

# Intellectual Capital Disclosure in Italy - An Empirical Analysis

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## ABSTRACT

The paper aims at assessing the level of voluntary disclosure of intellectual capital in the main companies listed on the Italian Stock Exchange. Information on intangible assets provided by companies is very important for investors due to the recent advent of the knowledge economy.

In particular, in this paper, it is analysed the effect that certain determinants (leverage, firm size, auditor and ownership concentration) could have on voluntary disclosures of intellectual capital information by the Italian companies observed. In order to do this, 186 annual reports of Italian listed companies for the year 2010 were analysed. To assess the extent of voluntary disclosure of intellectual capital an index is created to measure it and it is used in an OLS model, as dependent variable, to understand the relationship between the above mentioned determinants and intellectual capital disclosure. In order to do this, 186 annual reports were analysed and about 6,000 items of information on their intellectual capital elements were collected. The study found that relational capital information is the most disclosed item and size affecting positively the total amount of intellectual capital disclosure. The paper contributes in improving knowledge about intellectual capital disclosure analysing a wide sample of Italian listed companies and assessing intellectual capital disclosure determinants.

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## Introduction

With the advent of the knowledge economy, the value that a firm is able to generate is increasingly dependent on the ability to learn, innovate and capitalise on knowledge, as well as to develop relationships. The general financial and organisational capacity, in fact, are no longer sufficient and firms, if they want to survive, have

to develop specific knowledge on which to base competencies and, therefore, to guarantee the creation of competitive advantage. However, compared with the past, the drivers of sustainable competitive advantage are related to the so-called soft value: the intellectual capital.

Intellectual capital has become one of the most important strategic resources for companies to

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create value (Canibato et al, 2000). Intellectual capital is essentially linked to the knowledge that can be converted into value. For Edvinsson and Malone (1997), intellectual capital is knowledge, applied experience, professional skills and customer relations that allow you to operate with a competitive advantage. Mouritsen (1998) points out that intellectual capital is broad organisational knowledge unique to a firm, which allows it to adapt constantly to changing conditions. Intellectual capital can be accepted as a competitive advantage for a company, a key factor

in value creation that increases free cash flows in any firm. In comparison, Sullivan et al. (2000) define IC (intellectual capital) as the knowledge that can be converted into profit, while Lev (2001) defines intellectual capital as the source of future benefits which are generated by innovation, organisation or human resource. There is no unique definition of intellectual capital accepted by the doctrine. However, the main definitions and classification of intellectual capital are reported in the following table (Table 1).

**Table 1 : Intellectual capital definitions and classification**

<b>Author(s)</b>	<b>Definition and classification of Intellectual capital (IC)</b>
Hall (1992)	IC can be classified as “assets” (e.g. trademark, contracts, brand) or “skills” (e.g. firm culture, know-how of employees)
OECD (1993)	IC is the economic value of two intangible assets categories: “organizational capital” (e.g. software, distribution network ) and “human capital” (internal and external)
Edvinsson and Sullivan (1996)	IC is knowledge that can be converted into value
Brooking (1996)	IC is formed by four main categories: market assets, human-centered assets, infrastructure assets and intellectual property assets
Sveiby (1997)	IC Consists of three categories of intangible assets; internal structure, external structure and human competence
Roos et al. (1997)	IC is composed of a thinking part, i.e., the human capital, and a non-thinking part, i.e. the structural capital
Stewart (1997)	IC is intellectual material that has been formalized, captured, and leveraged to produce a higher-valued asset
Edvinsson and Malone (1997)	IC is The sum of human capital and structural capital. It involves applied experience, organizational technology, customer relationships and professional skills that provide an organization

IFAC (1998)	IC is the capital stock based on knowledge possessed by the firm. It can be either the result of a process of transformation of knowledge or the knowledge itself that is transformed into intellectual property rights or intangible assets of the company
Bontis et al (1999)	It is a concept that classifies all intangible resources as well as their interconnections
Sullivan et al. (2000)	IC is all knowledge that could be converted in profit
Arvudssib (2001)	IC consists of five intangible assets categories: human intangibles, relational intangibles, organizational intangibles, R&D intangibles, legal intangibles
Lev (2001)	IC is the source of future benefits, which are generated by innovation, unique organizational designs, or human resource practices
Marr and Schiuma (2001)	IC is composed of all knowledge-based assets, distinguished between organizational actors and infrastructure
Mourtisen et al. (2001)	IC is the aggregate sum of intangible assets which comprise both human and structural capital
De Pablos (2003)	IC is the difference between company market value and its book value, or the resource created from internal learning and development of valuable relationship
Wood (2003)	Intellectual capital is information in people minds
Zambon (2003)	IC is the stock on intangible internal resources (skills, abilities etc.) and external resources (corporate image, brands, customer satisfaction, customer loyalty etc.) of an organization, which enables it to transform a set of material, financial and human assets in a system capable of creating stakeholder value through the pursuit of sustainable competitive advantages
Roos et al (2005)	IC is all non-monetary and non-physical resources that are fully or partly controlled by the organization and that contribute to the organizations value creation
Jussupova-Mariethoz et al. (2007)	IC is a set of non-financial, nonphysical resources that procures a competitive advantage for the enterprise

The World Congress on Intellectual capital classified Intellectual capital into three main categories that are: Human Capital, Relational Capital and Structural Capital

Schultz (1993) defines the term human capital as a key element in improving firm performance and increasing productivity as well as sustaining competitive advantage. This includes the skills, experience, innovativeness and problem-solving abilities of each individual knowledge (Davis and Harrison, 2001). As Rizvi argues, human capital impacts on firm performance thanks to training, education and other actions that have been done in order to increase the levels of knowledge, skills, abilities, values and social assets (Rizvi, 2010).

