INFORMATION DISCLOSURE INDEXES TO QUANTIFY COMPLEX CATEGORICAL VARIABLES. A STUDY OF INTELLECTUAL CAPITAL*

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Abstract:

This paper deals with indexes that allow us to quantify the extent of information about a complex categorical variable. In particular, intellectual capital disclosed by Spanish firms. We also take into account quality levels of information (given by quantitative or qualitative disclosure) and study the impact on indexes when we give different relative importance to them. We present theoretical results that relate general, quantitative and partially specific indexes.

The objective of the empirical study is to assess the extent and type of information dealing with intellectual capital which is disclosed in presentations to sell-side analysts by Spanish companies. We show the factors that determine non-financial disclosure. We use a sample of 257 meeting reports from Spanish companies listed in the Madrid Stock Exchange Index during the years 2000 and 2001. The results show that the extent of information disclosed about intellectual capital depends on the firm size, quotation status, market to book ratio and type of meeting. Financial situation, financial industry and the existence of an investor relations department influence the quality of the disclosure. The findings suggest that asymmetric information and uncertainty associated with the firm are important determinants of intellectual capital disclosure through private channels.

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1. INTRODUCTION

In recent years, investors and analysts have become more aware of information concerning factors not reflected in financial statements (Previts et al., 1994; Mavrinac and Boyle, 1996). According to Eccles et al. (2001), the capital market is requesting more reliable information regarding knowledge resources in a company; such as risk factors, strategic direction, managerial qualities, innovatory skills, experience, and integrity. Increasing competition, new business sectors and technological developments are some of the factors that have increased the frustration with traditional financial statements (AICPA 1994; Wallman, 1995; FASB, 2001b). Limitations of annual reports, as well as comparative advantages arising from the use of private means, have led many companies to use private channels when releasing information which could not be disclosed otherwise.

The objective of this paper is to examine the extent and type of disclosure used in presentations to analysts regarding issues such as customers, human resources, or technology. Since this information is concerned with the knowledge resources of a company, it is considered as intellectual capital information. According to Stewart (1997), intellectual capital can be defined as *"…knowledge, information, intellectual property, experience- that can be put to use to create wealth."* As this type of reporting is presently non-mandatory, and hence not included in traditional financial statements, we regard the disclosure hereof as being voluntary and non-financial by nature. Our research was designed, firstly, to test whether Spanish companies disclose this information to analysts through presentations; secondly, to analyse the quality of the disclosure by giving a different relative importance to quantitative information, since quantification of the information provides a more specific, precise and convincing message; and finally, to study the factors that have an impact on disclosure choices in the meetings. This analysis gives insight into the information about intellectual capital disclosed by a company in order to reveal its value drivers to investors and analysts.

Prior studies of non-financial disclosure have focused on annual reports (e.g. Rob et al., 2001; Bozzolo et al., 2002) or other public sources such as IPO prospectuses (e.g. Bukh et al., 2001; 2002). This study differs from previous papers in its examination of presentations to sell-side analysts. Moreover, we extend the analysis of disclosure beyond the commonly used disclosure/no disclosure dichotomy (Cooke, 1989; Adrem, 1999) and introduce different indexes to distinguish between quantitative and qualitative disclosures in order to analyse not only the extent but also the specificity of disclosure.

Our analysis is based on disclosure indexes used to quantify the amount of the non-financial information reported. It sheds new light on an area that has aroused a great deal of academic interest in recent years: the use of disclosure indexes in accounting research. Thus, we obtain general theoretical results for this subject. We also gain insight into partially specific disclosure indexes; in particular, regarding scores to be used when both quantitative and qualitative disclosures are taken into account with different relative importance. We also demonstrate the relationship between disclosure indexes of specific and non-specific information.

Briefly, the study finds that information related to intellectual capital is widely reported to financial analysts and that there are differences in disclosure levels for particular categories. The results show that there are different factors which appear to influence the extent and specificity of intellectual capital disclosure. The probability of having a proactive disclosure strategy of intellectual capital through presentations increases in large firms which have higher market to book ratios, and are listed in the IBEX 35 Index and in foreign markets. The specificity of information also depends on financial industry, profitability, leverage, and the existence of an investor relations department. The type of meeting is also significantly associated with the intellectual capital disclosure strategy.

The remainder of this paper is organised as follows: section 2 describes previous literature about private channels; in section 3 we explain the research methodology, choice of control variables and the sample of meeting reports, and we also discuss the construction of disclosure indexes and the relationships between them; section 4 reports the results of the multivariate data analysis and statistical inference techniques; and in section 5 the main conclusions are summarised.

2. INFORMATION DISCLOSURE OF INTELLECTUAL CAPITAL THROUGH PRIVATE CHANNELS

The increasing relevance of narrative reporting as well as the declining value relevance of financial statements has become quite evident in recent years. Previous literature (e.g. Robb et al., 2001; Bukh et al., 2001) shows that changes in the business environment and pressure on organizations have led companies to disclose voluntary information about strategy, management, production, customers, and innovation. Most of these studies have been focused on public channels; generally annual reports (e.g. Cooke, 1989; Adrem, 1999; Bozzolan et al., 2002), because these have always been considered as the primary means of communication. However, the financial report is dominated by financial data and it does not

provide information on areas such as management credibility or strategy. As a result, according to Holland (2001: 507), it is not an effective mechanism for disclosing information on intangibles.

In spite of its relevance, disclosure through these channels has received little attention in academic literature on disclosure because of the paucity of available data and the misconception that these channels merely emphasize information already in the public domain (Tasker, 1998). However, Walmsley et al. (1992) and Frankel et al. (1997) show that these meetings provide price sensitive information, which demonstrates informative content.

Companies are also aware of the relevance of private sources. These channels are used to give the management feed-back on the market sentiment, and also play an important role in reducing share price volatility and improving the company's image. Moreover, Holland (1998) argues that private channels could be the only feasible means of disclosing certain forms of company information, such as R&D or innovation information, which could not be revealed through public channels because of competitive disadvantages. Such perceptions lead to disclosure choices, which reduce the value of public information in order to prevent competitors from gaining knowledge (Foster, 1986).

