



Intellectual Capital Disclosure: the Portuguese Case

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Abstract The purpose of this research is to identify the factors that can explain practices of voluntary disclosure of information on intellectual capital (IC). This is an empirical quantitative study that seeks to examine the influence of certain firm characteristics (firm size, auditor type, ownership concentration, industry, proportion of non-executive directors (NEDs) on the board, chairman/CEO duality and audit committee) on intellectual capital disclosure (ICD) in Portuguese companies. ICD data for this longitudinal study were gathered from the annual reports of 32 Portuguese listed firms over 5 years using content analysis. The results of this study indicate that firm size and industry are explanatory factors of the level of disclosure of information on intellectual capital. One of the limitations of the empirical part of the study derives from choosing the content analysis method because it is subject to the subjectivity of interpretation. Another limitation is the small sample size and the application only to Portugal which reduces the ability to generalize the results to other settings. This study contributes to the IC literature, providing new empirical data covering the analysis of 5 years of disclosure related to corporate governance.

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Introduction

The transition from the industrial age to the age of knowledge has produced a significant change in the nature, structure and operations of most industries. Presently, organizations focus more on intangible assets than on tangible fixed assets, which together with the globalization of the economy and the development of information technology make knowledge the major source of wealth for organizations.

Thus, it becomes important to study what factors encourage organizations to disclose their intellectual capital or not.

The motivation for our study is threefold. First, clearer insights into the factors for voluntary disclosure of information on intellectual capital could have important policy implications. For instance, a better understanding of the factors that can explain practices of voluntary disclosure could enable accounting standard-setters and legislators, to better gauge the need for, and likely impact of, regulatory initiatives affecting the financial reporting practices. Second, by focusing on single country, our study avoids the potentially confounding effects which differences in accounting and reporting practices could have on the results obtained in cross-border studies. Thus, it is likely that a more robust test of the theory underlying the study can be carried out. Third, the study presents the evolution of intellectual capital disclosure for the first years of the implementation of corporate governance rules in Portugal. The longitudinal perspective would enable an evaluation as to whether Portuguese listed companies have included more intellectual capital information in their annual reports and an identification of the determinants of that disclosure. These research directions will provide a more complete picture of the annual reporting ICD practices. Therefore, we consider that the study makes a positive contribution to the academic accounting literature with regard to both theory development and to the empirical analysis of the disclosure practices.

In the first decade of the 2000s, the Portuguese economy was characterized by low GDP growth and the existence of various macroeconomic imbalances and suffering from a serious lack of competitiveness in comparison with other industrialized economies.

The changes in Portuguese legislation related to corporate governance practices introduced in the first 10 years of the 2000s provide opportunity to study the effectiveness of internal governance mechanisms to improve disclosure of intellectual capital.

This study analyses the voluntary disclosure of intellectual capital of companies listed on Euronext Lisbon between 2001 and 2009. Based on the Intellectual Capital Model proposed by Sveiby (1997), which allowed the definition of intellectual capital elements to be analysed, content analysis is performed on companies' annual reports.

The objective is to identify factors that could explain practices of voluntary disclosure of information on intellectual capital, with special emphasis on factors related to corporate governance with a longitudinal study. The conclusions are that the hypotheses of firm size and industry cannot be rejected as explaining the level of disclosure of information on intellectual capital and that the variables related to corporate governance have no effect on the level of disclosure of intellectual capital.

The remainder of the paper is organized as follows. The second section presents a review of the literature on intellectual capital disclosure, the third section shows the determinants of intellectual capital disclosure and the hypotheses, the fourth section focuses on the research method and the fifth section reports the results of the statistical analysis and in the final section conclusions are summarized.

Literature on Intellectual Capital Disclosure

Discussion of the underlying theoretical framework for voluntary disclosure of information on intellectual capital is still new and many reasons can be identified as leading companies to disclose information without being forced to by any regulation, that is, voluntary reporting.

For Guthrie et al. (2007), there are numerous incentives for companies to disclose their intellectual capital. Incentives for information disclosure on intellectual capital, according to Guthrie et al. (1999), can be broken down into those related to the external environment that influences the company and those related to the company's internal activities.

These external and internal incentives are consistent with theories some authors use to explain the incentives for information disclosure and among them agency theory, signalling theory, legitimacy theory and stakeholder theory can be highlighted.

Legitimacy theory and stakeholder theory are derived from political-economic theory and both see the inclusion of information in the annual report as having a social and political basis, as well as for economic reasons (Gray et al. 1995).

According to stakeholder theory, an organization's management takes on activities expected by its stakeholders and reports back to them (Clarkson 1995; Guthrie et al. 2004) and all stakeholders have a right to be informed about how the organization's activities impacts on them (Vergauwen and Alem 2005).

The ethical perspective of stakeholder theory argues that weaker stakeholders need to be compensated for the information that larger and more powerful stakeholders have obtained in private meetings (Holland 2001).

Providing management information can be seen as an element for the support and approval of stakeholders (e.g. the trust of employees (Meer-Kooistra and Zijlstra 2001)) or to combat their opposition and criticism (Gray et al. 1995). Therefore, stakeholders need information on companies' relevant assets, and high levels of intellectual capital require high levels of voluntary disclosure of information in the annual reports. Stakeholders need to communicate to the market how the company uses its intellectual capital to create value (Meer-Kooistra and Zijlstra 2001; Mouritsen et al. 2004).