According to Davis (2001), structural capital encompasses elements such as Information, Research and Development (R&D), Patents, Copyrights, Trademarks, IT Systems, Networking Systems, etc. Structural capital can be defined as the supportive non-physical infrastructure, processes and database of the organisation that enable human capital to function (Maddocks and Beaney, 2002).

Relational capital refers to the relationships with stakeholders (internal and external) such as with customers, distributors, suppliers and joint ventures (Kannan and Aulbur, 2004; Ordonez de Pablos, 2003). It also includes company image, customer loyalty and satisfaction supplier channels and relationships, distribution channels and licensing agreements (Starovic and Marr, 2003).

The disclosure of these kinds of assets is crucial in this era where information is one of the most important and considered resources that can drive the profitability and sustainability of a company (Amir and Lev, 1996; Calisir, Gummusoy, Cirt

and Bayraktaroglu, 2010; Maditinos, Chatzoudes, Tsairids and Theriou, 2011; Salamudin, Bakar, Ibrahin and Hassa, 2010).

Disclose information about intellectual capital involves difficulties in measuring and reporting them. In addition, the disclosure of these kinds of elements could entail further costs for companies such as cost of gathering, processing and interpreting data (Vergauwen et al. 2007) or indirect costs such as the competitive disadvantage position that a firm could assume after the publication of sensitive information (Backjuijs, 1999; Meer-Kooistra and Zijlstra, 2001; Vergawen and van Alem, 2005).

Despite these “costs”, there are different reasons for which a firm could be interested in measuring knowledge assets: these have internal and external perspectives. In the former case, assessing the knowledge components of a firm could help in their management and improve performance. External perspective is important too because in this way the market could know the real value of an organisation (Marr et al., 2004).

Intellectual Capital disclosure can also help companies in reducing information asymmetry aligning insiders with outsiders, resulting in some advantages such as lower costs of capital, deriving also from the possibility for the stakeholders to assess with higher accuracy firm risks (Andriesse, 2004; Bontis, 2003; Vergawen and van Alem, 2005).

The voluntary disclosure of these kinds of elements, therefore, is widely discussed in international researches, in order to understand more effectively firms’ “intangible” resources which are not always communicated by present accounting frameworks.

## Literature review on intellectual capital disclosure

There are several studies that have been conducted on intellectual capital disclosure (ICD) that analyse this aspect in different countries.

Most of these researches have been conducted in different economic contexts with a different level of knowledge based resources: Australia (Brüggen et al., 2009; Guthrie and Petty, 2000; White et al., 2010), Ireland (Brennan, 2001), UK (Bozzolan et al. 2005; Vandemaele et al., 2005; Vergauwen et al., 2007; Williams, 2001), Canada (Bontis, 2003), Sri Lanka (Abeysekera and Guthrie, 2005; Abeysekera, 2007), Italy (Bozzolan et al., 2003; Bozzolan et al., 2006; Cinquini et al., 2012), Malaysia (Goh and Lim, 2004), Taiwan (Chen et al., 2005), India (Bhasin, 2011; de Pablos, 2005; Singh et al. 2011), the Netherlands (Vandemaele et al., 2005; Vergauwen and van Alem, 2005), Sweden (Vandemaele et al., 2005; Vergauwen et al., 2007), France and Germany (Vergauwen and van Alem, 2005), Portugal (Branco et al., 2011; Ferreira et al., 2012; Oliveira et al., 2006), Spain (Oliveras et al., 2008), Denmark (Vergauwen et al, 2007) and South Africa (Wagiciengo et al., 2012).

Intellectual capital resources are not disclosed in the same way across the world due to country specific regulations, auditor conservatism (Vergauwen and van Alem, 2007) and economic, social and political factors (Abeysekera, 2007).

One of the first studies on intellectual capital disclosure, conducted by Guthrie, Petty, Ferrier and Wells (1999), was presented at the OECD Symposium on measuring and reporting intellectual capital. The findings were later published (Guthrie and Petty, 2000). The authors used the classification of Intellectual capital

proposed by Sveiby in 1997 in order to assess the level of intellectual capital disclosure of 20 Australian companies. They find that intellectual capital attributes are disclosed only in qualitatively terms, without defining a robust IC reporting framework.

Brennan (2001) analysed 11 knowledge-based Irish listed companies finding that the level of ICD is lower than that in the previous study on Australian firms (Guthrie and Petty, 2000). However, the research is focused on a small sample, so the results could be highly influenced by the choice of the firms analysed.

