Disclosure indexes and compliance with mandatory disclosure — The case of intangible assets in the Italian market

DSCORE INDEXES AND THE COMPLIANCE WITH MANDATORY DISCLOSURE. THE CASE OF INTANGIBLE ASSETS IN THE ITALIAN MARKET

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a b s t r a c t

Disclosure of financial statements is an important topic both for investors and for preparers as disclosure allows investors to understand the application of the accounting principles used by companies. This research examines the 2010 financial statements under IFRS of 189 Italian listed groups and their compliance with mandatory disclosure on intangible assets and presents an in depth empirical analysis of the Italian market – that belongs to the Continental European accounting cluster. Different variables were tested to analyze the compliance with the mandatory disclosure such as size variables, performance variables, financial interest variables and market variables. Many studies on mandatory disclosure are based on one disclosure index method and results are affected by the different approaches used: Cooke's dichotomous approach, Partial Compliance method, weighted and unweighted. In this paper, the decision was taken to run all the previous methods: results show that the only significant variable for all Dscore indexes is the weight of interests on revenues and this result is a distinctive feature of the Italian market where the role of the banking systems is more important than in other countries.

1. Introduction

The topic of disclosure is extremely frequent in the international accounting debate as it represents a key item to understand the financial statements of a company. With reference to financial disclosure, it represents "any deliberate release of financial information, whether numerical or qualitative, required or voluntary, or via formal or informal channels" (Gibbins, Richardson & Waterhouse 1990). Disclosure allows investors to evaluate the application of the accounting principles used by companies and permits investors to analyze the relevant information (Healy & Palepu 2001; Graham, Harvey & Rajgopal 2005; Lambert, Leuz & Verrecchia 2007). Users generally rely on information contained in financial statements to make economic decisions (IASB, *Conceptual Framework* 2010) and some authors (Graham Harvey & Rajgopal 2005) stated that a relevant and complete disclosure produces economic advantages for companies even if it entails investments in information systems (Verrecchia 1983; Darrough & Stoughton 1990; Skinner 1994; Botosan 2000). IFRSs request mandatory disclosure but, as many studies have proved, the level of compliance with these requirements is not the same in the different jurisdictions (Larson & Street 2004; Ball 2006; Nobes 2006; Soderstrom & Sun 2007; Weetman 2006; Zeff 2007; Tsalavoutas, André & Dionjsiou 2014). Moreover, disclosure of the financial statements is a topic fuelled by the European Financial Reporting Advisory Group (EFRAG) with the publication of the Discussion Paper (EFRAG 2012) entitled *Towards a Disclosure Framework for the Notes*. This paper's objective is to "ensure that all and only relevant information is disclosed in an appropriate manner, so that detailed information does not obscure relevant information in the notes to the financial statements". In fact, if on the one hand companies do not provide all the disclosure required by the different standards, on the other hand the increase in these requirements has led to a growth in the notes pushing the EFRAG and the IASB to face the topic. In 2013, the IASB started a project, called *Disclosure Initiative* (made up of a number of implementation and research projects) in order to improve the disclosure usefulness. Among all the different standards that require disclosure, those about intangible assets and impairment test are particular thorny. In fact, the financial crisis has shown the weaknesses of the recoverable amount of some intangible assets (e.g. goodwill) and financial statements have shown a lack of information in the notes. The relevance of IAS 36 *Intangible Assets* and, in particular, of the goodwill impairment test is proved also by two interventions of the European Securities and Markets Authority ESMA (ESMA, 2011, 2013) calling for improvements in disclosure related to goodwill impairment. In particular, in 2013 ESMA stated that "Although the major disclosures related to goodwill impairment testing were generally included, in many cases these were of a boilerplate nature and not entity-specific. This stems from a combination of a failure to comply with the requirements of the standard by issuers, as well as, arguably, a lack of specificity in the standard, especially in the area of sensitivity analysis. This also means that, in many cases, the user of the financial statements is not able to evaluate the reliability of the assumptions used from the disclosures given, which is the primary purpose of those disclosures". Similar concerns were highlighted by the Accounting Standards Board of Japan (ASBJ), EFRAG and the Italian Standard Setter (Organismo Italiano di Contabilità OIC) in the Discussion Paper on Goodwill *Should goodwill still not be amortized* (ASBJ, EFRAG & OIC 2014): according to their opinion, the impairment-only approach leaves significant room for managerial discretion, interpretation, judgment and bias and in fact may result in the entity failing to recognize an incurred impairment loss. The Discussion Paper states that there is a perception that users are not able to anticipate when impairment will occur or understand why it has not occurred based on the information provided in notes. Furthermore, the Discussion Paper underlines claims that compliance with disclosure provided by IAS 36 *Intangible Assets* and IFRS 3 *Business Combination* is lacking or merely formal. This paper addresses these concerns and contributes to literature in the following ways. First, this research examines the 2010 financial statements under IFRS of 189 Italian listed groups

and their compliance with mandatory disclosure on intangible assets. The sample represents 78.43% of the Italian FTSE ALL Share companies: the paper presents an in depth analysis of the Italian market whose results show the level of compliance with mandatory disclosure with reference to intangible assets. Moreover, the analysis is one of the very few papers with reference to the Italian market that belongs to the Continental European accounting cluster. Then different variables were tested to analyze the compliance of the mandatory disclosure such as size variables, performance variables, financial cost variables and market variables. Secondly, this paper contributes to literature by identifying as a significant variable the weight of interests on revenues. This result is specific of the Italian market where the leverage of companies is higher than in other countries. Thirdly, most of the previous studies on mandatory disclosure are based on one disclosure index method and results are affected by the different disclosure index approaches used: weighted, unweighted, Cooke's dichotomous approach and the Partial Compliance method. In this paper, the decision was taken to run all the previous methods in order to identify results not influenced by the model of Dscore used.

The remainder of this paper is organized as follows. Section 2 presents the literature review and the development of hypotheses. Data and research design are presented in Section 3. The results are presented in Section 4 and in Section 5 there are the conclusions.

2. Literature review and development of hypotheses

The first studies on disclosure refer to the late sixties. For example, we can quote Copeland and Fredericks (1968), Mautz and May (1978), Nair and Frank (1980), Gray, McSweeney and Shaw (1984), etc. Groups disclose information through different channels such as annual reports, analyst presentations, investor relations, interim reports, etc. (Hassan & Marston 2010). As stated by Marston and Shrives (1991), disclosure "aroused a great deal of academic interest in the past". Literature classifies disclosure in different ways (Devalle and Rizzato 2013), depending on the obligation to disclose information, on the typology of information disclosed and on the way it is reported. With reference to the obligation to disclose information, it is possible to distinguish between mandatory disclosure that is, for example, required by laws or accounting standards and voluntary disclosure. The latter refers to information that companies disclose that are not specifically required by laws and regulations, but whose information could be relevant for investors (Graham, Harvey & Rajgopal 2005). Analyzing the typology of information disclosed we can analyze the financial information related to the financial statements of the company and non-financial information not related to the financial statements, such as for example market share and customer satisfaction (Robba, Sinleb & Zarzeskic 2001). Finally, regarding the way the information is disclosed (Marston & Shrives 1991; Boyatzis 1998) we can identify the quantitative information, based on tables, graphs, numbers, etc. and the qualitative information based on texts, diagrams, etc.

The aim of this paper is to analyze the mandatory disclosure of the financial statements. In the following paragraphs, we report the Italian financial reporting environment, the literature review on mandatory disclosure under IFRSs in general and in particular about intangible assets and the literature review on the methodologies used to asses compliance with IFRS-required disclosures.

2.1 The Italian financial reporting environment

IFRS have been heavily influenced by the shareholder-based orientation typical of the Anglo-Saxon system (Flower & Ebbers 2002; Hung & Subranyam 2007). For this reason, the introduction of IFRS represented a profound change for many European accounting models and, in particular, for those more different from that model, like the Italian one (Ding, Hope, Jeanjean & Stolowy 2007). In fact, the Italian financial reporting environment belongs to the Continental European cluster (Joos & Lang 1994; Ali and Hwan 2000; Delvaille, Ebbers & Saccon 2005). With reference to the classification made by LaPorta, Lopez-de-Silanes and Sheleifer (1997), who posit a link between the legal system and the quality of protection for outsiders (both common shareholders and creditors), the Italian financial reporting environment belongs to the French-origin group that have the poorest protection for outsiders and the least-developed capital markets (Leuz 2010). The Italian economy is characterized by many small enterprises which obtain funds mainly from banks and other financial institutions with a limited recourse to financial markets. For this reason, even if Italian Local GAAP (named OIC) state "financial statements' users are shareholders, lenders, other people and institutions" (OIC 11), the Italian financial statements model is designed to satisfy lenders' information needs (Gavana, Guggiola and Marenzi 2013). Moreover, financial statements prepared under the Continental European model are likely to report more conservative profits than those prepared under the Anglo-Saxon model (Demaria and Dufour 2007). In particular, according to the Italian Civil Code (art. 2423), financial statements must be based on prudence (i.e. conservatism) that dictates that only gains that are certain should be recorded, while appropriate provisions should be set aside for potential losses. In order to achieve this goal, historical cost is the main criterion for subsequent measurement of assets. The balance sheet value (historical cost) of an asset can decrease if its value is believed to have fallen; but it cannot increase except as a result of an exceptional event, or if an increase is justified by a specific law. In the Anglo-Saxon model, historical cost is frequently modified on the basis of revaluations to reflect "fair value", even if fair value is not always decisive (Cairns 2006).