Signalling theory is more related to markets and investments and can be used to explain the dissemination of information on intellectual capital. Usually managers recognize that a company can obtain economic benefits from an effective disclosure policy (Williams 2001). Signalling theory proposes that the organization will try to give a positive signal to investors through an annual reporting mechanism (Oliveira et al. 2006).

Voluntary disclosures of intellectual capital can allow investors and other stakeholders to better assess the company's capacity to create wealth, give a more accurate image of the company and reduce the perception of risk (Botosan 1997; Williams 2001;

Meer-Kooistra and Zijlstra 2001). Therefore, interest rates and the cost of capital may fall (Mouritsen et al. 2004; Vergauwen and Alem 2005) and administration in companies with high levels of intellectual capital will be motivated to signal to the market positive information about their intangible assets in the annual reports. On the contrary, Meer-Kooistra and Zijlstra (2001) and Williams (2001) suggest that firms with highly performing intellectual capital would be reluctant to disclose information about this because of the possible threat to their competitive advantage.

With the transition to the knowledge-based global economy, conventional financial statements are less and less appropriate, and investors are now demanding a more diverse set of information which is easy to use. For Lopes (2010), the difficulties associated with the accounting treatment of intangible assets have led to often unreliable disclosure of information, hence the need for more consistent and objective regulation.

Information helps provide a more transparent view of the company (Meer-Kooistra and Zijlstra 2001) and helps users to make decisions. Companies with high levels of intellectual capital may include disclosure of intellectual capital in their annual reports in order to satisfy current and potential investors' information requirements and therefore maintain or attract valuable resources.

On the other hand, two possible major obstacles to voluntary disclosure of information on intellectual capital should be noted. The high development costs and dissemination of intellectual capital measures (Abdolmohammadi 2005), plus the potential to disclose elements of competitive advantage can damage future returns (Williams 2001; Bozzolan et al. 2003) and may annul benefits which accrue to the company through the voluntary disclosure of information on intellectual capital. Further studies are needed to confirm the applicability of any of these incentives and/or disincentives.

From the above, it can be stated that no one theory can explain the incentives inherent in the voluntary disclosure of information so necessary in connection with explaining this phenomenon. Theories do not compete but complement each other, with the understanding that, in certain contexts, some of these theories are more relevant than others.

To develop a theoretical framework, it is necessary to integrate the concepts of the theories that are consistent in explaining the phenomenon under study (An et al. 2011). An et al. (2011) show the relationship between the four theories mentioned as a basis to explain voluntary disclosure of information.

The framework presented by An et al. (2011) illustrates the relationship between the four theories, highlighting the key concepts intrinsic to each of them, according to the three key premises of the practices of voluntary disclosure of information on intellectual capital:

1. To reduce information asymmetry between the organization's management and various stakeholders in society
2. To attribute accountability to various stakeholders
3. To signal organizational legitimacy and excellence (or superior quality) to society

It can be assumed that companies voluntarily disclose their intellectual capital so as to reduce information asymmetry and attribute accountability to stakeholders and to signal their legitimacy and excellence to society.

Agency theory and stakeholder theory revealed as interrelated concepts the key concept of information asymmetry and stakeholders. Stakeholders' theory and legitimacy theory revealed as interrelated concepts the key concept of accountability and organizational legitimacy. Legitimacy theory and signalling theory presented as interrelated concepts the key concepts of signalling and organizational legitimacy. Signalling theory and agency theory presented as interrelated concepts the key concepts of asymmetric information and signalling.

An et al. (2011) identified several benefits of voluntary disclosure of information on intellectual capital that can encourage organizations to disseminate such information. The benefits were identified as follows: improved relationships with various stakeholders; diverting attention from the negative influence of their community activities; improving an organization's corporate image; attracting potential investors; lower capital costs; decreasing volatility of stocks; and creating a better understanding of its products and services.

Despite the benefits to organizations of voluntarily disclosing their intellectual capital, some costs supported by organizations from this disclosure can also be identified. Costs typically include the direct costs related to the preparation and dissemination of intellectual capital reports, and indirect costs, such as competition costs and political costs. The practice of voluntary disclosure of information should result in a correct balance of related benefits and costs (Verrecchia 1983; Ferguson et al. 2002).

Portugal has already been the object of study by different authors and in different ways of approaching the disclosure of intellectual capital. These studies on intellectual capital present no uniformity among authors regarding the concept, and the various authors employ different frameworks. The papers are not all comparable; some studies are only descriptive and present the different levels of voluntary disclosure of intellectual capital, and some of the papers present explanatory factors.

Concerning the level of disclosure of each category of intellectual capital, the results are as follows.

In the study by Oliveira et al. (2006), items of intellectual capital are more concentrated in *management processes*, *investors* and *employees*. The least reported items are *patents*, *copyrights* and *trademarks*, *flexibility* and *know-how* and *experience*.

In the study by Gomes et al. (2007), the items most reported are, in descending order, *financial relations*, *management philosophy* and *management processes*.

The results of the studies by Oliveira et al. (2006) and Gomes et al. (2007) are not consistent with the results presented by Branco et al. (2010) also referring to Portugal. Branco et al. (2010) suggest the use of content analysis methodology as a factor justifying this inconsistency, but the years in question are also different. Branco et al. (2010) show human capital to be the most reported category of intellectual capital. This can be explained by the type of coding done in content analysis whereby every time the item is referred to, it is encoded causing a company repeatedly disclosing an item to increase the frequency of reporting.