Williams (2001) provides a longitudinal examination of intellectual capital disclosure practices in reference to 31 UK listed companies' annual reports for the 1996–2000 period. He finds that between 1996 and 2000 the quantity of information provided by firms increased, even if there is not a systematic relationship between intellectual capital performance and the quantity of information disclosed. He also finds that variables such as leverage, industry and listing status can affect positively the level of IC voluntary disclosure.

Firm-specific determinants of intellectual capital reporting, such as the abovementioned, have been studied by different authors in order to understand whether a firm with a certain characteristic gives more information about its intellectual capital resources. In particular, a company's size and a firm's industry are the main variable that can predict a higher intellectual capital disclosure in different countries (Italy, UK, Portugal, Australia) as empirical evidence provided by different authors confirms (Branco et al., 2011; Bozzolan et al., 2003; Bozzolan et al., 2006; Brüggen et al., 2009; Oliveira et al., 2006; White et al., 2010). Leverage and ownership structure seems to be

a good predictor of intellectual capital disclosure too but only in an Australian context (in accordance with White et al., 2010). However, this is not significant in explaining ICD in Portugal (according to Ferreira et al., 2012).

Findings from previous researches also show that relational capital information is more often disclosed than human capital and structural capital in different countries: Sri Lanka (Abeysekera and Guthrie, 2005), Italy (Bozzolan et al., 2003), Spain (Oliveras et al., 2008), Portugal (Ferreira et al., 2012). Different observations were provided by other researches

in which human capital disclosure represents the most disclosed categories followed by relational and structural capital (Cinquini et al., 2012; Wagiciengo et al., 2012).

In order to obtain an overview of the main studies on intellectual capital disclosure, Table 2 summarizes the literature review. Column (1) reports the name of the author(s), column (2) the name of the article, column (3) the year of publication, column (4) the country context, column (5) the sample period and, finally, column (6) the main findings provided by authors.

**Table 2 : Intellectual Capital Disclosure Literature Review**

Author(s)	Article	Year of publication	Country	Sample	Findings period
Guthrie and Petty	"Intellectual capital: Australian annual	2000	Australia	1998	The development of a model for reporting reporting practices" intangibles is piecemeal and not widely spread. The key components of intellectual capital are poorly understood, inadequately identified, inefficiently managed, and not reported within a consistent framework when reported at all.
Brennan	"Reporting intellectual capital in annual reports: evidence from Ireland"	2001	Ireland	1999	The level of disclosure of intellectual capital attributes of the companies studied is low and knowledge-based Irish listed companies have a substantial level of non-physical, intangible, intellectual capital assets.
Williams	"Is intellectual capital performance and disclosure practices related?"	2001	UK	1996-2000	Between 1996 and 2000 the quantity of ICD increases. There is not a systematic relationship between intellectual capital performance and the quantity of disclosure. Results, however, suggest that if intellectual capital performance is too high the amount of disclosure is reduced.
Bontis	"Intellectual Capital Disclosure in Canadian corporations"	2003	Canada	2000	There is no evidence at all that intellectual capital disclosure has garnered any traction for Canadian corporations.

Bozzolan et al.	"Italian annual intellectual capital disclosure, an empirical analysis"	2003	Italy	2001	Disclosure by Italian companies mainly occurs with regard to external structure. Industry and size seem to be relevant factors in explaining the differences in reporting behaviour amongst Italian companies.
Goh and Lim	"Disclosing intellectual capital in company annual reports evidence from Malaysia"	2004	Malaysia	2001	The incidences of voluntary disclosure of IC in company report are high qualitatively, but not quantitatively.
Olsson retail	"Intellectual capital information through annual reports. A study of the Swedish retail industry"	2004	Sweden	1998-2002	There is an increase in intellectual capital disclosure in Swedish companies, in particular in human capital informations
Abdolmohammadi	"Intellectual capital disclosure and market capitalization"	2005	USA	1993-1997	The frequency of disclosure of information about brand and proprietary processes has increased over the study period. The results show a highly significant effect for the intellectual capital disclosure on market capitalization.
Abeysekera and Guthrie	"An empirical investigation of annual reporting trends of intellectual capital in Sri Lanka"	2005	Sri Lanka	1998-2000	The findings indicate that the most reported accounting category during this period was external capital and the second most reported was human capital.
Chen et al.	"An empirical investigation of the relationship between intellectual capital and firms' market value and financial performance"	2005	Taiwan	1992-2002	Intellectual capital has a positive impact on market value and financial performance, and may be an indicator for future financial performance. R&D expenditure may capture additional information on structural capital and has a positive effect on firm value and profitability.
De Pablos	"Intellectual capital report in India: 2005 Lessons from a case study"		India	1997	The Indian intellectual capital report does not focus on the business model, values, mission and vision and/or knowledge management issues as in the case of European intellectual capital reports. It presents a "narrative" style. This is a major distinctive feature of Indian report