For the above mentioned reasons, the gap between Italian Local GAAP and IFRSs was (is) large: users of IFRS financial statements are existing and potential investors, lenders and other creditors (IASB, *Conceptual Framework*, par. OB2) whereas the main users of an Italian financial statements are creditors. When preparing financial statements under IFRSs, an entity must use the accrual basis of accounting (IAS 1, par. 27) whereas an entity preparing financial statements Italian GAAP compliant must use conservatism (prudence) (OIC 11). Under IFRSs, fair value, defined as "the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date" (IFRS 13, par. 9), is a relevant criterion for both initial recognition and subsequent measurement of assets and liabilities. According to Italian GAAP, fair value is not an allowed criterion for subsequent measurement if its application leads to the recognition of a gain, but only one of the ways to determine the decrease in the historic cost when the asset value falls.

Differences in objectives, users and general assumptions have generated many other differences in the initial recognition and measurement, subsequent measurement and derecognition of many categories of assets and liabilities. In particular, intangible assets are one of the categories most affected by many changes when moving from Italian GAAP to IFRSs. Dissimilarities start with the definition of intangible assets and end with their subsequent measurement.

IAS 38 defines an intangible asset as "an identifiable non-monetary asset without physical substance" (par. 9). Intangible resource satisfies the definition of intangible asset only if it is identifiable (par. 11-12), the entity controls it as a

result of past events (par. 13-16) and the future economic benefits are expected to flow from it to the entity (par. 17). However, if an intangible resource meets the definition criteria this does not mean the intangible asset could be recognized in the balance sheet. In fact, in order to recognize it in the balance sheet it is also necessary to satisfy the recognition criteria: it is probable that the expected future economic benefits that are attributable to the asset will flow to the entity and the cost of the asset can be measured reliably (par. 18-23). In order to be clearer, IAS 38 deals with the application of these criteria according to the different ways an entity can acquire an intangible asset: separate acquisition (par. 25-32), as part of a business combination (par. 33-43), by way of a government grant (par. 44), in exchange of assets (par. 45-47), internally generated (par. 51-87). Generally speaking, if an intangible asset is acquired separately or in a business combination it is easier to demonstrate both the identifiability and the control due to the existence of an exchange transaction. Italian GAAP deal with intangible assets in OIC 24 (par. 4) where intangible assets are defined as "assets that are normally without physical substance. They are costs that generate economic benefits throughout more than one year. Multi-year costs, intangible goods, goodwill, intangible asset under construction and advances are intangible assets." Multi-year costs are start-up and extension costs, research and development costs, advertising costs. According to the Italian Civil Code, an entity can decide to recognize them either in the balance sheet as assets or in the income statement as costs. Therefore, if an entity demonstrates their capability to generate future economic benefits and if their recoverability is almost certain (par. 35) the entity can qualify them as assets. Intangible goods are generally protected by legal rights and are licenses, patents, brands, concessions, right of use of intellectual properties, etc. Though both IAS 38 and OIC 24 share some parts of the intangible asset definition, there are differences that lead to different recognition criteria and generate a diverse content of "Intangible assets". The most significant differences in the composition of the Intangible assets under IFRSs and under Italian GAAP are shown in the following Table 1.

Table 1

Differences in the content of Intangible assets (I.A.) under IFRSs and Italian GAAP.

Item	IAS 38	OIC 24
Start-up and extension costs (e.g. costs of introducing a new product or service, costs of conducting business in a new location or with a new class of customer, costs of staff training)	They are not I.A. (IAS 38.29) Transaction costs of an equity transaction are accounted for as a deduction from equity (IAS 32.35)	Under specific circumstances, option of the entity to consider them as I.A. (OIC 24.18) Transaction costs of an equity transaction, under specific circumstances, are considered start-up and extension costs (OIC 24.18)
Research and development costs	Costs arising from research (or from the research phase of an internal project) are always recognized as an expense (IAS 38.54) Costs arising from development (or from the development phase of an internal project) are I.A. if the criteria of IAS 38.57 are met.	Under specific circumstances, option of the entity to consider them as I.A. (OIC 24.19)
Advertising costs	Recognized as expense when incurred (IAS 38.29)	If pertaining to non-recurring transactions, under specific circumstances, option of the entity to consider them as I.A. (OIC 24.19)
Transaction costs attributable to the issue of financial liability	Transaction costs of a financial liability transaction are accounted for as a deduction from financial liability (IAS 39.14)	Recognized as I.A. (OIC 24.76)
Expenses on tangible assets not owned	If recognition criteria are met, recognized as tangible assets (under IAS 16 – Property Plant and Equipment or IAS 17 – Lease)	If they are not separable from tangible asset, they are I.A.

Considering goodwill differences are even greater. Under IFRSs, goodwill is dealt with IFRS 3 *Business combination*. A business combination is a transaction or other event in which the acquirer obtains control of one or more businesses (IFRS 3, Appendix A). According to the definition, the key point is obtaining control over a business, irrespective of the transaction form. If a transaction is a business combination, the only permitted method to account for it is the acquisition method. The acquisition method forces the acquirer to recognize all the identifiable assets acquired and all the liabilities assumed at their acquisition-date fair values (IFRS 3.18). Goodwill is recognized only when the aggregate of the consideration transferred and the amount of any non-controlling interest is higher than the net of the acquisition-date amounts of the identifiable assets acquired and the liabilities assumed measured at their acquisition-date fair values (IFRS 3.32). Thus defined, goodwill is a residual amount determined in the same way, irrespective of the form in which the business combination is achieved. IFRS 3 does not apply to business combinations under common control that are explicitly out of the scope of this standard. Under Italian GAAP, the recognition criteria are not linked to the transaction substance, but to the transaction form. In fact, OIC 24 (par. 70) states goodwill is recognized as the difference between the price paid to buy the business (or the value of the contribution of the business or the purchase price of the merged or de-merged company) and the current value attributed to the other transferred assets and liability. The definition itself of the initial amount of goodwill depends on the transaction form: purchase of a business, contribution of a business in exchange of an interest in another business, merger or de-merger of a business. More in details, there are no specific standards for a separate purchase of a business, even if in this case goodwill is determined as the difference between the price paid and the current values of assets and liabilities (do current values have the same meaning of fair values?). OIC 4 is the standard dealing with merger and de-merger. In this case, goodwill can arise only when the aggregate of the cost of the interest previously held and the increase in equity is higher than the carrying amounts of merged or de-merged company's assets and liabilities. This difference is first allocated to the assets that have a current value higher than the carrying amount and then, only for the difference non-allocable to the other assets, to the goodwill. OIC 17 deals with consolidated financial statements and states a method to recognize goodwill deriving from a subsidiary similar to the one OIC 4 prescribes for merger and de-merger. The method prescribed by OIC 4 and OIC 17 is not an "acquisition method" as intended by IFRS 3. Neither is it a pooling of interest method since it is possible to modify the carrying amounts of assets and liabilities and to recognize a goodwill. The contribution of a business in exchange of an interest in another entity is not dealt with a standard, but according to Italian tax law it is possible to use either the acquisition method or the pooling of interests method. Moreover, the above methods are applicable according to the form of the transaction, even when the transaction involved two entities controlled by the same parent company. The most significant differences in the initial recognition and measurement of goodwill are shown in Table 2.

Table 2

Differences in goodwill initial recognition and measurement under IFRS and under Italian GAAP.

Item	IFRSs	Italian GAAP
Type of transaction that generates goodwill	Goodwill is recognized only when a business	The recognition of goodwill depends on the

	combination occurs (IFRS 3) Business combinations under common control are out of the scope of IFRS 3	type of transactions, irrespective of the change of control of the business
Method of accounting	Acquisition method: • goodwill is a residual amount that arises only if the "price paid" for the business combination cannot be entirely allocated to the identifiable assets and liabilities acquired • identifiable assets and liabilities acquired are always recognized at their acquisition-date fair values	Depends on the type of transactions: • purchase of a business: acquisition method (no specific standard) • merger and de-merger: goodwill is recognized only to the extent of the difference between the "price paid" and the equity book value if this difference is not allocable to assets and liabilities (OIC 4) • purchase of a subsidiary: like merger and de-merger (OIC 17) • contribution of a business: either acquisition method or pooling of interests (no specific standard)

Subsequent measurement entails other differences. According to IAS 38 (par. 88) an intangible asset can have a finite useful life or an indefinite useful life. If the useful life is finite, the intangible asset is amortized (IAS 38, par. 97-106) and is tested for impairment only when there are indications of impairment (IAS 38 par. 74). If the useful life is indefinite, the intangible asset is not amortized (IAS 38, par. 107) and is tested for impairment at least annually (IAS 38, par. 108 and IAS 36, par. 10.a). Goodwill is not amortized (IFRS 3 par. B63) but is tested for impairment at least annually (IFRS 3, par. B63 and IAS 36, par. 10.b). Impairment test procedure is dealt by IAS 36 that leaves companies discretion in making a number of choices (ASBJ, EFRAG and OIC 2014). OIC 24 (par. 79) states all intangible assets must be amortized: intangible assets with indefinite useful life are not allowed. OIC 24 identifies the maximum period of useful life for some intangible assets: five years for start-up and extension costs (OIC 24, par. 85), research and development costs and advertising costs (OIC 24, par. 86) and twenty years for brands, trademarks (OIC 24 par. 90) and goodwill (OIC 24 par. 92). Impairment test is required only when there are impairment indicators. In fact, according to the Italian Civil Code (art. 2426.3) if the value of a non-current asset is lower than its carrying amount (historical cost less accumulated depreciation) for a long-lasting period, the carrying amount must be written-down. Before 2014, there were no specific standards about the impairment procedure: a few indications were present in the tangible assets standard (OIC 16) and in the intangible assets standard (OIC 24). In 2014, a specific standard (OIC 9) was issued. OIC 9 states two different approaches: a regular approach, similar to impairment test prescribed by IAS 36 and a simplified approach, for small companies. In brief, in Italy impairment test is never the only method for intangible assets subsequent measurement because depreciation is always mandatory. Consequently, Italian companies were (are) not used to doing impairment test in such a formally way (Mazzi et Al, 2014). From 2009, Italian regulators and public organizations have started to publish some documents about impairment test. In particular, in 2009 a first document was issued (Banca d'Italia, CONSOB and ISVAP, 2009) in order to provide impairment test guidance and to enhance compliance with mandatory disclosure. Then in 2009, the Italian Standard Setter issued guidelines on impairment test for all companies (OIC 2009) and in 2001 issued two specific documents about impairment test for banking and insurance companies (OIC 2011a, 2011b).