Frankel et al. (1997) report that firms using this approach are larger, more profitable, go to the capital markets more often, have higher market to book ratios, and are growing more rapidly than other firms. These results are related to those of Verrechia (1990), indicating that the probability of disclosure of the management's private information is negatively related to the precision of prior public information on firm value. In accordance with this, Tasker (1998) shows that managers of firms with relatively uninformative financial statements are more likely to possess private information not reflected in their financial statements, and are therefore more likely to use conference calls as a medium to bridge the information gap.

Different types of private channels have evolved in order to meet the needs of the audience. Marston (1996) analyses companies' perceptions of the relative importance of disclosure of different types of information at meetings with analysts in the UK. The most important items on future prospects were a company's long-term and short-term strategy and the company's strategy regarding particular segments of the business. The results are similar to those of Larrán (2001), who states that in Spain the most important aspects in analyst meetings are a company's long-term strategy and the company's strategy for future acquisitions and alliances.

3. RESEARCH METHODOLOGY

3.1 Objective and sample

The purpose of this study is to quantify the extent and specificity of intellectual capital information revealed in presentations to analysts. In this sense, we will try to enhance our knowledge of the intellectual capital disclosure in private channels. Moreover, we will assess whether there is a relationship between certain characteristics of the firm and the disclosure strategy.

The database consists of reports of presentations to financial analysts made by Spanish companies listed in the Madrid Stock Exchange (IGBM), during two time periods: 2000 and 2001. Since these meetings are suspected of providing information that could significantly influence stock trading or market value, Spanish listed firms communicate the content of these meetings to the National Commission of the Stock Exchange (CNMV). This information, previously prepared for the managers (usually slides) and used in the meetings, is then disseminated through the investor community. Data on disclosures was collected from the documents filed by firms with the CNMV. Because the investor community usually has access to the information revealed in analyst meetings, this channel may be considered public. However, meetings are directed to a narrow audience, which can obtain and use the relevant information before the rest of the community. Moreover, the presentations are interactive and analysts can use their questions to gain useful information (question-and-answer sessions); but the company does not report these data, which constitutes a limitation of this study.

The meetings have been classified into company presentations and results presentations. Results presentations are held to announce quarterly or annual results. On the other hand, company presentations are organised in order to announce strategic issues such as mergers, new products, or change in the firm's strategy. We have ignored those presentations directed to the press or to institutional investors. Moreover, we have eliminated repeated company presentations taking place in different stock exchanges on successive days. This left us with 257 reports of analyst presentations (see table 1).

TABLE 1. Presentations to analysts by IGBM firms

Year	Firms	Firms that made presentations	Presentations
2000	116	61	127
2001	115	66	130

3.2 A complex categorical variable: the intellectual capital

Intellectual capital can not be considered a simple magnitude since it is formed by a great deal of different aspects or items related to firm's knowledge. Consequently, we face a problem when we try to measure it. So, a major task was the selection of intellectual capital items that could be reported by the companies. In general, there are no theoretical guidelines for selecting items, and a successful application of the information disclosure indexes depends on critical and cautious selection. The choice of items has partly been made on the basis of the literature about disclosure (Cooke, 1989), literature about intellectual capital (Edvisson and Malone, 1997; Sveiby, 1997, Bukh et al., 2001), value relevance studies (Ernst & Young, 2000), and disclosures recommended by the Financial Accounting Standard Board (FASB, 2001). In this study 71 items have been considered and, according to Bukh et al. (2001), the items are divided into six different categories or groups: *Human Capital* (HC), *Customers* (CUS), *Processes* (PRO), *Technology* (TEC), *Innovation, Research and Development* (IRD) and *Strategy* (ST) (see Appendix 2). Items were distributed as follows in table 2.

TABLE 2. Items of intellectual capital

CATEGORY	ITEMS	%
Human Capital	19	26.76
Customers	13	18.31
Technology	4	5.63
Processes	9	12.68
Innovation, Research and Development	7	9.86
Strategy	19	26.76
TOTAL	71	100

3.3 Information disclosure indexes

Certain indexes of information disclosure are applied to measure the extent and specificity of intellectual capital information. This method has most often been applied to estimate voluntary information (Adrem 1999; Gray et al., 1995; Williams, 2001) or compulsory information (Wallace et al., 1994) in annual reports. In several cases, the relationships between independent variables and disclosure indexes were investigated using appropriate statistical techniques (e.g. Singhvi y Desay, 1971; Cooke, 1989; Chong and Wong-Boren, 1987; Raffournier, 1995; Adrem, 1999; Bozzolan et al., 2002).

The validity of a disclosure index as a measure of information cannot be accepted without question. Focusing on self-constructed measures, which is the method widely used in scoring voluntary disclosure practice, the major drawback is the subjectivity involved in constructing the index, with the consequent difficulty of replicating the analysis. However, a

test of its usefulness as a research tool is the extent to which it is used (Marston and Shrives, 1996). In our study we will use a general disclosure index (*GI*), a partially specific index (*PSI*), and a specific index for quantitative information (*QTI*).

The *general index* (GI) or *non-specific index* reports on the proportion (or percentage) of intellectual capital items disclosed to financial analysts in a presentation. It is a ratio of the actual scores revealed to the total score that the company may communicate. Consequently, a company is not penalised for those items that are irrelevant to it (Cooke, 1989, Adrem, 1999). The general or non-specific index of meeting *s* may be written as follows

$$GI_S = \frac{\sum_{i=1}^{m_s} d_i^{(k_1)}}{m_s \times k_1} = \frac{n_s}{m_s}(\times 100) \qquad d_i^{(k_1)} = 0,\ k_1 \qquad k_1 > 0$$

where m_s is the maximum number of items a company may disclose in meeting *s;* n_s is the number of disclosed items; $d_i^{(k_1)}$ is a dichotomous variable of disclosure about intellectual capital, which scores k_1 if it is disclosed and zero otherwise. As one can see GI_S does not depend on the value given to k_1.

One disadvantage of this index is that, although it can give a measure of the degree of disclosure, it does not necessarily report on its quality. In this sense, according to Botosan (1997), quantitative disclosure is understood to be a proxy of the quality of information, since numbers demonstrate reliability and function almost as a guarantee of facts. Qualitative disclosures are "soft" information leaving a great deal of flexibility in their content. For that reason, it is common practice (e.g. Buzby, 1974; Wiseman, 1982; Bukh et al., 2001) to categorise indexes as different degrees of specificity, where items disclosed in quantitative terms are awarded.