Vandemaele et al.	"Intellectual capital Disclosure in The Netherlands, Sweden and the UK; a longitudinal and comparative study"	2005	The Netherlands, Sweden and the UK	1998, 2000, 2002	Swedish companies disclose more, on average, about IC than Dutch and UK ones.
Vergauwen and van Alem	"Annual report IC disclosure in The Netherlands, France and Germany"	2005	The Netherlands, France and Germany	2000, 2001	Voluntary IC disclosure significantly differs between French, Dutch and German companies. This difference can be explained by country-specific regulation and auditor conservatism.
Bozzolan et al.	"Intellectual Capital Disclosure (ICD). A comparison between Italy and the UK"	2006	Italy and UK	2001	Size and industrial sectors are found to be predictors of levels of ICD; the hypothesis relating nationality of origin to ICD is not supported.
Oliveira et al.	"Firm-specific determinants of intangibles reporting: evidence from the Portuguese stock market"	2006	Portugal	2003	ICD is influenced significantly by size, ownership concentration, type of auditor, industry and listing status in univariate analysis and by size, industry, type of auditor, and ownership concentration in multivariate analyses.
Abeysekera	"Intellectual capital reporting between a developing and developed nation"	2007	Sri Lanka	1998-2000	ICR differences were identified between Sri Lankan and Australian firms, and it is argued that these differences can be attributed to economic, social and political factors
Vergauwen et al.	"Intellectual capital disclosure and intangible value drivers: an empirical study"	2007	Sweden, UK, Denmark	2002	Strong positive relationship between structural capital possession and the firm's ICD.
Oliveras et al.	"Reporting intellectual capital in Spain"	2008	Spain	2000-2002	External intellectual capital is disclosed more than internal or employee capital. IC disclosure remains, however, at a relatively limited level
Brüggen et al.	"Determinants of intellectual capital disclosure: evidence from Australia"	2009	Australia	2004	Firm size and industry type are determinant for intellectual capital disclosure in Australian listed companies. There are no relationship between information asymmetry and intellectual capital disclosure.
White et al.	"Drivers of Voluntary Intellectual Capital Disclosure in listed biotechnology companies"	2010	Australia	2005	Board independence, leverage and size had a significant relationship with the level of voluntary intellectual capital disclosure. Separate regression controlling for large-sized and small-sized firms demonstrated that voluntary intellectual capital disclosure was only driven by board independence and the levels of firm leverage in large firms. Small firms did not demonstrate this relationship.



Branco et al.	"Intellectual Capital Disclosure Media in Portugal"	2011	Portugal	2008-2009	Size is significant in explaining ICD only in the case of annual reports. Industrial affiliation is only partially a factor explain ICD.
Bhasin	"Disclosure of intellectual capital in the annual reports by the IT companies: an exploratory study of India"	2011	India	2007-2009	IC Disclosure in IT firm analysed is almost negligible and its disclosure had not received any preference from the mentors of these corporations.
Singh et al.	"Voluntary disclosures of intellectual capital: An empirical analysis"	2011	India	2009	Correlation between IC valuation and disclosure is negative, weak and insignificant.
Vafaei et al.	"The value relevance of intellectual capital disclosures"	2011	Britain, Australia, Hong Kong, Singapore	2005-2006	The direct relationship of ICD to share price is affected by country-specific and industry-specific factors. ICD is found to provide investors with value relevant information only in Britain and Australia and in the non-traditional industry sector
Cinquini et al.	"Analyzing intellectual capital information in sustainability reports: some empirical evidence"	2012	Italy	2005-2006	Intellectual capital disclosure is going to increase over time. Human capital disclosure represents the most reported category followed by relational and organizational capital. IC disclosure is mainly expressed in non-financial, quantitative and non-time-specific terms with a low level of forward-looking information.
Ferreira et al.	"Factors influencing intellectual capital disclosure report by Portuguese companies"	2012	Portugal	2006	Information on external capital is the type of information on IC that more companies disclose in their annual report. Size and type of auditor are significant in explaining ICD, whereas leverage, profitability, ownership concentration, and intellectual capital level are not.
Wagiciengo et al.	"Intellectual capital disclosures by South African companies: A longitudinal investigation"	2012	South Africa	2002-2006	ICD in South Africa has increased over the 5 years study period, and human capital informations are disclose more than external capital.

## Hypothesis Development

The aim of this research is to understand whether firms with specific characteristics disclose more information about intellectual capital compared with other firms with different attributes.

To conduct this study the following hypotheses were developed:

*H1: There is a positive association between levels of leverage and the extent of voluntary disclosure of intellectual capital.*

Lower leverage suggests lower agency cost, due to the potential size of wealth transfers from debt-holders to stakeholders. Firms with higher leverage have more incentive to disclose information voluntarily, thereby hoping to reduce agency costs (Oliveira et al., 2006).

*H2: There is a positive association between levels of shareholder dispersion in a firm and the extent of voluntary disclosure of intellectual capital.*

With a diffuse ownership structure, agency costs increase (increased likelihood of conflicts of interest between owners (Fama and Jensen, 1983)). In order to reduce agency cost, higher ownership firms have incentives to disclose MORE information voluntarily. Ruland et al. (1990), Mc Kinnon and Dalimunthe (1993) and Malone et al. (1993) found moderate evidence to support this hypothesis.