Table 3

Differences in Intangible Assets subsequent measurement under IFRS and under Italian GAAP.

Item	IFRSs	Italian GAAP
Goodwill	No amortization (IFRS 3 – IAS 36) Annual impairment test (IAS 36)	Always amortized over a maximum period of twenty years Impairment is carried out only when impairment indicators are present
Intangible assets with indefinite useful life	No amortization (IAS 38 – IAS 36) Annual impairment test (IAS 36)	Not allowed
Intangible assets with definite useful life	Amortization (IAS 38) Impairment is carried out only when impairment indicators are present (IAS 36)	Amortization (OIC 24) • Maximum period for some intangible assets is prescribed Impairment is carried out only when impairment indicators are present (OIC 24 – OIC 9)

Another characteristic of the Italian financial reporting environment is about the financial institutions' financial statements. In fact, in 2005 the Bank of Italy (Banca d'Italia 2005) issued a regulation that forced all the financial institutions to provide financial statements in compliance with a specific format. So, even if IAS 1 does not require a specific format but only a minimum content for both financial documents and notes, Italian banks and other financial institutions are obliged to present them according to specific schemes, equal for all the companies. In particular, Italian financial institutions are requested to present many tables with non-modifiable content in their notes. The same was done by the regulator for insurance company (ISVAP) for insurance companies in 2005 (ISVAP 2005).

2.2 Compliance with mandatory disclosure under IFRS

Many studies have been conducted on the mandatory disclosure under Local GAAP. The introduction of IFRS in Europe is more recent (after 2005) and therefore there are less research studies available on the mandatory disclosure of the financial statements under IFRS. Our paper focuses on the analysis of mandatory disclosure of intangible assets under IFRS in Italy. As reported below, research on the Italian market is also scarce.

Table 4 provides a summary of the reviewed disclosure studies on mandatory disclosure under IFRS. Considering the country analyzed, we found seven papers on the mandatory disclosure in Europe & USA and four on non-European & non-USA countries such as for example Asia, Australia, etc. One research is carried out across the above mentioned classification. If we focused our analysis solely on Italy, we found only one paper written by Hodgon, Tondkar, Harless and Adhikari (2008) where two Italian companies were analyzed. With reference to the European countries, we found several studies on the Greek market. Tsalavoutas (2011) demonstrated a significant change in fundamental financial measures, because of the change in the accounting regime, which explains compliance based on the premises of the relevant disclosure theories. Galani, Alexandridis and Stavropoulos (2011) showed that Greek companies in general have responded adequately to the mandatory disclosure requirements of the regulatory bodies. Seven out of twelve studies analyzed the companies' compliance

before the introduction of IFRSs in Europe. Only five studies are made up of a sample after 2005. In general, the results of the research reported in Table 4 showed a lack of compliance with mandatory disclosure. Thus, our research improves previous literature by analyzing compliance with IFRS-mandatory disclosure in 2010, five years after the introduction of IFRSs.

Table 4

Literature review on compliance with IFRS-mandatory disclosures.

Paper	Country(s)	Disclosure index	Statistich method	Sample	Year	FINDINGS
Street and Bryant (2000)	USA	Unweighted	Stepwise multiple regression	82	1998	The findings reveal the overall level of disclosure is greater for companies with U.S. listings. Additionally, greater disclosure is associated with an accounting policies footnote that specifically states that the financial statements are prepared in accordance with IASs and an audit opinion that states that International Standards of Auditing (ISAs) were followed when conducting the audit. Further, the findings indicate the extent of compliance with IASs is greater for companies with U.S. listings or filings. A higher level of compliance is associated with an audit opinion that states the financial statements are in accordance with IASs and that ISAs were followed when conducting the audit.
Street and Gray (2001)	UK	Unweighted	Stepwise multiple regression	279	1998/ 1999	The major findings of the research are that there is a significant extent of non-compliance with IAS and that key factors associated with levels of compliance include listing status, being audited by a big firm, the manner of reference to IAS, and country of domicile.
Abd-Elsalam and Weetman (2003)	Egypt	Unweighted	OLS regression	72	1995	The results show that for relatively less familiar requirements of IASs, the extent of compliance is related to the type of audit firm used and to the presence of a specific statement of compliance with IASs. A lower degree of compliance with less familiar IASs disclosure is observed consistently across a range of company characteristics. Consideration of agency theory and capital need theory would lead to prior expectation of a distinction in disclosure practices between different categories of companies. The results were, therefore, counterintuitive to expectations where the regulations were unfamiliar or not available in the native language, indicating that new variables have to be considered and additional theoretical explanations have to be found in future disclosure studies on emerging capital markets.
Glaum and Street (2003)	Germany	Unweighted	OLS regression	200	2001	The overall level of compliance with IAS and US GAAP disclosures is positively related to firms being audited by the Big 5 auditing firms and to cross-listings on US exchanges. Compliance is also associated with references to the use of International Standards of Auditing (ISA) or US GAAS in the audit opinion. The findings add to the growing concerns regarding the lack of effective supervision in the German capital market.
Al-shammari, Brown and Tarca (2008)	Asian countries	Unweighted	Probit regression	137	1996-200 2	The study has shown that the level of mandatory compliance with IASs differed among companies from the Gulf Co-Operation Council (GCC) member states (Bahrain, Oman, Kuwait, Qatar, Saudi Arabia and the United Arab Emirates) over the period 1996–2002. Although these countries had progressively made IASs mandatory for all or selected companies since 1996, and compliance improved over the period, no company achieved full compliance with either IASs measurement or disclosure requirements during the period.
Hodgdon, Tondkar, Harless and Adhikari (2008)	Many countries	Unweighted	KendMany countries rank correlation coefficient	87	1999-200 0	Findings support the viewpoint that the extent of compliance with accounting standards is as important as the standards themselves.
Tsalavoutas and Evans (2010)	Greece	Unweighted/weighted	Descriptive statistics	10	2005	It is found that the two methods produce significantly different overall and relative (i.e. ranking order) compliance scores.
Al Mutawaa and Hewaidy (2010)	Kuwait	Unweighted	OLS regression	48	2006	The findings of the study indicate that the overall compliance level for the sampled companies averages 69% of the disclosures required by the standards tested. Regression results indicate that only company size and type of industry have a positive association with IAS-required disclosures and their coefficients are significantly different from zero. Other explanatory variables are found to be statistically insignificant.
Al-Akra, Eddieb and Alic (2010)	Jordan	Unweighted	OLS regression	80	1996 - 2004	The multiple regression results indicate that disclosure regulation reforms produced the most significant influence on mandatory disclosure compliance. Further, governance reforms through the mandate of audit committees emerged as a significant determinant of compliance with mandatory disclosure requirements.
Galani, Alexandridis and Stavropoulos (2011)	Greece	Unweighted	OLS regression	43	2009	The study reveals that Greek companies in general have responded adequately to the mandatory disclosure requirements of the regulatory bodies. The findings also indicate that firm size was significant positively associated with the level of disclosure. The remaining variables such as age, profitability, liquidity and board composition were found to be insignificant in explaining the variation of mandatory disclosures.
Tsalavoutas (2011)	Greece	Unweighted	OLS regression	153	2005	The study examines 153 Greek listed companies' compliance with all IFRS mandatory disclosure requirements during 2005 and complements and extends prior literature in the following way. The study hypothesizes that, in addition to the financial measures and other corporate characteristics that prior literature identifies as proxies for explaining compliance, a significant change in fundamental financial measures, because of the change in the accounting regime, may also explain compliance based on the premises of the relevant disclosure theories. The findings confirm these hypotheses.
Glaum, Baetge, Grothe and Oberdorster (2013 – a)	Germany	Unweighted	OLS regression	1908	1997 - 2005	The study finds that the introduction of international accounting standards has been associated with a significant improvement in forecast accuracy. Increases in the quality of companies' disclosures appear to have contributed to this improvement. However, the disclosure effect, while significant, explains only a small portion of the overall improvement in forecast accuracy.

After analyzing specifically the literature review on intangible assets we can state that, to the best of our knowledge, several papers focus on the disclosure of intangible assets under IFRSs but only few focus on the Italian market (Table 5).

Table 5

Literature review on compliance with intangible assets mandatory disclosure under IFRSs.