In this sense, we develop another index to capture both levels of disclosure (quantitative and qualitative). This index is called *partially specific disclosure index* (*PSI*) and can be written as follows:

$$PSI_S = \frac{\sum_{i=1}^{m_s} d_i^{(k_1,k_2)}}{k_2 m_s}(\times 100) \qquad d_i^{(k_1,k_2)} = 0, k_1, k_2; \qquad 0 < k_1 < k_2.$$

where k_1 is the score of items disclosed in qualitative terms and k_2 is the score of items disclosed in quantitative terms.

In addition, we propose a specific index for quantitative information, called *quantitative index* (*QTI*), which only takes into account intellectual capital information revealed in a quantitative form; that is, it reports the proportion (or percentage) of quantitative

information in a presentation over the total information considered. Its expression is as follows:

$$QTI_S = \frac{\sum_{i=1}^{m_s} d_i^{(k_2)}}{m_s \times k_2} = \frac{c_s}{m_s}(\times 100) \qquad d_i^{(k_2)} = 0, k_2 \qquad k_2 > 0$$

where c_s denotes the number of items reported in a quantitative form. This expression does not depend on k_2. Furthermore, since $c_S \leq n_S$ then $QTI_S \leq GI_S$.[1]

There exists the following relationship among the three indexes[2]:

$$PSI_S = \frac{k_1}{k_2} GI_S + \left(1 - \frac{k_1}{k_2}\right) QTI_S \tag{1}$$

from which we can easily establish that, for presentation *s*,

$$QTI_S \leq PSI_S \leq GI_S$$

since $QTI_S \leq GI_S$ and $k_1/k_2 < 1$.

From expression (1) one can calculate that, when k_2 tends to k_1 so that k_1/k_2 is near one, then PSI_S approximates to GI_S. However, when k_2 is high enough in relation to k_1 so that k_1/k_2 approximates to zero, then PSI_S tends to QTI_S. So, with scores k_1 and k_2 one can reduce the diclosure quantification from GI_S level till QTI_S level; the exact point depends on the quotient k_1/k_2.

The relation (1) shows the problem of the proper scores k_1 and k_2 in order to evaluate the degrees of disclosure specificity. When we take into account the quality of the information disclosed, then the relative difference between k_2 and k_1 affects PSI_S.

Apart from their own meaning, QTI_S and GI_S can be used to obtain further information about a presentation's content. Let QTP_S be the *quantitative proportion*, that is, the proportion of items reported quantitatively over the total items effectively divulged in presentation *s*. So,

$$QTP_S = \frac{QTI_S}{GI_S} = \frac{c_s / m_s}{n_s / m_s} = \frac{c_s}{n_s}$$

[1] Note that specific indexes in this study may be of two classes: quantitative or qualitative. The latter may be defined in a similar way, only taking into account qualitative information, and can be called *qualitative index* (QLI), with l_S being the number of items only disclosed in qualitative terms. Observe that $GI_S = QTI_S + QLI_S$.

[2]

Note that one can also define the qualitative proportion in a similar way.[3]

We now propose a new measure of disclosure based on the following assumption: 'The general disclosure index should be increased proportionally to the relative amount of quantitative information in the presentation'. That leads to the following disclosure index (*DI*) for presentation *s*,

$$DI_S = GI_S\left(1+QTP_S\right)$$

It can easily shown that

$$DI_S = GI_S + QTI_S$$

On the other hand, since $0 \le DI_S \le 2$, one can express it in relative terms, so that

$$RDI_S = \frac{DI_S}{2}$$

where RDI_S stands for *relative disclosure index* in presentation s. From this and expression (1), it can easily be shown that

$$RDI_S = PSI_S \qquad \text{if} \quad \frac{k_1}{k_2} = \frac{1}{2}.$$

In this way, we gain insight into the proper scores to be used. We find that if we use scores so that k_1/k_2=1/2, then the higher the quantitative proportion, the higher the quantification of the disclosure level of a presentation; proportionally to the former. Thus, it is taken into account that two presentations with the same general disclosure ($GI_i=GI_j$) but with different relative amounts of quantitative information ($QTP_i \neq QTP_j$) have different disclosure levels, and disclosure quantification is corrected proportionally according to the quantitative proportion. Using other scores leads to the assumption that the general disclosure level should be corrected more or less than proportionally to QTP_S. Note that $k_1/k_2 < 1/2$ implies a more than proportional adjustment and $k_1/k_2 > 1/2$ a less than proportional one. The problem now is

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$$PSI_S = \frac{\sum_{i=1}^{m_s} d_i^{(k_1,k_2)}}{k_2 m_s} = \frac{\sum_{i=1}^{m_s} d_i^{(k_1)}}{k_2 m_s} + \frac{c_s\left(k_2-k_1\right)}{k_2\, m_s} = \frac{1}{k_2}\left[\frac{\sum_{i=1}^{m_s} d_i^{(k_1)}}{m_s} + \frac{c_s(k_2-k_1)}{m_s}\right] =$$

$$= \frac{1}{k_2}\left[GI_S \times k_1 + (k_2-k_1)QTI_S\right] = \frac{k_1}{k_2}GI_S + \frac{k_2-k_1}{k_2}QTI_S = \frac{k_1}{k_2}GI_S + \left(1-\frac{k_1}{k_2}\right)QTI_S$$

[3] $QLP_S = \dfrac{QLI_S}{GI_S} = \dfrac{l_s/m_s}{n_s/m_s} = \dfrac{l_s}{n_s}$

$$QLP_S = \frac{QLI_S}{GI_S} = \frac{GI_S - QTI_S}{GI_S} = 1 - \frac{QTI_S}{GI_S} = 1 - QTP_S$$

how to determine proper scores; what arguments there are to tip the balance one way or another.

In this study, as in Botosan (2001) and Bukh et al. (2001), we use a score so that k_1/k_2 = 1/2. In particular, a score of two was given to each item reported in quantitative terms (k_2=2) and a score of one if it was only referred to in qualitative terms (k_1=1).