*H3: There is a positive association between the extent of voluntary disclosure of intellectual capital and firm size.*

From the evidence of other studies, a positive association between size and the voluntary disclosure of intangible is expected (Bozzolan et al, 2003; Bozzolan et al. 2006; Buzby, 1975; Chow and Wong-Boren, 1987; Cooke, 1989; Craig

and Diga, 1998; Firth, 1979; Giner, 1997; Lang and Lundholm, 1993; Raffournier, 1995; Rees, 1998; Singhvi and Desai, 1971; Wallace et al. 1994; Wallace and Naser, 1995; Wallace and Naser, 1995).

*H4: Firms audited by Big 4 auditing firms are likely to disclose voluntarily more information about intangibles than those that are audited by non-Big 4 auditors.*

Auditing activities can mitigate the information gap, increase the effectiveness of disclosure and reduce agency costs (Jensen and Meckling, 1976; Watts and Zimmerman, 1986). Empirical evidence does not support a strong relationship between the size of auditing firm and the extent of information disclosed. Singhvi and Desai (1971), Raffournier (1995) and Giner (1997) support this hypothesis, but other studies have rejected it (Depoers, 2000; Firth, 1979; Hossain et al. 1995).

## Research Methodology

### Sample

To assess the relationship between voluntary disclosure of intangibles and firm characteristics, in this study 186 annual reports of Italian listed companies were analysed. The research includes the main companies listed on the Italian Stock Exchange as of 31 December 2010. The annual reports are available on the Italian Stock Exchange website. Annual reports are usually considered the main source of information as well as the key channel of communication with external users of information.

The sample analysed is shown in the following tables, which report the number of annual reports included in the sample.

**Table 3: Number of annual reports analysed (stock indexes)**

Stock Indexes	Absolute Frequencies	Relative Frequencies
FTSE MIB	25	13.44%
FTSE Mid Cap	41	22.04%
FSTE Small Cap	110	59.14%
FTSE Micro Cap	10	5.38%
<b>Total</b>	<b>186</b>	<b>100%</b>

The sample could also be reported by classifying it in reference to firms belonging to the FTSE STAR Segment (FTSE STAR is an Italian stock exchange index that includes medium-sized companies and has particular admission requirements in terms of transparency, liquidity and corporate governance) (Table 4).

**Table 4: Number of annual report analysed (analysis by FTSE STAR belonging)**

STAR/ NON Companies	Absolute Frequencies	Relative Frequencies
STAR Companies	58	31.18%
Non-STAR Companies	128	68.82%
<b>Total</b>	<b>186</b>	<b>100%</b>

The sample can also be analysed by classifying it in reference to a firm's sector (Table 5).

**Table 5 : Number of annual reports analysed (analysis by sectors)**

Sectors	Absolute Frequencies	Relative Frequencies
Food	5	2.69%
Automotive	10	5.38%
Industrial Goods	40	21.51%
Real Estate	8	4.30%
Chemistry	3	1.61%
Trade	4	2.15%
Construction	15	8.06%
Energy	6	3.23%
Media	14	7.53%
Household Products	21	11.29%
Health	8	4.30%
Utilities	15	8.06%
Financial Services	7	3.76%
Technology	18	9.68%
Tele communication	4	2.15%
Travel and leisure	8	4.30%
<b>Total</b>	<b>186</b>	<b>100%</b>

## Methodology

In order to assess the determinants of intellectual capital disclosure an OLS model is used:

$$ICDI = \alpha_0 + \beta_1 SIZE + \beta_2 BIG4 + \beta_3 LEVERAGE + \beta_4 OWNERSHIP + \varepsilon_{it} \quad (M1)$$

Where:

ICDI is the intellectual capital disclosure index

SIZE refers to the size of firm analysed

BIG4 is a dummy variable that indicates the presence of a BIG 4 auditor

OWNERSHIP represents the ownership structure

The variables used are explained in detail in the following paragraphs.

### ***Dependent Variable***

The method in this research has become widely used in the study of ICD: content analysis (Abeysekera and Guthrie, 2005; Bozzolan et al., 2003; Brennan, 2001; Brüngen et al., 2009; Guthrie and Petty, 2000; Oliveira et al., 2006; Petty and Cuganesan, 2005; Rashid et al., 2013; Whiting and Woodcock, 2012). Using this method implies classifying the information on IC disclosed by firms into various categories of items that capture the aspects to analyse. Content analysis has become a widely used method of analysis in financial accounting research (Beattie, 2005). It is a research technique for making replicable and valid inferences from data to their context (Krippendorff, 1980). By using the content analysis technique, the amount of information disclosed can be measured per category or per company by counting the data items, i.e. the number of words, the number of sentences (Hackston and Milne, 1996; Marston and Shrivess, 1991).

According to Abeysekera et al. (2005), Taliyan et al (2011) and Abhayawansa (2011), the aim of the content analysis method is to single out specific key units in the data of the analysed source, to group them into categories representing variables defined in specific objectives or target areas of the research.

The research methods used in different studies focus on what is reported and a content analysis has been conducted by coding qualitative and quantitative information.

In order to create an index that represents the level of intellectual capital disclosed by companies, different intellectual capital items were observed in accordance with the most used classifications of intellectual capital (Brooking, 1997; Meritum, 2002; Oliveira and Rodrigues, 2006; Sveiby, 1997). The items selected and included in the index are reported in Table 6.