The findings reported in Ferreira et al. (2012) show external capital to be the most reported category. The kind of intellectual information that more companies disclose in their annual reports pertains to *management processes*, *business collaborations*, *brands* and the *profile of workers*. Results also show that size and type of auditor are significant in explaining ICD.

Martins et al. (2013) study the voluntary disclosure of intellectual capital in Portugal from 2001 to 2009 and the results indicate there was no change (increase or decrease) statistically significant at the level of disclosure. Any change that has occurred over the years, including the economic crisis that has affected Portugal did not cause changes in the level of disclosure. The results from this study also indicate that in 2001, the category of intellectual capital with most disclosure was external capital, while in the years 2003 and 2005 the category with the highest level of disclosure was internal capital. In 2007 and 2009, the categories of external capital and internal capital have very similar proportions of disclosure. Human capital is the category with the lowest level of disclosure.

Regarding the studies that have explanatory factors for the wider dissemination of information on intellectual capital, the main conclusions reached by the various studies are as follows.

For Oliveira et al. (2006) study concludes that the level of ICD is positively and significantly influenced by size, type of auditor and industry and negatively by ownership concentration.

The results found by Branco et al. (2010) suggest that the level of ICD is positively influenced by size.

The findings reported in Ferreira et al. (2012) that size and type of auditor are significant in explaining ICD.

Hypotheses and Research Design

The objective of this study is to identify factors that could explain practices of voluntary disclosure of information on intellectual capital, with special emphasis on factors related to corporate governance, such as the proportion of non-executive directors (NEDs) on the board, chairman/CEO duality and audit committee.

Firm Size

Firm size is the independent variable most commonly used in studies on disclosure of information. Larger companies are more likely to operate in different markets or sectors and as a result provide a higher level of reporting on a varied set of activities (Botosan 1997).

Large companies operating in various markets in order to obtain financing in different countries are required to provide more information to stakeholders, especially to financial analysts (Lang and Lundholm 1993). Disclosing more information allows large firms to obtain new funds at a low cost (Botosan 1997; Lang and Lundholm 2000). Large companies are more exposed to public trial than small companies (Camfferman and Cooke 2002), and therefore, stakeholders request greater disclosure. Large companies have enough resources to collect, analyse and present large volumes of data cheaply and reduce the cost of producing supporting information (Leftwich et al. 1981; Inchausti 1997), since they produce information for internal use and its disclosure incurs minimum direct costs (Singhvi and Desai 1971; Cooke 1989a; Raffournier 1995). Large companies may have a stronger impact on society, since they are more market-oriented and followed by analysts, making them more likely to supply

information (McKinnon and Dalimunthe 1993). Large companies believe that disclosure reduces the pressure of undesirable examination by government entities (Buzby 1975; Watts and Zimmerman 1978).

Furthermore, smaller companies tend to disclose less information since the costs related to that disclosure may discourage dissemination (Dye 1985). Small businesses may not have the resources to collect and present an extensive set of information in their annual reports since these activities are normally expensive (Buzby 1975). The cost of obtaining and disseminating detailed information is relatively high for small companies (Singhvi and Desai 1971; Buzby 1975; Lang and Lundholm 1993). Managers of small businesses sense that the disclosure of details may endanger their competitive position (Singhvi and Desai 1971; Buzby 1975; Raffournier 1995).

Several measures were used throughout the various studies to characterize firm size.

In most of the studies conducted on disclosure of information, firm size was indicated as a key determinant of the level of disclosure; however, Stanga (1976) found no evidence when using the turnover variable. Malone et al. (1993), Patton and Zelenka (1997), Entwistle (1999), Williams (2001), Ferguson et al. (2002), Haniffa and Cooke (2002) and Naser et al. (2002) found no evidence when they used the variable of total assets. Naser et al. (2002) and Bukh et al. (2005) found no evidence when using the variable of number of employees.

A positive association is expected between size and voluntary disclosure.

H1—There is a positive association between the extent of voluntary disclosure of intellectual capital and firm size.

Auditor Type

According to Schipper (1981) and Watts and Zimmerman (1983), the choice of external auditors is a mechanism that helps minimize conflicts of interest.

The signalling theory interrelated to the agency theory as the framework proposed by An et al. (2011) also suggests that the choice of an external auditor can serve as a signal of the company's value. For example, Bar-Yosef and Livnat (1984) show that business owners can choose a large auditing firm to give a signal to investors of the expected high results. Likewise, the choice of an auditor can be a signal to the market about the quality of disclosure of information about a company.

Firms audited by large accounting firms have high agency costs and try to reduce them by choosing the auditor (Jensen and Meckling 1976; Watts and Zimmerman 1983).

For example, Singhvi and Desai (1971), Craswell and Taylor (1992), Raffournier (1995), Inchausti (1997) and Patton and Zelenka (1997) concluded that the auditor type has a positive influence on the level of voluntary disclosure. However, McNally et al. (1982), Forker (1992), Wallace et al. (1994), Hossain et al. (1995), Wallace and Naser (1995), Haniffa and Cooke (2002) and Barako et al. (2006b) concluded that auditor type has no significant influence on the level of voluntary disclosure. Camfferman and Cooke (2002) concluded that for UK companies, there is a significant correlation between the level of disclosure and auditor type but in the case of Dutch companies there is no such relationship.

The following hypothesis is proposed:

H2—There is a positive association between the extent of voluntary disclosure of intellectual capital and firms audited by Big 4 auditing firms.