3.4 Hypothesis

A considerable body of empirical literature has investigated the relationship between the extent of voluntary disclosure and certain characteristics of firms since 1961. Findings have shown firm size and listing status to be significantly associated with disclosure strategy (e.g. Cerf, 1961; Buzby, 1975; Cooke, 1989; Wallace et al., 1994; Adrem, 1999; Robb et al., 2001; Bozzolan et al., 2002). Mixed results have been reported about leverage, profitability and industry, among other variables. Explanations for selecting the firms' characteristics include agency costs, proprietary costs, political costs, corporate governance and monitoring, signalling and information asymmetry, capital needs, litigation costs and audit firm reputation (Ahmed and Courtis, 1999).

In accordance with previous literature, we will try to test whether the extent and specificity of intellectual capital disclosure depends on:

1. Industry. The firms were categorised into financial industry and non-financial industry (IND).
2. Firm size. This variable can be measured in a number of different ways. This study incorporates four size variables: market value (M), number of employees (EMP), turnover (T), and total assets (ASS).
3. International listing status (IL). This is indicated by a dummy variable with a value of one if the firm is listed in a foreign market listing.
4. IBEX 35 listing (IBEX). This variable is measured by a dummy variable with a value of one if the firm is listed in the Spanish IBEX 35 index, which includes the 35 most liquid firms quoted on the Joint Stock Exchange System of the four Spanish stock exchanges during the control period.
5. Profitability (PRO). This is measured by the rate of net profit divided by book value of equity.
6. Leverage (LEV). LEV is measured as the book value of short- and long-term debt to the book value of equity.

7. The existence of an investor relations department (IRD).[4] This was indicated by a dummy variable (IRD) with a value of one if the firm has such a department and zero otherwise.
8. Market to book ratio (M/B). This is measured as the ratio of market value to book value of equity. This ratio can be considered as a measure to capture the extent to which firms' financial statements are informative about the underlying business.
9. Type of meeting (MET). This variable took a value of one if the presentation was a results meeting and a value of zero if it was a company meeting.

A previous factorial analysis showed that these variables can be reduced to seven factors: size (market value (M), employees (EMP), turnover (T), and total assets (ASS)); listing status, measured by IBEX listing (IBEX) and international listing (IL); financial situation, measured by leverage (LEV) and profitability (PRO); investors relation department (IRD); market to book ratio (M/B); type of meeting (MET); and financial industry (IND). Although we applied the analysis to variables, the results are similar to the analysis with factors.

Various statistical techniques have been used to give insight into the influence of these variables on information disclosure indexes. Analysis of variance (ANOVA) is used for the purposes of the statistical analysis. In this regard, the assumption of normality was checked using the *Kolmogorov-Smirnov* test. We also tested the homoscedasticity applying the *Levene* test. In those cases where only homoscedasticity was not verified, *t* test (two samples) and *T2 Tamhane* test (more than two samples) were used. When normality is not verified we applied *t* test (two samples with size higher than 30) and *Median* test (more than two samples) over the original variables. In addition, in order to use parametric methods and find further evidence, we transformed the original variables into normal variables. Linear regression techniques have also been applied to discover linear correlations between variables and information disclosure indexes.

[4]Investor Relations are defined as 'A corporate marketing activity combining the disciplines of communication and finance, and providing present and potential investors with an accurate portrayal of a company's performance and prospects' (NIRI, 1994). The existence of IRD was checked through the firm's web page.

4. RESULTS

4.1. Descriptive Analysis

If we analyse the extent of intellectual capital information revealed in analyst meetings (GI_S), we find that firms disclosed, on average, 26.93% in the year 2000 (see table 3). The percentage decreases the following year because of the rise in the number of results meetings included in the study. We believe that the amount of intellectual capital information revealed in these presentations is lower than in company presentations due to their different objectives. Standard deviations indicate that there are large variations in the disclosure practices of different meetings. This result is also consistent with the literature stating that companies in Spain have great flexibility in their voluntary disclosure choices.

TABLE 3. Descriptive statistics for the GI index

Year	Mean	Median	S.D.	Kurtosis	Skewness	Min	Max	Confidence Interv.
2000	26.933	25.352	10.805	0.1394	0.367	4.22	57.35	(25.09, 28.89)
2001	22.097	21.12	9.57	-0.269	0.185	1.47	47.88	(20.43, 23.75)

In order to study the different groups of non-financial information, we use sub-indexes of intellectual capital. These indexes are ratios of actual scores awarded to the maximum score in the group considered. There are six sub-indexes according to the categories of items included in the disclosure index: *Human Capital* (GI-HC), *Customers* (GI-CUS), *Processes*, (GI-PRO), *Technology* (GI-TEC), *Innovation, Research and Development* (GI-IRD), and *Strategy* (GI-ST). Table 4 reports descriptive statistics of them.

TABLE 4. Descriptive statistics for GI indexes by groups

YEAR 2000	**GI-ST**	**GI-TEC**	**GI-PRO**	**GI-CUS**	**GI-HC**	**GI-IRD**
Mean	47.16	39.96	30.15	24.59	10.52	10.48
Median	47.36	25	33.33	23.07	10.52	14.28
St. D.	16.63	31.06	16.95	16.95	9.3	15.47
Kurtosis	-0.44	-1.13	-0.16	0.007	2.92	8.14
Skewness	-0.13	0.19	0.35	0.744	1.277	2.53
Conf. Interv. (95%)	(44.24, 50.08)	(34.51, 45.41)	(27.17, 33.13)	(21.61, 27.57)	(8.89, 12.15)	(7.77, 13.19)
YEAR 2001	**GI-ST**	**GI-TEC**	**GI-PRO**	**GI-CUS**	**GI-HC**	**GI-IRD**
Mean	40.45	31.73	23.95	19.58	8.34	7.47
Median	37.86	25	22.22	15.38	10.52	0
St. D.	17.4	27.97	14.42	13.75	7.4	14.25
Kurtosis	-0.44	-0.955	0.59	0.53	0.62	10.09
Skewness	-0.23	0.392	0.612	0.816	0.77	2.83
Conf. Interv. (95%)	(37.43, 43.47)	(26.87, 36.58)	(21.45, 26.45)	(17.2, 21.96)	(7.06, 9.62)	(5, 9.94)

The year 2000 presentations revealed, on average, 47.16% of *Strategy* items, 10.52% of *Human Capital* items, and 10.48% of *Innovation, Research and Development* items. However, in 2001 there is a general decrease in the number of items reported. According to previous literature (Marston, 1996; Larrán, 2001), items about *Innovation, Research and Development* are the least reported by firms. The low ranking of *Human Capital* indicators is also shown in the studies of Mavrinac and Siesfeld (1997) and Eccles and Mavrinac (1995).