Paper	Country(s)	Disclosure index (weighted/Unweighted approach)	Statistich method	Sample	Year	FINDINGS
Garcia-Meca, Perra, Larran and Martinez (2005)	Spain	Unweighted	OLS regression	257	2000-2001	The study finds that there are differences in the quality of the information reported to financial analysts in Spain, and that several factors, such as firm size and the levels of profitability and leverage, highly influence it.
Ritter and Wells (2006)	Australia	Unweighted	OLS regression	150	1979 or 1997	Results show a positive association between stock prices and voluntarily recognized and disclosed identifiable intangible assets and a positive association between identifiable intangible assets and realized future period income.
Carlin, Nigel and Guy (2007)	Australia	Unweighted	OLS regression	50	2006	The results of the paper regarding disclosures relating to goodwill and its impairment by a sample of large Australian reporting entities in the first year after the transition to IFRS suggest that there is substantial room for improvement. In particular, required disclosures were frequently omitted, or suggested that the technical requirements of the IFRS goodwill impairment testing process had not been complied with.
Shalev (2009)	USA	Unweighted	OLS regression	500	2001-2004	This study provides evidence that, after controlling for materiality, disclosure level on business combinations is positively associated with two measures of acquirers' performance: change in ROA one and two years ahead, and a year forward stock return. Further analysis reveals that the disclosure level decreases with abnormal goodwill. Investors, however, do not seem to understand the information content in the disclosure level on business combinations.
Carlin (2010)	Australia	Unweighted	OLS regression	50	2005 or 2006	Findings show continued high levels of non-compliance with the goodwill accounting standard suggesting that a viable organizational option in the face of change is to fail to take steps to comply. This organizational response undermines the assumptions of consistency and comparability as key qualitative characteristics under IFRS.
Glaum, Schmidt, Street and Vogel (2013 – b)	Many European countries (of which 17 Italian companies)	Unweighted	OLS regression	357	2005	On a national level, the strength of the enforcement system and the size of the national stock market are associated with compliance. Both factors not only directly influence compliance but also moderate and mediate some company-level factors. Finally, national culture in the form of the strength of national traditions ('conservation') also influences compliance, in combination with company-level factors.
Tsalavoutas, André and Dionysiou (2014)	Many countries (of which 20 Italian companies)	Unweighted	OLS regression	544	2010	IAS 36, IFRS 3 and IAS 38 disclosures and determinants of non-compliance with mandatory disclosures depend also on enforcement mechanisms in the different countries. Moreover, the Authors' findings show that compliance levels are lower when a company is from a country with a legal system of French origin, like Italy.

Considering the country analyzed, we found two papers on the mandatory disclosure in Europe, four on non-European countries and one with different countries analyzed. From the seven, only the two more recent studies were made after the introduction of IFRS in Europe. Glaum, Schmidt, Street and Vogel (2013 b) analyzed the compliance for a large sample of European companies applying IFRSs. Focusing on disclosures required by IFRS 3 *Business Combinations* and IAS 36 *Impairment of Assets*, they find substantial non-compliance. At the company level, they identify the importance of goodwill positions, prior experience with IFRS, type of auditor, the existence of audit committees, the issuance of equity shares or bonds in the reporting period or in the subsequent period, ownership structure and the financial services industry as influential factors. At the country level, the strength of the enforcement system and the size of the national stock market are associated with compliance. Tsalavoutas, André and Dionysiou (2014) analyzed several studies conducted by different organizations (the Financial Reporting Review Panel-FRRP on UK companies, the European Commission on EU-companies, the ICAEW on EU-companies, the SEC on US listed companies that prepared their financial statements in accordance with IFRSs) and concluded that "there is ample evidence of non-compliance with the mandated disclosures of these standards [IFRS 3, IAS 36 and IAS 38] across some EU member states during early periods of mandatory implementation of IFRS". Their sample is made up of European and Non-European companies and their findings indicate that companies impairing intangible assets comply less with mandatory disclosure than companies that do not have impaired intangible assets. Moreover, according to their results, cross-listing in the US increases compliance levels and the level of enforcement in a country affects the level of compliance, due to the auditing component of the enforcement environment. Finally, the Authors' findings show that compliance levels are lower when a company is from a country with a legal system of French origin, like Italy.

As described before, the Italian financial reporting environment was (is) very different compared to what IFRSs prescribe, in particular pertaining to intangible assets. Besides, previous studies (Tsalavoutas, André & Dionysiou 2014) found lower compliance in countries like Italy, but in their sample there were only seventeen Italian companies. Our research contributes to the literature by providing an analysis of the compliance with the intangible assets mandatory disclosure of a large sample of Italian companies.

2.3 Assessing compliance with IFRS-required disclosures: different Dscore methodologies.

The level of compliance with mandatory disclosure can be measured in several ways, using different Dscores that depend on the different variables analyzed (Siegel 1956). In some studies the disclosure index is weighted (Cerf 1961; Buzby 1975; Botosan 1997; Richardson & Welker 2001; Ali, Ahmed & Henry 2004), whereas in other studies it is not weighted (Cooke 1989a; Cooke 1989b; Ahmed & Nicholls 1994; Hossain, Tan & Adams 1994; Wallace, Naser & Mora 1994; Hossain & Hammami 2009; Al Mutawaa & Hewaidy 2010; Galani, Alexandridis & Stavropoulos 2011). The use of the two approaches is independent of the period the research was carried out in, due to the fact that over the years there have been many studies that have used indexes that are not weighted. As can be found in prior literature, each method has weak points that can impact on the research findings. The weighted indexes are based on the assignment of a different weight to the different pieces of information provided by the firms (Inchausti 1997). Those who support this approach believe that the information found in the notes of the financial statements does not have equal importance, and, consequently, researchers assign a subjective weight to the different types of information (Stanga 1976). The main limit of the weighted approach lies in the way the weight is assigned to the different pieces of information. The subjectivity of the researchers' attribution of the weight to the information may indeed impact on the level of compliance with mandatory disclosure. Moreover, this weight may increase the subjectivity of the analysis, thus limiting the comparison of the findings deriving from the research with other studies on the topic. The attempt to reduce the subjectivity existing in the points assignment is called "Saidin Index" (Spetz & Baker 1999) whose first applications to the compliance with IFRS disclosure requirements is found in the paper by Hodgdon, Tondkar, Harless and Adhikari (2008). This index is characterized by the assignment of the weight to several items, not based on the importance attributed by the researchers, but by the importance attributed by the firms. In particular, this index derives from the assumption that the more a piece of information is shared by the groups, the less its weight must be regarding the measurement of compliance with the requirements of the IFRS. In order to achieve this result the information provided by each group must be analyzed with the average frequency with which the firms tend to provide that information. The second approach used by main literature is referred to as the unweighted approach: basically this approach assumes that each piece of information is of equal weight to the investor. Furthermore, all the information found in the notes of the financial statement is of equal importance for the average of the users of financial statement (Wallace 1987). Hence the focus is placed on the investors in general and not on the particular typology of the users. This index is calculated as the association between the total amount of the information found in the financial statements out of the total amount of information that can be found there. In many cases a score of one point is attributed if the information is present or zero if it is not. This approach is known as the dichotomous approach. However, this approach penalizes all the groups that do not provide a specific piece of information. Cooke was one of the first to face this problem (Cooke 1989a), adding a variant to the dichotomous approach. If data is not necessary in the consolidated financial statements the data is deemed to be not important and thus does not take on any significance in the computation of the Dscore. On the other hand, if the data is important but is absent from the notes of the financial statements, it is assigned the value of nil. Therefore this model is characterized by the association of the weight with all the items analyzed, but differentiates them into those which are present, not present or unnecessary. This approach also has its limitations. The main weak point is the subjectivity that the researcher has to use in order to decide which information is necessary or not. Independently of the type of approach that is used (weighted or unweighted), attention must be paid to how the disclosure index is determined with reference to how the items requested by each standard are counted. It is a well-known fact that the number of these items may indeed vary considerably. Some international standards require a high number of items (IAS 1) whereas others require a lower amount (IAS 2) (Tsalavoutas & Evans 2010). The ensuing result is that "[. . .] standards which require more items to be disclosed or, in other words, standards with more items included in the index are unintentionally and indirectly not treated equally with those that require fewer items to be disclosed" (Al-Shiab 2003, p.

222). This is why research about compliance with IFRS-mandatory disclosure has resulted in a further version of the index of disclosure, known as the Partial Compliance approach (hereafter known as the PC approach, found in Al-Shiab 2003). This model calculates an index of disclosure for each standard. In order to achieve the total index, it is sufficient to add the Dscore values obtained for each standard and divide the number by the sum of the standards analyzed. Therefore this method focuses on the individual standard analyzed and the total disclosure index is equal to the mean of the information provided by the firms for each of the applicable standards. Hence, in order to obtain a complete and reliable study of the compliance with mandatory disclosure, it would be useful to use both the general method, which assesses all the items independently of the standards, and the Partial Compliance method (Tsalavoutas & Evans 2010; Tsalavoutas, André & Dionysiou 2014).

The literature review shows that results are influenced by the different Dscore configurations. Our research contributes to the literature by providing the results of an empirical analysis of the compliance with IFRS-mandatory disclosure about intangible assets in the Italian market measured using four different Dscores.

2.4 Development of hypotheses.

Many studies have shown that some independent variables influence the compliance with mandatory disclosure (Camfferman 2002). The most frequent are size, leverage, profitability, industry type and audit firm. Enforcement environment is not considered in our paper because we analyze only the Italian market. According to existing literature, size is the variable which has the greatest impact on the compliance with mandatory disclosure. Total assets, sales and number of shareholders are the variables which typically identify the size of a company, even if some studies state that size is important regardless of the variable used (Cooke 1989a). The findings of studies referring to other variables are conflicting: some studies affirm that there is a correlation between profitability and the level of compliance with mandatory disclosure (Singhvi & Desai 1971; Belkaoui & Kahl 1978; Wallace, Naser & Mora 1994; Wallace & Naser 1995) whereas others disagree (Cerf 1961; Dumontier & Raffournier 1998; McNally, Eng & Hasseldine 1982; Inchausti 1997). There are also differences regarding the industry type. On the one hand it is claimed that manufacturing firms provide more information compared to firms operating in other sectors (Cooke 1991; Cooke 1992), whereas other papers state that there is no link between the sector and the level of disclosure (Inchausti 1997). Differences can also be found concerning the independent variable audit firm. While some researches confirm the link between the audit firm and the level of disclosure (Singhvi & Desai 1971; Inchausti 1997; Dumontier & Raffournier 1998), others state that no such link exists (Firth 1979; McNally, Eng & Hasseldine 1982). The stock exchange where companies are listed is also another item that distinguishes the different studies, but our paper focuses only on the Italian market. The hypotheses of our research are shown below.