Ownership Concentration

The separation of company ownership and administration generates agency costs resulting from conflicting interests between managers and shareholders.

Jensen and Meckling (1976) showed that managers can be motivated to divert a portion of the company's wealth in bonuses. To the extent that this behaviour is anticipated by the shareholders, managers support the expected cost of these transfers of wealth, so that they can be an incentive for activities to reassure shareholders that they are acting in a manner consistent with the interests of shareholders. Disclosure of information can be seen as a binding activity between the two parties, as it helps to limit transfers of wealth.

Deviations from wealth maximizing behaviour are more likely in companies whose managers have a small part of the capital. These companies are expected to disclose more information than those controlled by large shareholders. The management report is the main, if not the only, source of information for small shareholders, as because of their small share of the wealth of the company, they may not want to incur a large expenditure in order to determine the transfer of wealth to managers. Company managers whose ownership is dispersed thus have an incentive to disclose more information to enable shareholders to control their behaviour.

For example, Singhvi and Desai (1971), Craswell and Taylor (1992) and Barako et al. (2006b) found a negative relationship between information disclosure and ownership concentration. Haniffa and Cooke (2002) and Singh and Zahn (2008) found a positive relationship, but Raffournier (1995), Wallace and Naser (1995), Cerbioni and Parbonetti (2007), Parsa et al. (2007) and Hidalgo et al. (2011) did not find any relationship. García-Meca and Sánchez-Ballesta (2010) in their meta-analysis found a negative relationship between ownership concentration and the level of information disclosure.

Since previous studies have reported contrary results, the following hypothesis is formulated:

H3—There is an association between levels of ownership concentration in a firm and extent of voluntary disclosure of intellectual capital.

Industry

Cooke (1989b) noted the likelihood of the leading companies in an industry being able to create a ripple effect in the level of information disclosure adopted by other companies within the same industry. Any deviation from the established industry practices on disclosure can be understood by the market as bad news (Inchausti 1997). Wallace et al. (1994) suggest that companies in a specific industry face circumstances that may influence their practice of disseminating information. For example, there are significant differences between the reporting

of operations and practices in a firm in manufacturing industry and one in financial services. In addition, Owusu-Ansah (1998) suggests that companies operating in a highly regulated industry may be subject to strict controls that can have strong impacts on information disclosure practices. Disclosure levels can be different according to the type of industry. Greater information disclosure can be expected in companies in politically sensitive industries such as manufacturing (Cooke 1992).

The following hypothesis is formulated:

H4—The industry is a determinant of the extent of voluntary disclosure of intellectual capital.

Proportion of Non-executive Directors on the Board

The composition of the board is important as these administrators are responsible for monitoring management on behalf of shareholders.

The company's board of directors may consist of executive directors (EDs) and NEDs. Non-executive directors can be divided into independent and non-independent. There are two distinct groups, one group that argues in favour of non-executive directors and a group that argues for more executive directors. Those in favour of more non-executive directors base their arguments on agency theory (e.g. Jensen and Meckling 1976; Franks et al. 2001; Haniffa and Cooke 2002). The premise of agency theory is that non-executive directors are required to supervise and control the actions of executive directors due to their opportunistic behaviour (Jensen and Meckling 1976). Non-executive directors are seen as a check and balance mechanism needed to improve the efficiency of administration (Franks et al. 2001 and Haniffa and Cooke 2002). Keenan and Aggestam (2001) are of the opinion that non-executive directors can improve quality control in critical decisions on investment in intellectual capital. In addition, NEDs can be seen as independent and are not intimidated by the president of the board, thus being able to reduce the consumption of benefits by the administration and act as a positive influence on the deliberations of directors (Pearce and Zahra 1992). However, a higher percentage of NEDs, as indicated by agency theory, also has disadvantages. The arguments against the dominance of NEDs include the smothering of strategic actions (Goodstein et al. 1994).

Haniffa and Cooke (2002) and Mangena and Pike (2005), for example, investigated whether a higher percentage of NEDs in administration is associated with greater disclosure and concluded there is no relationship. Furthermore, for example, Haniffa and Cooke (2005) and Barako et al. (2006b) found a negative correlation, but Leftwich et al. (1981), Leung and Horwitz (2004) and Parsa et al. (2007) concluded there is a positive relationship.

Since previous studies have reported contrary results, the following hypothesis is formulated:

H5—There is an association between the extent of voluntary disclosure of intellectual capital and the proportion of NEDs on the board.