Analysing the information content in each category, some empirical findings emerged:

1. In *Strategy*, information about firms' products, coherence and credibility of strategy, new investments, leadership, and marks are the items most reported to financial analysts. Corporate culture, environmental investments, and social responsibility are the least valued items when a company discloses information to analysts (see appendix 2).
2. In relation to *Processes*, firm capacity, business model, and efficiency are the most valued items. Litigations and environmental politics are hardly revealed in these presentations.
3. In *Customers*, more than 25% of information concerns the breakdown of annual sales by product or segment, order book, new customers, and information about relations with customers.
4. In *Technology*, the firms usually report data about technological systems and web transactions. We notice an increase in information about the Internet traffic in 2001.
5. Regarding *Human Capital*, in both years, the quality and experience of managers are the most reported items. The latter is consistent with previous literature (Mavrinac and Siesfeld, 1997; Holland and Doran, 1998) which suggests that top management quality is an important issue for the investor community. However, insurance politics or value added per employee items are scarcely reported.
6. In relation to *Innovation, Research and Development*, there is empirical evidence supporting the fact that this kind of information is strongly demanded by financial analysts (Eccles and Kahn, 1998). However, companies must balance the profit of disclosing this information with the costs of competitive disadvantages. In our sample, these items are rarely reported by the firms.

After studying the extent of disclosed information about intellectual capital, we analysed its specificity, considering whether the disclosure is in quantitative or qualitative terms. By categories, *Customers, Strategy* and *Technology* are the most reported groups in

quantitative form (QT). *Human Capital* information is usually revealed in a qualitative way, only 32.24% of the items disclosed are reported in quantitative terms. Moreover, although intellectual capital disclosure decreased in 2001, in general the specificity of reported information increased (see table 5).

TABLE 5. Quantitative proportion (QTP, in percentage) by categories

CATEGORY	2000	2001
Customer	58.12	67.40
Strategy	52.90	52.83
Technology	46.06	55.63
Processes	44.89	49.14
Innovation, Research and Development	43.32	62.41
Human Capital	32.24	30.61

If we analyse the disclosure specificity by items (see Appendix 2), we notice that the variation in employees, production by customers, efficiency, installed capacity, formation, new products, new investments and acquisitions are reported in a quantitative way in more than 60% of presentations. Specificity of information about business view, IRD in developed products, shares per employee and support data varies from 40% to 60%. Managers' and employees' experience, managers' quality, technology systems, or strategy for IRD are revealed in a quantitative way in less than 15% of the presentations. The statistics also show that the extent and specificity of intellectual capital disclosure varies by information categories.

In the next section we will test whether there is a correlation between the independent variables and the disclosure strategy of a company.

4.2. Univariate Analysis

Univariate analysis results confirm that firm size (measured by market value, net income and total assets), international listing, IBEX 35 listing, market to book ratio, and type of meeting are explanatory variables of the extent of intellectual capital disclosure identified in private channels at the 0.05 level. The partially specific index (*PSI*) is related to these variables along with leverage, profitability, and financial industry.

Furthermore, if we only take into account the information reported in a quantitative way (*QTI*), the results show that disclosure strategy is significantly related to all the independent variables considered in this study. This result indicates that the variables concerning financial situation and financial industry are only associated with the disclosure

strategy when we distinguish between quantitative and qualitative information. The investor relations department variable only significantly affects quantitative disclosure (*QTI*) (see table 6).

TABLE 6. Statistical inference results (p-values)[a]

	Dependent variables		
Independent Variables	**GI**	**PSI**	**QTI**
IBEX	0.020**	0.000*	0.000*
IL	0.024**	0.002*	0.000*
EMP	0.012**	0.001*	0.000*
ASS	0.182	0.001*	0.000*
M	0.007*	0.000*	0.000*
T	0.001*	0.000*	0.000*
IND	0.241	0.005*	0.000*
LEV	0.144	0.002*	0.000*
PRO	0.137	0.006*	0.000*
M/B	0.008*	0.000*	0.000*
IRD	0.899	0.264	0.009**
MET	0.000*	0.000*	0.000*

[a] (*p<0.01; **p <0.05).
IBEX= IBEX 35 listing; IL= international listing; EMP= level of employees; ASS=total assets; M= market valuation; T= turnover; IND= financial industry; LEV= leverage level; PRO= profitability; M/B= market to book ratio; IRD= investor relations department; MET= kind of meeting.

4.3. Regression Analysis

We applied linear regressions to the three indexes in order to assess the linear correlation between variables and disclosure indexes. The three linear regressions were carried out using the *stepwise* method.

The results show that the larger companies disclose higher levels of intellectual capital information (see table 7), which usually occurs in company presentations. These results support previous empirical studies which show that larger firms disclose more information. The explicative variables are the same in both the general index (GI) and the partially specific index (*PSI*). The kind of meeting and the size (measured by market value) only explain about 28% of the variability of each index, which shows a weak linear correlation.

If we use the quantitative disclosure index (*QTI*) as a dependent variable, size (measured by total assets), reason for the meeting, leverage, and profitability explain about 33% of the variability. Individually, and in agreement with previous literature (Chow and Wong-Boren, 1987; Robb et al. 2001; Bukh et al., 2001), firm size is the variable which contributes more. The results suggest that companies generally disclosing more information in their meetings with analysts are also those which disclose more specific information.

TABLE 7. Regression models results[a]

Dependent variable	Independent variables	Coefficient	t	p-value	R^2
GI	Constant	23.71	5.50	0	0.275
	MET	-11.27	-9.21	0	
	L-M	0.971	3.11	0.002	
PSI	Constant	11.799	4.00	0	0.281
	MET	-7.259	-8.00	0	
	L-M	1.359	6.00	0	
QTI	Constant	6.246	2.242	0.016	0.328
	L-ASS	0.988	5.29	0	
	MET	-4.803	-6.33	0	
	PRO	3.64	4.32	0	
	LEV	0.188	3.48	0.001	

[a] MET= kind of meeting; L-M= Logarithm of market value; L-ASS= Logarithm of total assets; PRO=profitability; LEV= leverage.