H1: Disclosure of intangible assets is positively associated with the size of entities

The size of a company is the most common variable used in research about the level of disclosure. Previous studies have shown that there is a positive correlation between the size of the firm and the compliance with mandatory disclosure (Beaulieu, Williams & Wright 2002; Bozzolan, Favotto & Ricceri 2003; Bozzolan, O'Regan & Ricceri 2006; Arvidsson 2003; Garcıa-Meca, Perra, Larran & Martinez 2005; Vandemaele, Vergauwen & Smits 2005; Guthrie, Petty & Ricceri 2006; Oliveira, Rodrigues & Craig 2006), with some exceptions (Williams 2001; Bukh, Nielsen, Gormsen & Mouritsen 2005). Size is a significant variable due to three main different factors. The first factor is resources. The larger companies have greater resources to invest in information systems in order to collect and present an extensive array of information, thus enabling an improvement both in internal and external disclosure (Buzby 1975; Firth 1979; Lang & Lundholm 1993; Inchausti 1997; Alsaeed 2005; , Nielsen, Gormsen & Mouritsen 2005; Oliveira, Rodrigues & Craig 2006). The second factor is public interest. Larger companies, such as listed companies, are usually the object of greater public interest and involve several stakeholders. Consequently these firms must provide more information (Firth 1979; Garcia–Meca, Perra, Larran & Martinez 2005). The last factor is the stock exchanges. Stock exchanges need detailed information on the financial and economic situation of the groups. (Firth 1979; Ahmed & Nicholls 1994; Naser, Al-Khatib & Karbhari 2002). Therefore the large listed firms provide information on investments which is more detailed than the information provided by smaller firms in order to reduce the information asymmetry between investors and management (Jensen & Meckling 1976; Lang & Lundholm 1993; Arvidsson 2003; Garcia-Meca, Perra, Larran & Martinez 2005). The size of the company is measured by means of several proxies, which are: total assets (Naser & Al-Khatib 2000; Naser, Al-Khatib & Karbhari 2002; Bozzolan, Favotto & Ricceri 2003; Alsaeed 2005), revenue (Naser, Al-Khatib & Karbhari 2002; Bozzolan, Favotto & Ricceri 2003), market capitalization (Bozzolan, O'Regan & Ricceri 2006), the stock exchange (Naser, Al-Khatib & Karbhari 2002; Bozzolan, Favotto & Ricceri 2003; Garcia-Meca, Perra, Larran & Martinez 2005) and the number of employees (Naser & Al-Khatib 2000; Bukh, Nielsen, Gormsen & Mouritsen 2005). Our research uses the natural logarithm of market capitalization and pro-capita revenue. The "total assets" variable has not been used (Wallace & Naser 1995; Ahmed & Nicholls 1994; Lang & Lundholm 1993; Cooke 1991) since it may create problems of multi-collinearity with the variable "Weight of intangible assets on investment". According to previous research we expect a positive correlation with the size of entities and the level of compliance with mandatory disclosure of intangible assets.

H2: Disclosure of intangible assets is positively associated with the materiality of intangible assets and the recognition of an impairment loss

Since we focus on mandatory disclosure pertaining to intangible assets, we have introduced two variables related to them. Our research consider the weight of intangible assets on the total assets and we expect a positive correlation between the intangible assets weight and the level of compliance with mandatory disclosure due to the materiality of the intangible assets (Tsalavoutas, André & Dionysiou 2014). Furthermore, the recognition of an impairment loss of the intangible assets request more information to be disclosed according to IAS 36 (par. 130-131). For this reason, a positive correlation between the recognition of an impairment loss and the compliance with mandatory disclosure would be expected. However, according to a previous study (Tsalavoutas, André & Dionysiou 2014), companies reporting impairment loss comply less with mandatory disclosure than companies not impairing the intangible assets. Consequently, we do not expect a clear relationship between the presence of an impairment loss and the compliance with the mandatory disclosure.

H3. Performance is correlated to the level of compliance with mandatory disclosure

In literature, there are many studies which show that there is a positive relationship between the firm's profitability and the level of disclosure as also stated by the EFRAG Discussion Paper (2014). Firms with a high profitability are indeed more inclined to provide positive and comprehensive information to the market than firms with low profitability (Inchausti 1997; Singhvi & Desai 1971; Wallace & Naser 1995; Wallace, Naser & Mora 1994). However, other studies show that the opposite is true (Belkaoui & Kahl 1978). Of the several configurations of profitability, this research has used the Return On Asset (ROA) and the Return On Sales (ROS). ROA and ROS are two typical independent variables used in existing literature (Cerf 1961; Singhvi 1968; Wallace 1978; Raffournier 1995; Inchausti 1997; Hossain & Hammami 2009; & Leuz 2000). We do not expect a clear relationship between the performance ratio and the compliance with the mandatory disclosure.

H4. In groups where the financial costs and financial debts are higher, the level of compliance with mandatory disclosure of intangible assets is higher

As stated in a previous study (Tsalavoutas, André & Dionysiou 2014) in countries where banks are the most important providers of funds, disclosures provided by highly leveraged companies can be redundant. Italian groups have a higher leverage compared to other European companies that entails to a high cost of interests in the income statement of the Italian groups. Also due to the financial crisis, the interest for Italian companies was higher than other European countries in 2010. This crisis has brought about a drop in revenue, difficulty in financial reimbursement as well as the difficulty for third parties to access the capital market. We identify two indicators that are the ratio between interests and revenues and the ratio between interests and financial debts (Return on Debts). These variables are based on the assumption that in order to facilitate access to the capital market, Italian firms aim at creating a more complete and transparent economic-financial disclosure in particular considering intangible assets. Thus, they are geared towards providing disclosure that is more complete and consistent with the requirements of IFRSs regarding the items considered especially risky for external investors, e.g. intangible assets. As the main user in the Italian context is the banking system we expect that companies will give an in-depth disclosure to support the evaluation of intangible assets. We expect that as the weight of the financial costs on revenues and the Return on Debts increase, so will also the level of compliance with mandatory disclosure.

H5. The level of compliance with mandatory disclosure is different by the industry type

Some studies showed that it is in the interest of firms belonging to the same sector to have the same level of disclosure, so as to avoid competitive pressures. Furthermore, some sectors may have greater pressure imposed on them by state organizations. In literature, there is some disagreement on the significance of this variable on the compliance with mandatory disclosure. Some papers perceive a considerable link between the industry type and the level of disclosure (Wallace & Naser 1995; Naser, Al-Khatib & Karbhari 2002), whereas in other papers this link is missing (Wallace, Naser & Mora 1994; Owusu-Ansah 1998; Glaum & Street 2003). Findings have not clearly proved whether the correlation is positive or negative. Thus, our hypothesis does not indicate an expected sign for the relationship (Lopes & Rodrigues 2007).

H6. Level of compliance with mandatory disclosure is positively influenced by the auditor type.

According to prior literature, big four auditing firms impose high standards of disclosure in order not to damage their reputation (Chalmers & Godfrey 2004) and also require companies to comply with best practice of the application of accounting standards (Dumontier & Raffournier 1998, Jensen & Meckling 1976; Watts & Zimmerman 1983). These theoretical considerations do not clearly define the direction of the relationship between disclosure and auditor type. Literature shows that in some cases there is a positive association between the auditing firm and level of compliance with mandatory disclosure (Street & Gray 2001; Glaum & Street 2003) whereas other studies showed a positive correlation (Wallace, Naser & Mora 1994). Wallace and Naser (1995) showed a negative relation. Considering the previous literature we expect a positive relation between the level of compliance with mandatory disclosure and auditor type.

3. Data and research design

3.1 Data

The examined sample is made up of the groups listed on the Italian Stock Exchange and belonging to the FTSE All-Share index at 31st December 2010. The total number of the groups analyzed is 241. Companies that did not draw up the consolidated financial statements were excluded from the sample as well as companies that did not recognize intangible assets in their financial statements. Companies reporting under US GAAP were also excluded. In order to analyze only companies where intangible assets are relevant we excluded from the sample the groups where the weight of the intangible assets on total assets is lower than 5%. Thus, the final sample is made up of 189 groups, that is 78.43% of the groups listed and belonging to the FTSE All-Share. Table 6 summarizes the sample selection process, showing for each step the number of observations eliminated from the sample and the remaining observations.

Table 6

Composition of the sample analyzed.

Items	N. groups	% sample
Composition of the FTSE All-Share	241	100%
Foreign entities	(2)	0.83%
No consolidated financial statement	(6)	2.49%
No intangible assets	(1)	0.41%
No goodwill and intangible assets less than 5%	(43)	17.84%
Sample Analyzed	**189**	78.43%

The main source of the information collected was the 2010 consolidated financial statements and, in particular, we collected mandatory disclosure concerning the recognition and measurement of intangible assets. The disclosure collected refers to the mandatory disclosure of IFRS 3 *Business combinations*, IAS 36 *Impairment of Assets* and IAS 38 *Intangible Assets*. Overall, the total score was 141, all the information was present in the notes of the consolidated financial statements. The 141 items (Table 7) were defined on the basis of the KPMG disclosure checklist (KPMG, 2011). Thus, we have hand collected 26,649 items from the notes on the 189 groups analyzed.