Chairman/CEO Duality

In the context of corporate governance, one of the most discussed questions is whether the chair of the board and the CEO should be different people (shared leadership) or one person (single lead). Agency theory suggests that unit leadership can significantly weaken the main function of supervising management and discipline, and compensate senior managers. For Cerbioni and Parbonetti (2007), one of the most important functions of the board is to oversee the performance of administrators, and allowing the CEO and chairman of the board of directors to be the same person compromises the desired check and balance system and is clearly a conflict of interest. This type of leadership also lets the CEO engage in opportunistic behaviour due to his dominant position over administration (Barako et al. 2006a). Gul and Leung (2004) argue that the concentration of decision-making power as a result of unit leadership can limit the board's independence and weaken the task of overseeing and governance, affecting the practice of disseminating information. Shared leadership will help improve the quality of supervision and reduces the advantages obtained by hiding information, consequently improving the quality of the report (Forker 1992). Haniffa and Cooke (2002) say that separation of the two functions was defended by Blackburn (1994) and unit leadership was defended by Eisenhardt (1989). It has been shown by Jensen (1993) that where the CEO and chairman of the board are the same person, the supervisory function is lower than in other companies where these functions are performed by different people. Forker (1992) empirically studied the relationship between corporate governance and the quality of disclosure and presented evidence of a negative relationship between quality and a “dominant personality” i.e. the president of the board of directors and the CEO being same person. The Higgs (2003) recommends that the chairman of the council is a non-executive director in order to minimize the possibility of abuse of power by an executive director. The idea that the concentration of decision-making power in one person (as chairman of the board and CEO) can erode the independence of the board and reduce the propensity to voluntarily disclose information is based on agency theory (Fama and Jensen 1983), which says that without the guidance of an independent leader, it is much more difficult for the board to perform its functions. Keenan and Aggestam (2001) are of the opinion that shared leadership can improve quality control in critical decisions on investment in intellectual capital. Barako (2007) and Akhtaruddin and Rouf (2011) empirically studied the relationship between shared leadership and disclosure level and concluded there is a positive relationship.

Forker (1992) Gul and Leung (2004), Cerbioni and Parbonetti (2007) and Hidalgo et al. (2011) found a negative relationship between unit leadership and the level of information disclosure. Other authors conclude there is no relationship between unit leadership and the level of information disclosure (e.g. Haniffa and Cooke 2002; Barako et al. 2006b; Parsa et al. 2007).

The following hypothesis is proposed:

H6—There is an association between the extent of voluntary disclosure of intellectual capital and chairman/CEO duality.

Audit Committee

McMullen (1996) states that the presence of an audit committee is associated with reliable financial reporting, as well as reducing the incidence of errors, irregularities and other unreliable reporting indicators. Administration usually delegates responsibility for omissions in financial reporting to the audit commission to improve the range of relevance and reliability of the management report (Wolnizer 1995). Thus, the audit committee may be an overseeing mechanism that improves the quality of information flow between shareholders (existing and potential) and administrators. Additionally, Keenan and Aggestam (2001) indicate that the existence of an audit committee provides better quality control in critical decisions on investment in intellectual capital.

For example, Barako et al. (2006b), empirically studied the relationship between the existence of the audit committee and the disclosure level and found a positive association, while Forker (1992) and Nasir and Abdullah (2004) found no significant influence and Yuen et al. (2009) found a negative relationship.

The following hypothesis is proposed:

H7—There is an association between the extent of voluntary disclosure of intellectual capital and the existence of audit committee.

Research Method

The sample is composed of non-financial companies listed on Euronext Lisbon simultaneously in 2001, 2003, 2005, 2007 and 2009.

The first year of study corresponds to the year in which disclosure became mandatory for Portuguese companies, with some aspects related to corporate governance being introduced as first changes in 2003, 2005 and 2007. Including 2009 allows 5 years for studying the first years of implementing the rules of corporate governance in Portugal.

In 2001, 56 companies were listed on Euronext Lisbon of which 11 were in the financial sector. Of the 45 companies in the non-financial sectors during the years under study, 13 listed companies ceased to exist. Thus, the sample is composed of a total of 32 listed firms that were simultaneously and continuously in the 9-year reporting period, corresponding to a total of 160 observations.

Distribution of the 32 firms by sectors using the industry classification benchmark (ICB) can be observed in Table 1. The 32 firms are spread over seven sectors; with the most represented ones being the industrial sector (35 %), consumer services (25 %) and technology (13 %). One sector (utilities) is represented by only one company.

Similar to Wallace et al. (1994), Camfferman and Cooke (2002), Haniffa and Cooke (2002) and Naser et al. (2002), financial companies were excluded from the study because the characteristics of their reports are different from non-financial corporate reports.

In order to characterize the companies in terms of the level of technological intensity, the method used by Fonseca (2004) is adopted.

Level of disclosure was measured by the disclosure made in the annual reports. Annual reports were chosen for two reasons (Lang and Lundholm 1993): first, because

Table 1 Sample firms by sector

Industry	<i>N</i>	Percent
Basic materials	3	9
Industrials	11	35
Consumer goods	3	9
Consumer services	8	25
Telecommunications	2	6
Utilities	1	3
Technology	4	13
	32	100

external users consider them an important source of information about companies and secondly, because the level of disclosure in annual reports is positively correlated with the amount of information the company announce to the market and investors using other means of communication.

As information collection technique, content analysis was used, a widely used method in previous studies on the dissemination index of intellectual capital (e.g. Guthrie et al. 2004; Haniffa and Cooke 2005), since it allows the repetition and validation of information deductions according to the context (Krippendorff 1980). Content analysis, which assumes that the amount of information disclosed reflects the importance of that information (Krippendorff 1980), is a technique for collecting information that involves coding qualitative and quantitative information in predefined categories for standards in presenting and reporting information. This methodology seeks to determine the manifestation of content writing or other forms of notices published through systematic, objective and reliable analysis (Krippendorff 1980).

A review of prior studies shows a great variation in the construction of a disclosure index. Several authors used weighted indexes by importance attached to each item (e.g. Singhvi and Desai 1971; Stanga, Stanga 1976; McNally et al. 1982; Chow and Wong-Boren, 1987; Botosan 1997; Ho and Wong, 2001) while others authors used unweighted indexes (e.g. Cooke 1989a, 1989b; Raffournier 1995; Owusu-Ansah 1998).