**Table 6: Items analysed in ICDI (Intellectual Capital Disclosure Index)**

<b>STRUCTURAL CAPITAL</b>	<b>RELATIONAL CAPITAL</b>	<b>HUMAN CAPITAL</b>
Management Philosophy	Brands and perception of the firm's products and services	Employees
Corporate Culture	Customers	Know-how and experience
Management process	Customers loyalty	Formal training
Information systems	Portfolio orders	Incentives and remuneration
Networking systems dedication	Company image	Initiative, motivation and
Research and development activities	Distribution channels and structures	Teamwork capacity and spirit
Patents, copyrights and trademarks	Business collaborations	Flexibility
Corporate Knowhow	Agreements and favourable contracts Suppliers Competitors Investors Community involvement Environmental activities Financial entities	Productivity Occupational health and safety

The index includes structural, relational and human capital elements. In order to differentiate the information presented in annual reports, a different score was assigned to arrange the index:

- 2 points if an item was reported in qualitative and quantitative terms;
- 1 point if the item was reported in qualitative terms;
- 0 point if the item was absent.

The model is unweighted because all items are important in the same way and information repeated is considered as the information presented only one time (consistently with other authors such as Giner, 1997; Oliveira et al., 2006; Raffournier, 1995).

The items are hand-collected because software-based searches are not robust and are not able to capture accurately narrative disclosure such as manual analysis (Beattie and Thomson, 2007).

The Intellectual Capital Disclosure Index (ICDI) could be expressed as reported above:

$$ICDI = \frac{\sum_{i=1}^m d_i}{m}$$

Where:

- $d_i$  is a variable that could assume the following values according to the following circumstances:
  - $d_i = 0$  if the item is not disclosed
  - $d_i = 1$  if the item is disclose in qualitative terms
  - $d_i = 2$  if the item is disclose in qualitative and quantitative terms
- $m$  is the maximum number of elements that a firm may disclose in reference to an intellectual capital framework provided in the previous table (Table 6); this variable is important in order to consider what a firm can effectively disclose in its report (i.e. a firm without patents could not give information about this kind of element)

### Independent Variables

All the independent variables used in this research have been extracted from a database of comparable financial information for public and private companies across Europe (Amadeus – Bureau van Dijk).

The first variable used refers to *SIZE* of the listed companies analysed.

The variable *SIZE* is obtained from the equation:

$$S = 0.984 A + 0.800 EM + 0.974OR + 0.962 EQ$$

Where:

- $A$  is the value of Total Assets (expressed in thousand euro);
- $EM$  is the number of employees;
- $OR$  is the value of Operating Revenue (expressed in thousand euro);
- $EQ$  is the value of Equity (expressed in thousand euro);

As can be seen, firm size is obtained by using the four variables previously mentioned. The use of these variables, in order to compose size variable, is due to collinearity characteristic presence that is confirmed by correlation and anti-image matrixes (Table 7 and 8).

KMO sampling adequacy is 0.768 and suggests the use of PCA (principal component analysis). Bartlett's test of sphericity confirms these correlations and the component computed accounts for 87 per cent of the total variance in the original variables (Table 9).

**Table 7 : Correlation matrix**

<b>r</b>	<b>A</b>	<b>EM</b>	<b>OR</b>	<b>EQ</b>
A	1	.788	.949	.975
EM	.788	1	.714	.703
OR	.949	.714	1	.960
EQ	.975	.703	.960	1
<b>Sig. 1-tailed</b>	<b>A</b>	<b>EM</b>	<b>OR</b>	<b>EQ</b>
A		0.000	0.000	0.000
EM	0.000		0.000	0.000
OR	0.000	0.000		0.000
EQ	0.000	0.000	0.000	

**Table 8 : Anti-image matrixes and commonalities**

<b>Anti-image Covariance</b>	<b>A</b>	<b>EM</b>	<b>OR</b>	<b>EQ</b>
A	.026	-.046	.006	-.020
EM	-.046	.260	-.046	.049
OR	.006	-.046	.026	-.022
EQ	-.020	.049	-.022	-.021
<b>Anti-image Correlation</b>	<b>A</b>	<b>EM</b>	<b>OR</b>	<b>EQ</b>
A	.664 §	-.677	.166	-.847
EM	-.677	.554 §	-.455	-.674
OR	.166	-.455	.784 §	-.633
EQ	-.847	.674	-.633	.589 §
<b>Commonalities</b>	<b>A</b>	<b>EM</b>	<b>OR</b>	<b>EQ</b>
Initial	1.000	1.000	1.000	1.000
Extraction	.967	.639	.948	.926

§ = Measures of sampling adequacies (MSAs)

**Table 9 : Principal component Analysis**

<i>Kaiser-Meyer-Olkin measure of sampling adequacy</i> .768						
<i>Barlett's test of sphericity</i>						
■	Approx. chi-Square	419.332				
■	df	6				
■	Sig.	.000				
<b>Component</b>	<b>INITIAL EINGENVALUES</b>			<b>EXTRACTION SUMS OF SQUARED LOADINGS</b>		
	<b>Total</b>	<b>Percentage of Variance</b>	<b>Cumulative percentage</b>	<b>Total</b>	<b>Percentage of Variance</b>	<b>Cumulative percentage</b>
1	3.481	87.018	87.018	3.481	87.018	87.018
2	.455	11.366	98.384			
3	.053	1.327	99.711			
4	.012	.289	100.000			
	<b>Component1</b>					
A	.984					
EM	.800					
OR	.974					
EQ	.962					

The other independent variables used in the research are: *BIG4*, *LEVERAGE* and *OWNERSHIP*.