Table 7

Items identified for analysis.

Standards	Items suggested by KPMG disclosure checklist	Final index	Paragraphs
IAS 36	46	46	126-135
IAS 38	30	30	118-124

IFRS 3	65	65	B64-B67
Total	141	141	

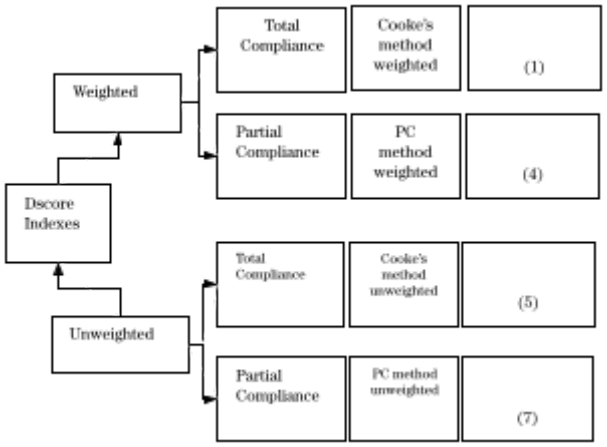
As done by other author (Tsalavoutas 2011), to ensure the reliability of the research instrument, the author and two independent researchers scored 10 randomly selected companies. Then the findings of the three researchers were compared. Since the final research instrument had been agreed on by all the investigators, differences in the compliance scores between the investigators were not significant.

3.2 Compliance scores configurations.

As stated in the literature review, due to the different Dscore configurations used by the main studies on the topic, and in order to prevent the analysis from being influenced by the Dscore configuration used, this paper calculates four Dscore configurations, as illustrated in Table 8, that are described below.[1]

Table 8

Configurations of Dscore indexes.



The first Dscore model attributes one point to all the items. The formula is the following:

$$Tot\ Dscore_{we_j} = \frac{\sum_{i=1}^{n} a_i d_i}{\sum_{i=1}^{n} x_i}$$

Where:

$Tot\ Dscore_{we\,j}$ = Total Dscore weighted for the company j

i = item analyzed

j = company analyzed

d_i = 1 if the item i is disclosed; 0 if the item i is not disclosed

x_i = 1 if the item i is relevant; 0 if the item i is not relevant

a_i = weight attributed to each item i

The weight of each item (a_i) is defined as follows:

$$a_i = 1 - \frac{\sum_{j=1}^{m} d_j}{\sum_{j=1}^{m} x_j}$$

Where:

i = item analyzed

j = company analyzed

d_j = 1 if the item i of the company j is disclosed 0; if the item i of the company j is not disclosed

x_j = 1 if the item i of the company j is relevant; 0 if the item i of the company j is not relevant

The second model of Dscore is based on the Partial Compliance approach that calculates a specific Dscore for each standard's mandatory disclosure requirement ($Dscore_{we\,j\,z}$). The formula is the following:

$$Dscore_{we\,j\,z} = \frac{\sum_{i=1}^{n} a_i d_i}{\sum_{i=1}^{n} x_i} \quad (3)$$

Where:

i = item analyzed

j = company analyzed

a_i = weight attributed to each item i

d_i = 1 if the item i is disclosed; 0 if the item i is not disclosed

x_i = 1 if the item i is relevant; 0 if the item i is not relevant

The weight of each item i is determined as in the first model.

Thus, the final formula is the following:

$$PC.Dscore_{we,j} = \frac{\sum_{z=1}^{k} Dscore_{we\,j\,z}}{k} \quad (4)$$

Where k is the total number of standards analyzed.

The third and fourth model of Dscore are based on the unweighted approach.

The third configuration of Dscore is characterized by the total sum of the items reported by each company. The formula is the following:

$$Tot\ Dscore_{unwe_j} = \frac{\sum_{i=1}^{n} d_i}{\sum_{i=1}^{n} x_i} \quad (5)$$

The fourth model of Dscore is based on the Partial Compliance Approach without weighing every item. The formula of Dscore for each Standard's mandatory disclosure requirement is following.

$$Dscore_{unwe\,j\,z} = \frac{\sum_{i=1}^{n} d_i}{\sum_{i=1}^{n} x_i} \quad (6)$$

The final formula of Partial compliance unweighted disclosure index for each company ($PC\ method_{unwe_j}$) is:

$$PC.Dscore_{unwe,j} = \frac{\sum_{z=1}^{k} Dscore_{unwe\,j\,z}}{k} \quad (7)$$

3.3 Measurement of the variables.

The descriptive statistics of the variable used are reported in Table 9.

[1] For a thorough analysis of the different formulas, see the Appendix.

Table 9

Independent variables and descriptive statistics.

Item	$\frac{Intangible}{Asset}$	Imp.IA	Ln(MktCap)	$\frac{Net\ Sales}{Employees}$	ROA	ROS	INC.FE.REV	DEB.COS.	SECTOR	AUDIT
Variable	Weight of intangible assets on investment	Impairment of intangible assets	Log of Market capitalization	Revenues per capita	$\frac{Income\ before\ taxes}{Asset}$	$\frac{EBIT}{Net\ Sales}$	Weight of Financial costs on Net Sales	Financial costs on financial liabilities	Industrial/No industrial	Big four/No big four auditing firm
Type of Variable	Numerical Control Variable	Dummy	Numerical	Numerical	Numerical	Numerical	Numerical	Numerical	Dummy	Dummy
Classification of Variable	Intangible assets weight variables	Intangible assets weight variables	Firm size variables	Firm size variables	Performance Variables	Performance Variables	Financial interest Variables	Financial interests Variables	Market Variables	Market Variables
Source of data	Financial Statements and AIDA Database	Financial Statements and AIDA Database	Borsa Italiana (Italian Stock Exchange)	Financial Statements and AIDA Database	Financial Statements and AIDA Database	Financial Statements and AIDA Database	Financial Statement and AIDA Database	Financial Statement and AIDA Database	Borsa Italiana (Italian Stock Exchange)	Financial Statements and AIDA Database
N. of groups	189	189	189	189	189	189	189	189	189	189
Missing	0	0	0	0	0	0	0	0	0	0
Mean	.2105	–	12.5461	.5083	.0164	.0551	.0409	.0481	–	–
Median	.1400	–	12.4368	.2599	.0123	.0601	.0133	.0318	–	–
Std. Deviation	.1948	–	2.0103	.9679	.05308	.2426	.0983	.1149	–	–
Skewness	.969	–	.267	6.431	-.348	-5.021	6.962	10.164	–	–
Curtosi	-.126	–	-.323	52.583	4.389	46.540	61.583	116.457	–	–
Min	.0013	,00	6.9100	.0614	-.21	-2.25	.00	,00	,00	,00
Max	.7445	1,00	18.0963	9.840	.24	.74	1.03	1.42	1,00	1,00

The independent variables have been divided into five typologies: intangible assets weight variables, firm size variables, performance variables, financial interests variables and market variables.

The first category is intangible assets weight variable: the "weight of intangible assets on total assets" and the "recognition of an impairment loss of intangible assets". The latter is defined as a dummy variable and takes on the value of 1 for the groups that wrote down the intangible assets in 2010, and takes on the value of 0 for groups that did not do so. As can be seen in the descriptive statistics, the weight of the intangible assets is important in the annual reports under examination, resulting in an average weight of 21.05% with a maximum value of 74%. Moreover, it can be observed that the independent variable "weight of intangible assets on investment" has a positive skewness, the distribution is platykurtic (downwards) and the frequency distribution approximates the normal distribution.

The second category of independent variables is defined as "Firm size variables" and it includes "ln(MktCap)" and "Revenue per capita". Market capitalization, for construction, is always positive but its amount varies considerably. For these reasons, as in previous studies, we have applied the logarithmic transformation. We can see, in fact, that ln(MktCap) has a lower variability and the mean (equal to 12.54) and the median (12.43) are similar. Also "Revenues per capita" is always positive; the distribution is skewness to the left and leptokurtic.

"Performance variables" are the third category, which includes "ROA" and "ROS". The average of ROA is equal to 1.64% and the median value is 1.23%. These results show a lower dispersion of values around the mean. The minimum value is negative and equal to -21% while the maximum value is equal to 24%. The same considerations apply to the ROS. The mean is equal to 5.51% and the median is equal to 6.01%. The distribution of ROS is skewness to the right and leptokurtic.

The fourth category is defined as "financial interests variables" and it includes the percentage of financial costs on sales and the Return On Debts (ROD – interests on net financial debts). The percentage of the interest on revenues has an average of 4.09% and a maximum value of 103%. However the median value is 1.33%. This independent variable is characterized by the strong tendency to be high (a leptokurtic variable with a kurtosis value of 61.58) and a high positive asymmetry, with a positive skewness (skewness to the left). The interests on financial liabilities (or ROD) has a mean of 4.81% and a median of 3.18%. The distribution is skewness to the left and leptokurtic

The last category of independent variables is the "Market variable" and includes the "Sector" and "Audit" variables which are both dummy variables. The sector takes on the value of 1 when the group belongs to the non-financial sector and 0 when it belongs to the financial one. The audit value takes on the value of 1 when the company is audited by one of the big four and 0 if this is not the case.

The Dscore dependent variable has also been the object of a descriptive statistic in order to verify its behavior. The findings are illustrated in Table 10.