An index approach or dichotomous procedure scores 0 (zero) if not disclosed and 1 (one) if disclosed. The weighted disclosure approach involves the application of weights above zero but less than one to items of information which are disclosed (zero is the weight for non-disclosure). Previous studies show that the use of unweighted and weighted scores for the items disclosed in the annual reports can make little or no difference to the findings (e.g. Chow and Wong-Boren, 1987).

Both approaches have disadvantages. Using a weighted index is criticized because it can introduce biases of a particular user, and the use of an unweighted index is criticized in his main assumption that all items have equal importance.

We used an unweighted index in order to avoid subjectivity inherent in any weighting and in order not to favour a particular set of users. Certainly, this approach assumes that every item is equally important for all users of annual reports. This assumption is probably incorrect but we suppose that the resulting bias is lower than if an erroneous weighting had been used. Each sentence was coded as follows; with a score of 0 (zero), if providing no information; with a score of 1 (one) if providing qualitative or quantitative information. If the same information was repeated in the report, we only considered this information once.

Content analysis included reading the annual reports of each company and the encoding of information in accordance with the model of intellectual capital used. The various previous studies reported used different models, those derived from the Sveiby model being most common. In this study, we used the model resulting from the modified Sveiby model. This model was used most in previous studies, as can be seen in the study by Ensslin and Carvalho (2007).

Sveiby (1997) classified intellectual capital into three main categories, which is a useful classification for collecting the index of information disclosure of intellectual capital. In the model used, 28 variables are identified, 10 variables of internal or structural capital, 11 external variables or relational capital and 7 variables of human capital or employee competence.

The independent variables representing the constructs are given in Table 2.

Table 2 Independent variables

Independent variables	Expected relationship	Operational definition
Firm size (SIZE)	+	The natural logarithm of total assets
Auditor type (AUD)	+	Dummy variable: 1 if a Big 4 auditor and 0 otherwise
Ownership concentration (OC)	±	Percentage of capital owned by company's top three shareholders
Industrials (ITI)	±	Dummy variable: 1 if industry is industrial and 0 if not
Consumer goods (ITCG)	±	Dummy variable: 1 if industry is consumer goods and 0 if not
Basic materials (ITBM)	±	Dummy variable: 1 if industry is basic materials and 0 if not
Consumer services (ITS)	±	Dummy variable: 1 if industry is services and 0 if not
Technology (ITT)	±	Dummy variable: 1 if industry is consumer goods and 0 if not
Telecommunications (ITTC)	±	Dummy variable: 1 if industry is technology and 0 if not
Utilities (ITU)	±	Dummy variable: 1 if industry is utilities and 0 if not
Proportion of NEDs on the board (NED)	±	Proportion of independent directors
Chairman/CEO duality (DUAL)	±	Dummy variable: 1 if there is duality and 0 if not
Audit committee (AUDIT)	±	Dummy variable: 1 if audit committee exists and 0 otherwise

We used two regression analysis to test the relation between the various independent variables and the ICD. The regression model is as follows:

$$\begin{aligned} \text{ICD}_{it} = & \beta_0 + \beta_1 \text{SIZE}_{it} + \beta_2 \text{AUD}_{it} + \beta_3 \text{OC}_{it} + \beta_4 \text{ITI}_{it} + \beta_5 \text{ITCG}_{it} + \beta_6 \text{ITBM}_{it} \\ & + \beta_7 \text{ITS}_{it} + \beta_8 \text{ITT}_{it} + \beta_9 \text{ITTC}_{it} + \beta_{10} \text{ITU}_{it} + \beta_{11} \text{NED}_{it} + \beta_{12} \text{DUAL}_{it} \\ & + \beta_{13} \text{AUDIT}_{it} + \varepsilon_{it} \end{aligned}$$

In the equations β_j ($j = 0, 1, \dots, 13$) are the 13 parameters to estimate and ε_i is the error term. Additionally, i represents each firm and t represents the period time (5 years in the period analysed).

We used three estimation methods, namely ordinary least squares (pooled OLS), fixed-effects (FE) and random-effects (RE). To choose the model that better fits the data, we ran F test to compare OLS and FE models, the Breusch-Pagan Lagrange multiplier test to compare OLS and RE models and the Hausman test to compare FE and a RE models. Moreover, to avoid possible misspecification problems, we considered the robust standard errors (Green 2002). Previously, we tested the regression model with year dummies to find if the year is significant to the level of ICD.

Results

Table 3 shows the descriptive statistics for the continuous variables and Table 5 contains the descriptive statistics for categorical independent variables (for the industry variable, see Table 1).

The ICD ranges from 0 to 18 with a mean of 7.4 and a standard deviation of 4.31.

Regarding the board directors variable, it is noteworthy that some firms do not have non-executive directors; nevertheless, this variable has a mean of 37 % and a maximum of 80 %.

The ICD mean according to Table 4 in 2001 is 6.09, and in 2009, the mean is 8.19 which represents a 34 % increase in the mean of ICD. In order to test if the increased level of intellectual capital disclosure over time is statistically significant, we used the variance analysis (ANOVA) for repeated measures.

The results obtained ($F(4|124) = 1.934$, $p = 0.109$) show that there is no significant difference between the levels of disclosure of intellectual capital in the years 2001, 2003, 2005, 2007 and 2009.

