficient (p-value)
l.Log (1+Q5)	+	0.600*** (0.000)				
l.Log (1+Q6)	+		0.472*** (0.000)			
l.Log (1+Q7)	+			0.442*** (0.000)		
l.Log (1+Q8)	+				0.527*** (0.000)	
l.Log (1+Q9)	+					0.669*** (0.000)
Firm size	+	0.116*** (0.000)	0.133** (0.037)	0.138*** (0.004)	0.248*** (0.000)	0.061 (0.217)
CNMV guide	+	0.340** (0.010)	0.206 (0.198)	0.318** (0.029)	0.063 (0.579)	0.236* (0.056)
Control variables						
Book-to-market	–	0.009 (0.553)	0.008 (0.716)	-0.001 (0.966)	0.040** (0.034)	0.017 (0.356)
Age	– / +	0.005 (0.955)	0.084 (0.586)	-0.026 (0.833)	0.112 (0.259)	0.075 (0.321)
Leverage	+	0.086 (0.486)	0.006 (0.974)	0.307** (0.012)	0.527*** (0.002)	-0.103 (0.471)
Ownership dispersion	+	0.289 (0.327)	0.624 (0.113)	0.158 (0.721)	-0.244 (0.604)	0.722** (0.027)
Corporate actions	+	0.244** (0.023)	-0.031 (0.899)	-0.328* (0.080)	-0.269 (0.224)	0.100 (0.603)
Qualified audit report	–	0.268 (0.204)	-0.375* (0.077)	-0.294* (0.054)	0.093 (0.578)	-0.163*** (0.002)
Sector dummies		Yes	Yes	Yes	Yes	Yes
Year dummies		Yes	Yes	Yes	Yes	Yes
Observations/Groups		508/87	508/87	508/87	508/87	508/87
Number of instruments		68	68	68	68	68
z_1		208.46*** (0.000)	106.31*** (0.000)	134.43*** (0.000)	127.98*** (0.000)	658.74*** (0.000)
m_1		-5.19*** (0.000)	-3.74*** (0.000)	-4.27*** (0.000)	-3.70*** (0.000)	-4.85*** (0.000)
m_2		1.18 (0.236)	0.71 (0.480)	1.31 (0.189)	0.23 (0.814)	0.35 (0.730)
Hansen test		43.11 (0.634)	53.33 (0.244)	47.41 (0.456)	51.61 (0.298)	46.94 (0.475)

This table shows the regression results of quality indicator and items of management reports, measured by the logarithms of the quality indicator (QI) and its nine categories of items (i.e. one plus organizational structure (Q1), one plus strategy (Q2), performance (Q3), one plus environment (Q4), one plus human resources (Q5), one plus risk management (Q6), one plus opportunities (Q7), one plus R+D+I (Q8) and one plus financial information (Q9)). In each of the regressions the lagged dependent variable is included as independent variable. The rest of variables (i.e., firm size, CNMV guide, book-to-market, age, leverage, ownership dispersion, corporate actions and qualified audit report) have been defined in table 4. All the regressions include sector and year dummies. z_1 is the chi-square statistics of Wald tests to check for the joint significance of reported coefficients. m_1 and m_2 tests verify the lack of first and second-order correlation in the first difference residuals. Hansen statistic tests absence of correlation between the instruments and the error term. The GMM instrument matrix is collapsed in all the regressions. Two steps system GMM is the method used. P-values reported for the regression coefficients consider the Windmeijer (2005) correction for standard errors. * Significant at 10%. ** Significant at 5%. *** Significant at 1%.