*BIG 4* is a dummy variable that indicates the type of auditor that conducts auditing activities in the firms analysed. In particular, it is attributed a score of 1 if a Big 4 auditor is present; otherwise a score of 0 is imputed.

*LEVERAGE* is calculated as the ratio between total liabilities on Equity.

*OWNERSHIP* refers to shareholder dispersion. In particular, a score from 0 to 3 is assigned in reference to firm "independency" index (BvD independence index) extracted from the Amadeus Database. The database assigns a "letter" that indicates the ownership structure. Based on that classification the score was assigned. The conversation of the score is shown in the table above (Table 10)



**Table 10 : BvD Index conversions**

<b>Cases</b>	<b>BvD Index</b>	<b>Score assigned in the research</b>
No shareholder with more than 25% of director total ownership	A	3
One or more shareholders recorded with more than 25% of direct or total ownership	B	2
One shareholder recorded with more than 50% of total ownership	C	1
One shareholder recorded with more than 50% of direct ownership	D	0

## **Research Findings**

Table 11 reports descriptive statistics for the variable included in the regression model: in particular, means, medians, standard deviation, variance and 95% confidence interval are provided splitting the sample by indexes.

Table 12 reports the percentage of intellectual capital items disclosed in the different Italian Stock Exchange indexes. As we can see, relational capital elements are provided with more frequencies compared with other categories, and FTSE MIB companies disclose more elements about their intellectual capital resources. In particular, the elements that are the most disclosed are brands, customers, distribution channels and business collaborations in reference to relational capital (respectively 55.37%, 60.75%, 53.76% and 52.697% of the companies analysed disclose these elements). At least three of these elements were provided by all the firms that disclose elements about external structure. In relation to structural capital, the most relevant items disclosed are related mainly to research and development and patents, copyrights and trademarks (43.02% and 42.47% of the companies disclose these elements). In reference to human capital, the information provided is mainly related to employees and their characteristics (number, turnover, age, position, etc.).

Table 13 and Table 14 show the results of the regression model applied (M1) to the whole sample (Table 13) and to the different companies belonging to different Italian stock exchange indexes (Table 14).

**Table 11: Descriptive Statistics**

Variables	Index	N	Mean	Std. Dev.	95% confidence interval	Median	Variance	
Equity (thousand euros)	FTSE Italia Micro Cap	10	95,186.64	104,780.28	20,203.34	170,113.93	55,328.13	1.098E10
	FTSE Italia Mid Cap	41	1,016,926.75	1,211,948.11	634,388.72	1,399,464.77	572,900.00	1.468E12
	FTSE Italia Small Cap	110	125,454.68	25,910.22	77,283.48	173,625.87	68,980.00	64.98E09
	FTSEMIB	25	8,519,245.56	15,322,452.21	2,191,448.15	14,844,042.97	3,269,404.00	234.7E12
Operating revenue (turnover) (thousand euros)	FTSE Italia Micro Cap	10	94,005.75	162,008.93	-21,888.46	209,899.95	33,739.50	26.246E09
	FTSE Italia Mid Cap	41	1,870,599.20	1,919,896.17	1,264,605.19	2,476,593.20	1,094,423.00	3.686E12
	FTSE Italia Small Cap	110	248,541.54	403,099.11	172,366.62	324,716.47	146,432.50	162.49E09
	FTSEMIB	25	13,196,369.80	24,270,133.20	3,178,151.20	23,214,588.40	4,474,200.00	589.04E12
Total Assets (thousand euros)	FTSE Italia Micro Cap	10	171,501.07	180,024.71	42,719.15	300,282.99	133,451.63	32.408E09
	FTSE Italia Mid Cap	41	2,850,645.05	2,884,545.48	1,940,170.15	3,761,119.95	1,541,193.00	8.32E12
	FTSE Italia Small Cap	110	384,168.28	601,531.89	270,494.88	497,841.68	206,022.00	361.84E09
	FTSEMIB	25	25,859,658.84	43,403,715.86	7,943,485.49	43,775,832.19	7,307,500.00	1.883E15
Number of Employees	FTSE Italia Micro Cap	10	418	622.17	26	863	200	387,096.01
	FTSE Italia Mid Cap	41	5,352	5,319.35	6,373	7,031	3,670	28,295,504
	FTSE Italia Small Cap	110	971	1,329.96	720	1,222	584	1,768,788
	FTSEMIB	25	30,805	44,349.49	12,498	49,111	9686	1.966E09