5. CONCLUSIONS

The purpose of this paper has been to enhance our knowledge of the overall extent and specificity of private information about intellectual capital and its role in presentations to analysts. We have also assessed whether there is a significant relationship among several corporate characteristics and the disclosure strategy.

The analysis is based in the use of indexes of information disclosure in order to quantify a complex categorical variable such as intellectual capital. We find that PSI_S may be obtained as a linear combination of QTI_S and GI_S, and it takes values from QTI_S to GI_S, according to the relative weight of the different classes of information considered. We also gain insight into the proper weights to be used. We find that, if the weight of quantitative information is double of the qualitative, then the impact on the disclosure index is that disclosure quantification is corrected proportionally to quantitative proportion. Thus, it is taken into account that two presentations with the same general disclosure ($GI_i=GI_j$) but with different relative amounts of quantitative information ($QTP_i \neq QTP_j$) have different disclosure levels, and disclosure quantification is corrected proportionally to the quantitative proportion. Using other scores lead to the assumption that the general disclosure level should be corrected more or less than proportionally to QTP_S. If the weight of quantitative information is more than the double of the qualitative, it implies a more than proportional correction, and if it is less than the double, a correction less than proportional. The problem now is how to determine proper scores; what arguments there are to tip the balance one way or another.

The empirical results indicate that firms usually reveal information about their strategy, customers, and processes. According to previous literature (Marston, 1996; Larrán, 2001), items about innovation, research, and development are the least reported by firms.

Agency and political costs, external financing necessity, analysts' coverage, and the firm's reputation explain why firm size and listing status have been found to be significantly and positively associated with intellectual capital disclosure levels. The type of meeting is significantly associated with the amount of intellectual capital disclosure; showing that company presentations disclose larger amounts of intellectual capital information than results presentations. If we analyse the specificity of the disclosure, the results indicate that the information about intellectual capital is more specific in financial firms, firms which are larger and more profitable, are listed in IBEX and in foreign markets, have less debts, have a large market to book ratio, and have investor relations departments. These kinds of companies are not only more proactive in their disclosure of intellectual capital information, but are also more transparent in their communication.

There are a number of limitations inherent in our study. Firstly, we only analyse the pack of information pre-prepared by the company for the presentation and we do not have control over all of the information reported in the meeting; although every effort was made to ensure a uniform coding of company disclosure scores, this process is inevitably subjective. Secondly, there may be other factors influencing intellectual capital disclosures which we did not include; such as the age of the firm (Kim and Ritter, 1999) or board characteristics (Ho and Wong, 2001). Moreover, there may be factors that we have failed to control. For example, some firms could use phone calls or other channels to provide the information which other firms disclose in presentations to analysts.

6. REFERENCES

ADREM, A.H. (1999): *Essays on disclosure practices in Sweden-Causes and Effects.* Lund Studies in Economics and Management 51, The Institute of Economic Research, Sweden: Lund University Press.

AHMED, K. and COURTIS, J.K. (1999): "Association between corporate characteristic and disclosure levels in annual reports: a meta-analysis", *British Accounting Review*, 31: 35-61.

AICPA (1994): *Improving Business Reporting a customer focus.* New York: American Institute of Certified Public Accountants.

BOTOSAN, C.A. (1997): "Disclosure level and the cost of equity capital", *The Accounting Review*, 72 (3): 323-349.

BOZZOLAN, S.; FAVOTTO, F. and RICCERI, F. (2002): "Narrative reporting on intangibles: an analysis of Italian Listed companies", Working Paper presented at the conference "The transparent Enterprise, the value of intangibles", November, Madrid.

BUKH, P.N.; GORMSES, P. and MOUTITSEN, J. (2001): "Disclosure of intellectual capital indicators in Danish IPO Prospectuses", Working Paper, Aarhus School of Business, Aarhus, Denmark.

BUKH, P.N.; JOHANSSEN, M.R.; GARCÍA MECA, E. and MOURITSEN, J. (2002): "IPO Prospectuses as Intellectual Capital Reports. A comparison of Danish and Spanish Reporting Practices", Working Paper presented at the European Accounting Association Congress, Copenhagen.

BUZBY, S. (1975): "Selected items of information and their disclosure in annual reports", *The Accounting Review*, 49: 423-435.

CHOW, C.W. and WONG-BOREN, A. (1987): "Voluntary financial disclosure by Mexican Corporations", *Accounting Review*, July: 533-541.

COOKE, T.E. (1989): "Disclosure in the corporate annual reports of Swedish companies", *Accounting and Business Research*, July: 533-541.

ECCLES, R.C. and KAHN, H. (1998*): Pursuing value: the information reporting gap in the U.S. capital markets*, PriceWaterhouse and Coopers LLP.

ECCLES, R.C. and MAVRINAC, S.C. (1995): "Improving the corporate disclosure process", Sloan Management Review, summer: 11-25.

ECCLES, R.G.; HERZ, R.H.; KEEGAN, E.M. and PHILLIPS, D.M. (2001): *The value reporting revolution: moving beyond the earnings game*. New York: John Willey & Sons.

EDVISSON, L. and MALONE, M.S. (1997): *Intellectual Capital, realizing your company's true value by findings its hidden brainpower*. New York: Harper Collins Publishers.

FINANCIAL ACCOUNTING STANDARDS BOARD (2001): "Improving Business Reporting: insights into enhancing voluntary disclosures*", Business Reporting Research Project*, January

- (2001b): "Business and financial reporting. Challenges from the new economy", *Special Report*, April.

FOSTER, G. (1986): *Financial Statement Analysis*, 2º Ed. Prentice Hall, Englewood Cliffs.

FRANKEL, R., JOHNSON, M. and SKINNER, D.J. (1997): "An empirical examination of conference calls as a voluntary disclosure medium", Working Paper, University of Michigan Business School.

GRAY, S.J., MEEK, G.K. and ROBERTS, C.B. (1995): "International Capital Market Pressures and Voluntary Annual Report disclosures by U.S. and U.K. Multinationals", *Journal of International Financial Management and Accounting*, 6 (1): 43-68.

HEALEY, P. HUTTON, A. Y PALEPU, K. (1998): "Do firms benefit from voluntary disclosure?", Working Paper, Harvard Business School.

HO, S.S.M. and WONG, K.S. (2001): "A study of the relationship between corporate governance structures and the extent of voluntary disclosure", *Journal of International Accounting, Auditing & Taxation*, 10: 139-156.