Table 10

Descriptive statistics of disclosure compliance level

Mandatory Disclosure Compliance Level								
Disclosure Compliance Level	PC method unweighted		PC method weighted		Cooke's method unweighted		Cooke's method weighted	
(%)	No	%	No	%	No	%	No	%
Between 90 and 100	3	1.59	-	-	3	1.59	-	-
Between 80 and 89	55	29.10	-	-	47	24.87	-	-
Between 70 and 79	63	33.33	-	-	57	30.16	-	-

Between 60 and 69	54	28.57	4	2.12	30	15.87	4	2.12
Between 50 and 59	9	4.76	17	8.99	13	6.88	10	5.30
Less than 50	5	2.65	168	88.89	39	20.63	175	92.58
Total	189	100.00	189	100.00	189	100.00	189	100.00
Missing	0		0		0		0	
Mean	.7281		.3496		.6738		.3502	
Median	.7417		.3412		.7273		.3507	
Std. Deviation	.09464		.11108		.16697		.11035	
Skewness	-.574		.417		-.788		.121	
Curtosi	.173		.498		-.577		.145	
Minimun	.47		.06		.30		.06	
Maximun	.94		.70		.92		.67	

Independently from the Dscore configuration, the table shows a lack of compliance with IFRS-mandatory disclosure of the intangible assets, consistently with many previous studies (Street & Gray 2001; Street & Bryant 2000; Galani, Alexandridis & Stavropoulos 2011; Al Mutawaa & Hewaidy 2010; Al-shammari, Brown & Tarca 2008). However, there are significant differences in these findings according to the Dscore configuration, especially in the distinction between the "weighted index" and the "unweighted" one. The range of oscillation of the Dscore, in the different configurations, goes from 6% to 94% with an average value of 72% when there is the "unweighted PC method" and of 67% when there is the "unweighted Cooke's method". On the other hand, when there is a "weighted Dscore", in the different configurations the range is from 6% to 70%, with an average value of 35% with the PC method and 35% with Cooke's method. It is noticeable that with the "Unweighted Dscore PC method" the median is 74% and 73% with the "Unweighted Cooke's method". Hence it is clear that even though the information is mandatory, many groups do not disclose the items required by the IFRSs. Irrespective of Dscore configuration used, findings show that the subjectivity allowed by IFRSs is broad.

The median falls even further if the weighted index approach is adopted. The median has a value of 34.12% with the "weighted PC method" and 35.07% if the "weighted Cooke's method" is used. This paper employs all the above mentioned Dscore index configurations, in order to avoid the inherent restraints of the two different approaches (the PC method and Cooke's method) and the two different indicator configurations (weighted and unweighted). Moreover, in this way it is possible to prevent the scenario whereby the identification of the determinants of the model is influenced by the choice of the approach rather than by the explicative capacity of the dependent variable.

3.4 Methodology

The methodology used to assess the determinants of the compliance with mandatory disclosure is based on the following OLS regression model consistent with the main literature review (Cerf 1961; Stanga 1976; McNally, Eng & Hasseldine 1982; Chow & Wong-Boren 1987; Wallace 1987; Cooke 1991; Cooke 1992; Botosan 1997; Depoers 2000; (8) & Street 2003):

$$Dscore\_Int\_Ass_j = \alpha + \beta_1\left(\frac{Intangible}{Asset}\right)_j + \beta_2 Imp.IA_j + \beta_3 ln(MktCap)_j + \beta_4\left(\frac{Net\ Sales}{Employees}\right)_j + \beta_5 ROA_j + \beta_6 ROS_j + \beta_7 Inc.Fe.Rev_j + \beta_8 Deb.Cos_j + \beta_9 Sector_j + \beta_{10} Audit_j + \varepsilon_j$$

Where:

Intangible/Asset	=	Weight of intangible assets on total assets
Imp. IA	=	Impairment loss of goodwill
Ln(MktCap)	=	Natural logarithm of market capitalization on 31st December 2010
Net Sales/Employees	=	Pro-capita revenue
ROA	=	Net revenue on Total assets
ROS	=	Ebit on revenues
Inc.Fe.Rev.	=	Financial costs on revenue
Deb.Cos.	=	Financial costs on financial liabilities
Sector	=	ICB Sector
Audit	=	Audit firm

In addition, we transformed the dependent variable "n" as the log of Dscore. The log of the dependent variable reduces the asymmetry of the variables (Al-shammari, Brown & Tarca 2008; Al-Shiab 2003; Incausti 1997; Makhija & Patton 2004; Tsalavoutas 2011; Ahmed 1996; Ahmed & Nicholls 1994).

4. Results

4.1 Assumption of the OLS regression model

In order to show the applicability of the OLS model to the dataset that has been proposed in the paper and, consequently, to create an appropriate estimator of the regression coefficients β_i, the following main assumptions of the OLS model can be made. The first assumption, which is implicit in the OLS model, is that there is a lack of perfect multicollinearity. In other words, there should be no considerable correlations between the independent variables used in the model. The presence of multicollinearity in the model creates distortion both in the regression parameters and in the standard error. There are three main diagnostics. In order to verify the presence of multicollinearity between the independent variables of the models we used the Pearson correlation (Table 11).

Table 11

Correlation.

Variables	*Item*	$\frac{Intangible}{Asset}$	*Imp.IA*	*Ln(MktCap)*	$\frac{Net\ Sales}{Employees}$	*ROA*	*ROS*	*INC.FE.REV*	*DEB.COS.*	*SECTOR*	*AUDIT*
$\frac{Intangible}{Asset}$	Pearson Correlation	1									
	Sig. (2-tailed)										
	N	189									
Imp.IA	Pearson Correlation	.143	1								
	Sig. (2-tailed)	.055									
	N	189	189								
Ln(Mkt Cap)	Pearson Correlation	.042	.107	1							
	Sig. (2-tailed)	.572	.151								
	N	189	189	189							
$\frac{Net\ Sales}{Employees}$	Pearson Correlation	-.144	.185*	.188*	1						
	Sig. (2-tailed)	.054	.013	.012							
	N	189	189	189	189						
ROA	Pearson Correlation	-.013	-.188*	.424**	.016	1					
	Sig. (2-tailed)	.867	.011	.000	.833						
	N	189	189	189	189	189					
ROS	Pearson Correlation	.151*	.001	.310**	.013	.357**	1				
	Sig. (2-tailed)	.043	.990	.000	.859	.000					
	N	189	189	189	189	189	189				
INC.FE.REV	Pearson Correlation	-.108	-.017	.017	-.064	-.119	-.370**	1			
	Sig. (2-tailed)	.147	.818	.816	.397	.111	.000				
	N	189	189	189	189	189	189	189			
DEB. COS.	Pearson Correlation	.004	.119	.114	-.011	.055	-.008	-.010	1		
	Sig. (2-tailed)	.959	.112	.127	.878	.467	.910	.894			
	N	189	189	189	189	189	189	189	189		
Sector	Pearson Correlation	.409**	.097	-.126	-.183*	.091	.010	-.401**	.025	1	
	Sig. (2-tailed)	.000	.195	.091	.014	.225	.897	.000	.742		
	N	189	189	189	189	189	189	189	189	189	
Audit	Pearson Correlation	.082	-.061	.328**	.108	.160*	.057	.064	-.039	-.074	1
	Sig. (2-tailed)	.272	.417	.000	.150	.032	.450	.396	.600	.323	
	N	189	189	189	189	189	189	189	189	189	189

***. Correlation is significant at the 0.01 level (2-tailed).*

**. Correlation is significant at the 0.05 level (2-tailed).*

Table 11 shows that there are no significant correlations between the variables analyzed. Therefore it can be safely concluded that the model being examined does not have multicollinearity, and, consequently, the interpretation of the regression parameters holds true and there is no inflation on the standard error. Having established the fact that multicollinearity is not present among the independent variables, another deduction of the OLS model is demonstrated, which is the lack of heteroscedasticity (A3).

This deduction shows that:

$$A3: \text{Var}(\varepsilon_i) = \sigma^2 \text{ with } i = 1,2, \ldots, n. \quad (9)$$

Where: $\sigma^2 = Variance$

This conclusion is necessary for the inferential studies and, as can be seen from the condition described above, consists of the assumption that the error variance is constant for all the observations. This is called the assumption of homoscedasticity. In order to prove the absence/presence of heteroscedasticity, the model has been subjected to heteroscedasticity by means of the With test. The results of the test show an R^2 equal to .0798 with a pvalue referred to the "Significance level of Chi-square df=P (H0:homoscedasticity)" equal to .6416. As the pvalue obtained is greater than .05 the hypothesis of homoscedasticity must be accepted. Therefore, it can be concluded that the model is not subject to heteroscedasticity. Furthermore, any outlier and leverage points can be identified (Table 12).

Table 12

Residual statistics.