Table 3 Summary descriptive statistics of continuous variables

Descriptive statistics	ICD	Firm size	Ownership concentration	Proportion of NEDs on the board
Minimum	0	16.91	0.15	0.00
Maximum	18	24.42	0.97	0.80
Mean	7.40	20.26	0.64	0.37
Std. deviation	4.31	1.74	0.21	0.25
N	160	160	160	160

Table 4 Summary descriptive statistics of continuous variables by year

Year	ICD		Firm size		Ownership concentration		Proportion of NEDs on the board	
	Mean	Std. deviation	Mean	Std. deviation	Mean	Std. deviation	Mean	Std. deviation
2001	6.09	3.236	20.21	1.684	0.62	0.194	0.27	0.224
2003	7.66	4.397	20.16	1.689	0.65	0.211	0.36	0.252
2005	7.44	4.565	20.21	1.788	0.63	0.215	0.35	0.248
2007	7.63	4.730	20.31	1.813	0.62	0.233	0.38	0.259
2009	8.19	4.454	20.44	1.794	0.68	0.213	0.48	0.223

Regarding the proportion of NEDs on the board, there is an increase in absolute terms in 2001 and 2009 of 78 %. The difference is justifiable with the implementation of new corporate governance rules in Portugal.

Table 5 shows that 51.2 % of the firms utilized the services of the big international audit firms. In 33.1 % of the firms, the CEO also holds the position of Chairman. 26.3% of the firms have an audit committee.

Table 6 presents the results of the test of the hypotheses using OLS model with year dummies. Based on the results presented in Table 6, the level of disclosure of information on intellectual capital is determined positively by firm size, ownership concentration and belonging to the technology and utilities sector but also year, operationalized through dummy not found significant. This is consistent with previous studies (Martins et al. 2013). Martins et al. (2013) study the voluntary disclosure of intellectual capital in Portugal from 2001 to 2009 and the results indicate there was no change (increase or decrease) statistically significant at the level of disclosure. Any change that has occurred over the years, including the economic crisis that has affected Portugal did not cause changes in the level of disclosure.

Table 7 presents the results of the test of the hypotheses using the three estimation methods. The random-effects model is the one more suitable ($F = 3.39$; $p < 0.001$; Breusch-Pagan = 16.62; $p < 0.001$ and Hausman = 3.79; $p = 0.706$). Although, for robustness purposes, the three models' results are showed. Based on the results presented in Table 7, the level of disclosure of information on intellectual capital is determined

Table 5 Summary descriptive statistics of categorical variables

Categorical variables		N	Percent
Auditor type	Non-big international firm	78	48.8
	Big international firm	82	51.2
Chairman/CEO duality	No	107	66.9
	Yes	53	33.1
Audit committee	No	118	73.8
	Yes	42	26.3

N = 160

Table 6 Linear regression results with year dummies

Independent variables		OLS (year dummy)		
		Coefficient	Std. error	<i>t</i> statistic
	Constant	21.598	6.395	−3.38***
SIZE	Firm size	1.128	0.289	3.90***
AUD	Auditor type	−0.510	0.786	−0.65
OC	Ownership concentration	5.468	1.804	3.03**
ITCG	Consumer goods	0.889	1.031	0.86
ITBM	Basic materials	0.276	0.856	0.32
ITS	Consumer services	1.016	0.875	1.16
ITT	Technology	5.960	1.367	4.36***
ITTC	Telecommunications	2.461	1.510	1.63
ITU	Utilities	5.702	1.198	4.76***
NED	Proportion of NEDs on the board	−0.084	1.376	−0.06
DUAL	Chairman/CEO duality	0.700	0.898	0.78
AUDIT	Audit committee	0.485	0.921	0.53
	Year 2003	1.398	1.048	1.33
	Year 2005	1.336	1.031	1.30
	Year 2007	1.412	1.057	1.34
	Year 2009	1.421	1.128	1.26
	N			160
	R^2			0.311
	<i>F</i> statistic			17.77***

Dependent variable is the ICD (disclosure of information on intellectual capital). Robust standard errors are reported

*Significant at the 0.05 level, + significant at the 0.1 level; **significant at the 0.01 level; ***significant at the 0.001 level

positively by firm size and belonging to the technology and utilities sector. The ownership concentration is not significant in the random-effects model, being the only difference to the OLS model.

Firm size is a determining factor in the dissemination of information on intellectual capital, showing a positive relationship, this being consistent with the vast majority of results of previous studies. The model indicates that the higher the total assets, the greater the level of disclosure of information on intellectual capital.

The positive relationship found indicates that managers are encouraged to disclose information on intellectual capital to reduce information asymmetry and therefore agency costs. There is an understanding by administrators that the cost of disseminating information may be outweighed by the cost of not disclosing. These results are consistent with previous ICD studies (e.g. Singhvi and Desai (1971), Buzby (1975)), Chow and Wong-Boren (1987), Craswell and Taylor (1992), Barako et al. (2006b), Brammer and Pavelin (2006), Donnelly and Mulcahy (2008), Brügger et al. (2009) and Hidalgo et al. (2011).