HOLLAND, J. (1998): "Private voluntary disclosure, financial intermediation and marker efficiency", *Journal of Business, Finance and Accounting*, 25: 29-68.

- (2001): "Financial institutions, intangibles and corporate governance", *Accounting, Auditing and Accountability Journal*, 14 (4): 497-529.

HOLLAND, J. and DORAN, P. (1998): "Financial Institutions, private acquisition of corporate information and fund management", *The European Journal of Finance*, 4: 129-155.

KIM, M. and RITTER, J.R. (1999): "Valuing IPOs", *Journal of Financial Economics*, 53: 409-437.

LARRÁN JORGE, M. (2001): *El mercado de Información Voluntaria en las Bolsas de Valores, (Disclosure information market in the Stock Markets)*. Madrid: ICAC.

LEV, B. ((2000): "Intangibles, Management, Measurement and Reporting", Working Paper, University of New York.

MARSTON, C.L. (1996): *Investor Relations: meeting the analysts. Edinburgh:* The Institute of Chartered Accountants of Scotland.

MARSTON, C.L. and SHRIVES, P.J. (1991): "The use of disclosure indices in accounting research: a review article", *British Accounting Review*, 23: 195-210.

MAVRINAC, S. and BOYLE, T. (1996): "Sell-Side analysis, non financial performance evaluation and the accuracy of short term earnings forecasts", Working Paper, The Ernst & Young Center for Business Innovation.

MAVRINAC, S. and SISFELD, T. (1997): "Measures that matter. An exploratory investigation of investors´ information needs and value priorities", Working Paper, The Ernst & Young Center for Business Innovation.

NATIONAL INVESTOR RELATIONS INSTITUTE (1994*): The body of Investor Relations Knowledge*, Vienna.

RAFFOURNIER, B. (1995): "The determinants of voluntary financial disclosure by Swiss listed companies", *The European Accounting Review*, 4 (2): 261-280.

ROBB, S.W.G.; SINGLE, L.E. and ZARZESKI, M.T. (2001): "Nonfinancial disclosures across Anglo-American countries", *Journal of International Accounting, Auditing and Taxation*, 10: 71-83.

SCHIPPER, K. (1991): "Analysts' forecasts", *Accounting Horizons*, December: 105-121.

SINGHVI, S.S. Y DESAY, H.B. (1971): "An empirical analysis of the quality of corporate financial disclosure", *The Accounting Review*, January: 129-138.

STEWART, T.A. (1997*): Intellectual Capital*. New York: Doubleday.

SVEIBY, K.E. (1997): *The New Organizational Wealth Managing and Measuring knowledge-based assets.* San Francisco: Berrett Koehler Publishers.

TASKER, S. (1998): "Bridging the information gap: quarterly conference calls as a medium for voluntary disclosure", *Review of Accounting Studies* (3): 137-167.

- (1998b): "Technology company conference calls: a small sample study", *Journal of Financial Statement Analysis*, 4: 6-14.

VERRECHIA, R. (1990): "Information quality and discretionary disclosure", *Journal of Accounting and Economics*, 5: 365-380.

WALLACE, R.S.O.; NASER, K. and MORA, A. (1994): "The relationship between comprehensiveness of corporate annual reports and firm characteristics in Spain ", *Accounting and Business Research*, 25 (97): 41-53.

WALLMAN, S.M. (1995): "The future of accounting and disclosure in an evolving world: The need for dramatic change", *Accounting Horizons*, 9 (3): 81-91.

WALMSLEY, T. YADAV, P. and REES, W. (1992): "The information content of the company meeting programme of the society of investment analysts: 1985-1990", *Journal of Business, Finance and Accounting*, 19 (4): 571-584.

WILLIAMS, S.M. (2001): "Is intellectual capital performance and disclosure practice related?", *Journal of Intellectual Capital*, 2: 192-203.

WISEMAN, J. (1982): "An evaluation of environmental disclosures made in corporate annual reports", *Accounting, Organizations and Society*, 7 (1): 53-63.

APPENDIX 1. Number of meetings by firm and year

Firms	2000	2001
Abengoa, S.A.	1	1
Acciona, S.A.	0	1
Aceralia Corporación Siderúrgica, S.A.	0	3
Acerinox, S.A.	2	0
Autopistas Concesionaria Española, S.A.	1	1
ACS, Actividades de Construcción y Servicios, S.A.	0	2
Sdad. General Aguas Barcelona, S.A.	0	1
Aldeasa, S.A.	3	3
Altadis, S.A.	2	4
Amadeus Global Travel Distribution, S.A.	1	1
Amper, S.A.	5	3
Banco Popular, S.A.	3	5
Banco Pastor, S.A.	0	1
Bankinter, S.A.	3	4
Banco Bilbao Vizcaya Argentaria, S.A.	5	4
Befesa, Medio Ambiente, S.A.	1	0
Bodegas Riojanas, S.A.	1	0
Banco Santander Central Hispano, S.A.	7	5
Campofrío Alimentación, S.A.	3	0
Catalana Occidente, S.A. de Seguros y Reaseguros	1	0
Centros Comerciales Carrefour, S.A.	1	1
Compañía de Distribución Integral Logista, S.A.	2	1
Compañía Española de Petroleros, S.A.	1	1
Corporación F. Alba, S.A.	1	0
Corporación Mapfre, S.A.	3	5
Cortefiel, S.A.	4	2
Dogi, S.A.	1	1
Ebro Puleva, S.A.	0	2
Ence, S.A.	1	1
Endesa, S.A.	3	3
Energía e Industrias Aragonesas, S.A.	1	0
Europistas Concesionaria Española, S.A.	0	1
Faes Farma Esp. Productos Químicos y Farmacéuticos, S.A.	1	1
Filo, S.A.	0	1
Fomento Const. y Contratas, S.A.	0	1
Gamesa Corporación Tecnológica, S.A.	0	3
Gas Natural SDG, S.A.	3	3
Grupo Dragados, S.A.	2	1