Variables	Index	N	Mean	Std. Dev.	95% confidence interval	Median	Variance
Auditor	FTSE Italia Micro Cap	10	0.70	0.48	0.35	1	0.23
	FTSE Italia Mid Cap	41	0.93	0.26	0.84	1	0.07
	FTSE Italia Small Cap	110	0.71	0.46	0.62	1	0.21
	FTSEMIB	25	0.96	0.44	0.88	1	0.19
Liabilities/Equity (thousand euros)	FTSE Italia Micro Cap	10	1.10	0.77	0.55	1.66	0.60
	FTSE Italia Mid Cap	41	2.03	1.21	1.65	2.41	1.46
	FTSE Italia Small Cap	110	22.33	156.58	7.26	51.92	24,518.27
	FTSEMIB	25	2.20	1.47	1.59	2.81	2.15
Ownership Independence	FTSE Italia Micro Cap	10	1.60	1.26	0.70	2.50	1.60
	FTSE Italia Mid Cap	41	0.78	1.11	0.43	1.13	1.23
	FTSE Italia Small Cap	110	1.04	1.20	0.81	1.26	1.43
	FTSEMIB	25	1.36	1.11	0.90	1.82	1.24
Intellectual Capital Disclosure Index	FTSE Italia Micro Cap	10	0.17	0.16	0.09	0.22	0.22
	FTSE Italia Mid Cap	41	0.23	0.11	0.11	0.26	0.26
	FTSE Italia Small Cap	110	0.33	0.15	0.19	0.31	0.33
	FTSEMIB	25	0.36	0.17	0.21	0.39	0.14

**Table 12 : Mean of percentage of ICDI elements disclosed in annual reports**

	FTSE MIB	FTSE Cap Cap	Mid FTSE Cap	Small FTSE Cap	Micro
Structural capital	41.12%	38.77%	27.32%	11.15%	
Relational capital	46.28%	42.12%	39.15%	38.37%	
Human Resource Capital	26.13%	25.67%	21.12%	17.22%	

**Table 13 : Regression Model Results (overall model)**

	Coefficient	t-statistic	Std. error
$\beta_1$	8.12***	4.12	0.84
$\beta_2$	0.55	0.87	0.62
$\beta_3$	0.16	0.76	1.12
$\beta_4$	0.14	0.61	1.25
N	186		
R <sup>2</sup>	0.487		
Adjusted R <sup>2</sup>	0.442		
F (H <sub>0</sub> : $\beta_1 = 0$ )	14.38***		

Notes: \*\*\* Denotes p-value < 0.01 \*\* Denotes p-value < 0.05 \* Denotes p-value < 0.1.

**Table 14: Regression Model Results (analysis by Stock Exchange indexes)**

	FTSE MIB	FTSE Mid Cap	FTSE Small Cap	FTSE Micro Cap
$\beta_1$	5.37***	7.89**	7.11 *	6.15
$\beta_2$	0.88	0.11	0.55	1.21
$\beta_3$	0.02	0.15	0.16	-0.55
$\beta_4$	0.96	0.13	0.14	-0.69
N	25	41	110	10
R <sup>2</sup>	0.332	0.289	0.315	0.411
Adjusted R <sup>2</sup>	0.311	0.277	0.301	0.389
F (H <sub>0</sub> : $\beta_1 = 0$ )	2.37*	7.55*	15.81*	12.89

$\beta_1, \beta_2, \beta_3, \beta_4$  are the coefficient of the independent variables referring respectively to size, big 4, leverage and ownership as reported in M1. The OLS model used interprets ICD patterns quite well even if the overall model, which considers the whole sample, is able to explain the relationship studied with more significant results. In particular,  $R^2$  and  $R^2$  Adjusted are respectively 0.487 and 0.442 considering the total sample, and F-test (14.38) is significant at 0.01 level. Findings show that the model applied in the different companies belonging to the Italian stock exchange is significant too with lower  $R^2$  and  $R^2$  adjusted value and a lower p-value ( $<0.1$ ). It is only in the case of companies belonging to FTSE Ita Micro Cap that the hypothesis test of null coefficients ( $H_0: \beta = \beta_2 = \beta_3 = \beta_4 = 0$ ) is not significantly rejected, as can be observed from Table 14. The coefficient of all control variables have the sign expected by the developed hypothesis (H1, H2, H3, H4), but only the control variable SIZE is statistically significant (at 0.01 level) – according to OLS results – for all the companies analysed apart from FTSE Micro Cap firms.

## Conclusion

Using Italian listed companies data for 2010, this research confirms previous studies on intellectual capital disclosure in Italian listed firms (Bozzolan et al. 2003), providing further evidence on a wider sample.

In order to assess voluntary intellectual capital disclosure, in accordance with prior existing international literature on this issue, an IC disclosure index was computed and used as a dependent variable in a OLS regression model. This model considers as independent variables firms' size, the presence of a big 4 company's auditor, leverage structure and ownership

concentration, in order to understand whether these control variables are able to explain intellectual capital disclosure behaviour of Italian listed firms in 2010.

The firms analysed report mainly information about relational capital, followed by structural capital information and human resource elements.

The findings of the study show that the size of the firms is able to explain significantly the intellectual capital disclosure of the overall sample and confirm the third hypothesis developed in this research (H3: There is a positive association between the extent of voluntary disclosure of intellectual capital and firm size).

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