Table 7 Panel regression results

Independent variables		OLS			FE			RE		
		Coefficient	Std. error	<i>t</i> statistic	Coefficient	Std. error	<i>t</i> statistic	Coefficient	Std. error	<i>z</i> statistic
SIZE	Constant	-19.824	6.090	-3.25***	-10.299	20.554	-0.50	-15.424	8.935	-1.73+
AUD	Firm Size	1.070	0.282	3.79***	0.801	1.018	0.79	0.930	0.415	2.24*
OC	Auditor type	-0.076	0.663	-0.11	-0.574	0.665	-0.86	-0.398	0.633	-0.63
ITCG	Ownership concentration	5.773	1.747	3.31***	1.342	3.322	0.40	3.493	2.422	1.44
ITBM	Consumer goods	0.932	1.011	0.92	Omitted. Industry does not vary with time.			0.898	1.966	0.46
ITS	Basic materials	0.134	0.849	0.16				0.257	1.036	0.25
ITT	Consumer services	0.910	0.861	1.06				0.891	1.264	0.71
ITTC	Technology	6.025	1.358	4.44***				5.078	1.417	3.58***
ITU	Telecommunications	2.256	1.496	1.51				1.862	2.472	0.75
NED	Utilities	5.636	1.195	4.72***				5.092	1.665	3.06***
DUAL	Proportion of NEDs on the board	0.122	1.360	0.09	0.344	1.438	0.24	0.173	1.403	0.12
AUDIT	Chairman/CEO duality	0.719	0.904	0.90	1.997	1.373	1.45	1.487	1.191	1.25
	Audit committee	0.790	0.880	0.90	0.434	1.270	0.34	0.584	1.128	0.49
	<i>N</i>	<i>N</i>		160	<i>N</i>		160	<i>N</i>		160
	<i>R</i> ²	<i>R</i> ²		0.299	<i>R</i> ² (overall)		0.156	<i>R</i> ² (overall)		0.288
	<i>F</i> statistic	<i>F</i> statistic		26.58***	<i>F</i> statistic		1.14	Wald $\chi^2(12)$		563.41***

Dependent variable is the ICD (disclosure of information on intellectual capital). Robust standard errors are reported

*Significant at the 0.05 level; **significant at the 0.01 level; ***significant at the 0.001 level, + significant at the 0.1 level

Regarding the hypothesis of the industry factor determining the level of disclosure, we found that companies belonging to the technology and utilities sector disclose significantly more than industrial companies.

Regarding ownership concentration, results from previous studies were divided between a negative or positive relationship and no statistical relationship. The results of this study applying the random-effects model indicate no statistical relationship between ownership concentration and the level of disclosure. This result is consistent with the studies by, e.g. Raffournier (1995), Wallace and Naser (1995), Cerbioni and Parbonetti (2007), Parsa et al. (2007) and Hidalgo et al. (2011). Although, the results applying the OLS model indicate a positive statistical relationship between shareholder concentration and the level of disclosure. This result is consistent with the studies by, e.g. Haniffa and Cooke (2002); Singh and Zahn (2008) and Oliveira et al. (2006). These different results between estimation methods emphasize the difficulty in determine if the ownership concentration influences or not the ICD.

Auditor type is not a factor explaining the differences in ICD among companies. This is an unexpected finding. The findings of Oliveira et al. (2006) and Ferreira et al. (2012), both applied to Portuguese companies, showed a relationship between these variables. The different period of analysis and the different data collection method possibly explain this discrepancy.

The hypotheses related to corporate governance as key factors in dissemination of information on intellectual capital are all rejected.

The hypothesis of chairman/CEO duality is rejected, being consistent with studies by e.g. Haniffa and Cooke (2002); Barako et al. (2006b) and Parsa et al. (2007).

The proportion of NEDs on the board is not a factor explaining the differences in ICD among companies. This is consistent with previous studies (e.g. Haniffa and Cooke (2002); Mangena and Pike (2005)).

The hypothesis of the audit committee as a determining factor of dissemination of information on intellectual capital is rejected, this being consistent with previous studies (e.g. Forker (1992); and Nasir and Abdullah (2004)).

Overall, the dissemination of information on intellectual capital will be greater the larger the company, when the holdings of three major shareholders are high, and when the company belongs to the technology and utilities sector.

Summary and Conclusions

The purpose of this research is to identify the factors that can explain the voluntary disclosure practices of information on intellectual capital.

A multiplicity of reasons that lead companies to disclose information without being forced to by any regulations can be identified, that is, there are several factors that can explain practices of voluntary reporting. According to some theoretical perspectives, voluntary disclosure may be encouraged. Agency theory, signalling theory, legitimacy theory and stakeholders theory indicate in their assumptions the trend to disseminate information or not.

Based on the fact that companies have different disclosure levels, we analysed the factors that would lead management to disclose in their annual reports more or less information about intellectual capital.

The most relevant results of the empirical study on identifying factors that compel administration to disclose intellectual capital or not are as follows: We cannot reject the hypotheses of size and industry as factors behind the level of dissemination of information on intellectual capital. However, the hypotheses of auditor type, ownership concentration, percentage of non-executive directors on the board, type of leadership and existence of an audit committee are rejected as factors explaining the level of disclosure of information on intellectual capital.

Some limitations should be identified in this research. One of these in the empirical part of the study concerns the choice of research methods. The main limitation of content analysis is the subjectivity of interpretation. Content analysis involves the application of judgment in deciding whether an item belongs to a category. Despite all the efforts made to ensure confidence in the encoding process and minimize errors, there is always the possibility of errors.

Another limitation is the small sample size and application only to Portugal which reduces the ability to generalize results to other settings.

This research only checked whether a particular item is disclosed or not, not taking into consideration if it is done qualitatively or quantitatively, and not taking into account any repetitions in the disclosure of a certain item.

To solve the limitation of small sample size, this study can be replicated with samples of companies listed on markets other than Euronext Lisbon. A sample of companies listed on other markets with a greater volume of share transaction may allow recognition of particularities in the various markets.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

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