Grupo Ferrovial, S.A.	1	2
Grupo Pickin Pack, S.A.	3	4
Hidroeléctrica del Cantábrico, S.A.	3	0
Iberdrola, S.A.	5	4
Iberpapel Gestión, S.A.	2	1
Iberica de Autopistas, S.A.	1	0
Inmobiliaria Colonial, S.A.	2	2
La Seda de Barcelona, S.A.	0	1
Mecalux, S.A.	2	0
Metrovacesa, S.A.	1	1
NH Hoteles, S.A.	1	3
Nicolás Correa, S.A.	1	0
Obrascón Huarte Laín, S.A.	3	1
Omsa Alimentación, S.A.	1	0
Parques Reunidos, S.A.	1	1
Papeles y Cartones de Europa, S.A.	1	0
Promotora de Informaciones, S.A.	0	1
Prosegur, S.A., Compañía de Seguridad	2	1
Recoletos Grupo de Comunicación, S.A.	0	3
Red Eléctrica de España, S.A.	2	1
Repsol, S.A.	2	2
Sdad. Nac. Ind. Apli. Cel. Española, S.A.	1	0
Sol Meliá, S.A.	1	1
SOS Arana Alimentación, S.A.	3	1
Superdiplo, S.A.	1	0
Tecnocom, Telecomunicaciones y Energ., S.A.	1	0
Tele Pizza, S.A.	4	3
Telefónica, S.A.	1	8
Telefónica Móviles, S.A.	0	1
Terra Networks, S.A.	2	4
Telefónica Publicidad e Información, S.A.	3	3
Transportes Azkar, S.A.	0	2
Tubacex, S.A.	1	0
Unión Eléctrica Fenosa, S.A.	4	1
Uralita, S.A.	2	2
Urbanizaciones y Transportes, S.A.	1	1
Vallehermoso, S.A.	3	3
Viscofán, S.A.	0	3
Zardoya Otis, S.A.	0	1
Zeltia, S.A.	2	1
Total	**127**	**130**

APPENDIX 2. Extent and specificity of disclosure by items

ITEMS	CATEGORY	% of disclosure		% of quantitative disclosure	
		2000	2001	2000	2001
New products and technology	ST	96.06	85.38	64.75	78.38
Investment in new business	ST	89.76	79.23	75.44	71.84
Business vision; objectives and consistency of strategy	ST	89.76	89.23	74.56	62.07
Leadership and marks	ST	77.95	70	40.4	45.05
Sales breakdown by product or business	CUS	72.44	55.38	97.83	100
Acquisitions	ST	70.87	58.46	80	67.11
Eficiency	PRO	69.29	62.3	88.64	81.48
Strategic alliances, agreements	ST	66.14	60.76	40.48	45.57
Installed capacity	PRO	63.78	61.53	86.42	92.5
IT Systems	TEC	60.63	49.23	7.79	12.5
Network of suppliers and distributors	ST	59.06	40.76	58.67	47.17
Customers breakdown by product or business	CUS	53.54	37.69	88.24	93.88
Quality of products	ST	51.18	46.15	38.46	40
Business model	PRO	50.39	26.92	3.13	8.57
Web transactions	TEC	49.61	34.615	31.75	46.67
Information about marketing	ST	48.82	43.84	32.26	33.33
Price policy	ST	48.03	37.69	65.57	69.39
Organisacional structure	ST	43.31	40	27.27	23.08

Market share by segment/product	ST	43.31	44.615	98.18	96.55
New customers	CUS	41.73	36.92	64.15	87.5
Management experience	HC	37.8	27.69	10.42	13.89
Customer relationships	CUS	37.01	23.84	14.89	25.81
Utilisation of energy and other input goods	PRO	34.65	25.38	61.36	48.48
Investment in technology	TEC	34.65	22.3	50	62.07
Change in number of employees	HC	32.28	32.3	100	90.7
Breakdown of employees by age, experience or department	HC	32.28	24.61	92.68	96.88
Customers engagement	CUS	29.13	22.3	10.81	3.45
Shareholders structure	ST	28.35	16.92	88.89	90.91
Relative market share to competitors	ST	26.77	13.07	97.06	94.12
Sales breakdown by customers	CUS	24.41	24.615	93.55	100
Strategy, objects of I&R&D	IRD	23.62	12.3	6.67	6.25
Information and communication within the company	PRO	22.83	15.38	17.24	5
Web customers	CUS	21.26	17.69	85.19	95.65
Management quality	HC	21.26	17.69	0	8.7
Incentive Systems	HC	19.69	10	8	23.08
Education and training policy	HC	14.96	9.23	21.05	16.67
Number of seen web pages, visits to the web	TEC	14.96	20.76	94.74	96.3
Experience of employees	HC	14.17	6.92	5.56	22.22
Value added by customer or business	CUS	12.6	11.53	50	20
Best Practise	ST	11.02	7.69	28.57	30
Corporative culture	ST	11.02	6.15	0	0
Dependence on key customers	CUS	10.24	12.3	38.46	50
Production by employee	HC	9.45	10.79	91.67	92.86
Market share	ST	9.45	7.69	58.33	70
Environmental investments	ST	8.66	5.38	36.36	14.29
Efforts related to the working environment	PRO	8.66	6.15	27.27	25
Social responsability	ST	7.09	3.07	0	25
Education/training of customers	CUS	6.3	0.79	12.5	100
Shares owned by employees or managers	HC	6.3	2.3	50	100
Production by customer	CUS	4.72	7.69	100	100
External and internal failures	PRO	4.72	1.53	50	100
Future projects regarding I&R&D	IRD	4.72	3.07	33.33	50
Enviromental policies	PRO	3.94	0	20	0
I&R&D in basic reseach	IRD	3.94	3.846	60	40
I&R&D in product design/development	IRD	3.94	3.076	60	75
Customers by employee	CUS	3.94	2.3	100	100
Remuneration systems	HC	2.36	0.79	33.33	0
Repurchase	CUS	2.36	1.53	33.33	0
Recruitment policy	HC	2.36	4.615	0	16.67
Job rotation opportunities	HC	1.57	0	0	0
Litigations	PRO	1.57	3.84	50	80
Dependence on key employees	HC	1.57	0	0	0
Agreements with employees	HC	1.57	3.864	0	0
Pensions	HC	0.79	0	100	0
Career opportunities	HC	0.79	0.796	0	0
Income by employee	HC	0.79	6.92	100	100
Value added per employee	HC	0	0	0	0
Insurance policies	HC	0	0	0	0
Patents pending	IRD	0	0.769	0	100