Item	PC method unweighted			PC method weighted			Cooke's method unweighted			Cooke's method weighted			
	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	N
Predicted value	.3403	1.706	1.031	-1.2878	.0887	-.665	-.558	1.628	.8011	-1.21	.0292	-.669	189
Std. Predicted value	-3.184	3.106	.000	-2.309	2.799	.000	-4.46	2.718	.000	-2.30	2.975	.000	189
Standard Error of Predicted value	.056	.395	.119	.057	.401	.121	.091	.637	.192	.061	.425	.128	189
Adjusted Predicted value	-.2863	1.677	1.029	-1.4070	.0807	-.664	-.486	1.729	.8042	-1.50	.0271	-.663	189
Residual	-1.1141	1.229	.0000	-1.6720	1.023	.0000	-1.73	1.751	.0000	-1.69	1.474	.0000	189
Std. residual	-2.386	2.632	.000	-3.526	2.159	.000	-2.29	2.324	.000	-3.37	2.930	.000	189
Stud. Residual	-2.441	2.713	.001	-3.788	2.237	-.001	-2.35	2.408	-.002	-3.62	3.036	-.005	189
Deleted residual	-1.1657	1.305	.0018	-1.9290	1.099	-.000	-1.81	1.879	-.003	-1.95	1.583	-.006	189
Stud. Deleted residual	-2.479	2.767	.001	-3.954	2.266	-.002	-2.38	2.444	-.003	-3.77	3.116	-.006	189
Mahal. Distance	1.576	124.7	12.92	1.576	124.7	12.92	1.576	124.7	12.92	1.576	124.7	12.92	189
Cook's Distance	.000	.274	.009	.000	.224	.007	.000	.075	.006	.000	.306	.008	189
Centered Leverage Value	.009	.709	.073	,009	.709	.073	.009	.709	.073	.009	.709	.073	189

We can see that there are not significant outlier and leverage points. In particular, Table 12 shows that the leverage

point (from .009 to .709 with the mean equal to 0.073) is on average lower than the "cut-off value":

$$Cut - off\ value = 2 * \frac{K+1}{N} = 0.1164 \quad (10)$$

Where:
K is the number of independent variables, equal to 10.
N is the number of entities, equal to 189

There are only 12 cases where the values are higher, and, consequently, they are abnormal values in the independent variables. With reference to the presence of outlier in the dependent variable, we have verified that the "standardized residual" has 95% of the data in the range $[-1.96, +1.96]$ or, alternatively, 99% of the data in the range $[-2.578, +2.578]$. The four configurations of unweighted Dscores have the "standardized residual" in the range $[-2.578, +2.578]$ in all the cases. Instead, in the case of weighted Dscores, only one value is not included in the significance range and for this reason is neglected.

To show the absence of outlier in the independent and dependent variable we compared the Mahalanobis distance and chi-squared (X_k^2) with K degrees of freedom. Only 12 observations are higher than X_k^2 (that is equal to 22.36). Thus these results show the absence of significant outlier and leverage points, except for the above-mentioned cases that are insignificant values. Having demonstrated the assumptions at the basis of the application of the OLS model to the dataset which is the subject of this paper, the table shows the output obtained by the OLS regression model.

4.2. Regression results.

Table 13 reports the results of our research.

Table 13
Regression results.

		PC method unweighted	PC method weighted	Cooke's method unweighted	Cooke's method weighted
Variables		Coefficient	Coefficient	Coefficient	Coefficient
		β_i	β_i	β_i	β_i
α	(Costant)				
β_1	Int/Asset	.036	.052	-.111	.036
β_2	Imp.IA	.030*	.041**	-.045	.023
β_3	Ln(MktCap)	.003	.011***	-.014**	.012***
β_4	NetSales/Employees	-.008	-.016**	.002	-.016**
β_5	ROA	-.056	-.140	-.312	-.062
β_6	ROS	-.041	-.038	-.051	-.035
β_7	INC.FE.REV	-.282***	-.254**	-.235*	-.209**
β_8	Deb.Cos	.047	.027	.206**	.018
β_9	Sector	-.082***	-.117***	-.057	-.105***
β_{10}	Audit	.061*	.062***	.043	.049*
	F	3.074***	4.799***	2.747***	3.560***
R^2		.154	.221	.140	.174
	N	189	189	189	189

* Significant p < 0.10 (two-tailed)
** Significant p < 0.05 (two-tailed)
*** Significant p < 0.01 (two-tailed)

In our analysis we used four different configurations of Dscore and the same independent variables. As can be seen in Table 13, R^2 is between the interval $[.140, .221]$ which is an acceptable value especially when taking into account the nature of the values of the dependent variables (subjective) and the lack of studies referring to the compliance with the intangible assets mandatory disclosure in Italy. Table 13 shows that the intangible assets F test of the model is in the interval $[2.747, 4.799]$; the p-value (sig.) is lower than the threshold of .001 in all cases; therefore the hypothesis that all the parameters are not significant is rejected, and the model, in its entirety, is significant. On the whole, the findings show that the identification of the independent variables which have the ability to impact on the level of intangible assets disclosure is influenced by which configuration of the Dscore index is used.

Where the measurement of the level of disclosure is carried out for each standard (IAS 36, IAS 38 and IFRS 3) and no weight is attributed to each item (Unweighted PC method), there are four independent variables which can influence the compliance with mandatory disclosure: the percentage of the financial costs on revenues, the presence of an impairment loss, the sector and the audit firm. The independent variable that has the greatest influence on the level of disclosure is that of the percentage of financial costs on revenues. As illustrated in Table 13, there is a considerable ($p<0.01$) and negative correlation (-.282). This is an interesting result, with particular reference to the Italian context. Groups where the financial costs percentage on revenues is more significant are less compliant with the mandatory disclosure analyzed in their annual reports compared to firms where the impact is lower. This variable is also important because is the only independent variable that is relevant in all the Dscore models used. As illustrated in previous paragraphs, the main provider of funds to the Italian companies is the banking system: when the impact of financial costs on revenues is higher, the company tends to provide a lower level of disclosure, even if the amount of intangible assets is relevant (in our sample only companies with intangible assets on total assets higher than 5% are considered). In the Italian context, the different "main users" (banks versus investors) lead to a different compliance with intangible assets mandatory disclosure. Thus, the results suggest that it would be suitable to reduce the preparers' subjectivity identifying the mandatory information in a "strict sense". Regarding the industry sector, a highly significant influence is present ($p<0.01$) and it is negative (B=-.082). This means that non-financial firms are less likely to provide the mandatory information on the intangible assets compared to firms belonging to the financial sector. This result is quite interesting since the weight of intangible assets on total assets for financial companies is lower than the non-financial companies' one. The

reason for a higher level of compliance can be found in the fact that Italian financial institutions are requested by the Bank of Italy to provide specific tables in the notes. Subjectivity left to preparers is reduced and they have to disclose all the information, both those they consider relevant and those they consider not relevant. The audit firm has a significant ($p<0.1$) positive correlation (B=.061) on the compliance with intangible assets mandatory disclosure. The groups which are being audited by one of the big four audit firms are more likely to provide the mandatory information on the intangible assets compared to the others. In fact, it has been proven that in order to protect their reputation, the high profile audit firms oblige their clients to maintain high standards regarding the compliance of the disclosure (Chalmers & Godfrey., 2004). The audit firms also expect their clients to respect the disclosure established by the more complex standards (Dumontier & Raffournier 1998).

Using the "weighted PC method" Dscore instead of the "Unweighted PC method" Dscore leads to different results. In fact, the market capitalization natural logarithm and revenue pro-capita affect compliance with mandatory disclosure. These results are also confirmed by the other Dscore configurations. In particular, the market capitalization natural logarithm influences significantly ($p<0.01$) and positively (B=.011) on Dscore. This means that, holding everything else constant, a 1% increase in the market capitalization is associated, on average, with a 0.011% increase in the compliance index. Revenue pro-capita influences significantly ($p<0.05$) but negatively (B=.-016) the compliance with intangible assets mandatory disclosure. This result show that as revenue pro-capita increases companies provide less disclosure about intangible assets. The "firm size variables" significantly affect the level of disclosure only with the PC method weighted, since the same Dscore but in the unweighted configuration does not provide the same results.

The Cooke's method weighted and unweighted confirms the same result for the market capitalization. Attributing a weight to the different items analyzed contributes to the identification of the variable "size" as a variable affecting significantly the compliance index. This result is not confirmed by the PC method unweighted. This means that for the variable "size" the choice of the configuration Dscore is very important. The performance variable (ROS in particular) loses significance if the "PC method weighted" is used. In fact, under "PC method weighted" no independent performance variable is able to influence the disclosure index. "Cooke's method" Dscores, both weighted and unweighted, confirm this result also. In the case of performance variable, their significance seems to be mainly affected by the Dscore configurations used, instead of by the attribution of weights to the single items analyzed. The impact of the financial costs on revenue, industry sector and the type of audit firm are confirmed also using the PC method unweighted.

Where the Dscores are calculated using the Cooke's method, whether they be weighted or unweighted, there is a decrease in the number of independent variables which can explain the variability of disclosure index. Depending on whether or not a weighted or unweighted Dscore is used, there are significant variables in the PC method that are not present or, on the contrary, there are insignificant variables that become so with a Partial Compliance Approach. The industry sector and the type of audit firm, which are significant variables in the Dscore based on the Partial Compliance, are only significant if an index calculated with the Cooke's method is used, attributing a weight to each item. Also in this case, besides the choice of the right Dscore configuration, the researcher's decision to attribute or not to attribute a weight to the items analyzed is very important. However, the amount of return on debts (ROD) becomes significant ($p<0.05$), which has a considerable and positive effect on the compliance with the mandatory disclosure. The variable "Weight of intangible assets on total assets" is worth an in-depth analysis. Table 13 shows that the weight of intangible assets on total assets is not relevant, irrespective of Dscore configurations used. This result seems not consistent with IFRSs' Conceptual Framework requirements. In fact, the more relevant and significant an item is the more compliant disclosure about its recognition and measurement should be, in particular mandatory disclosure. The reason for this result is ascribable to the sample. As described above, all groups with intangible assets lower than 5% of total assets have been excluded. Therefore, in all the companies of the sample, intangible assets are relevant in comparison with total assets. Then, it is obvious why this variable does not affect the disclosure compliance. The only independent variable that is significant and that has a negative impact on the level of disclosure is the percentage of the financial costs on revenues. In conclusion, we can state that the only variable on which the compliance with mandatory disclosure on intangible assets depends is that of the impact of financial costs on revenues. In all the other cases, the Dscore method of calculation may have a crucial role regarding the degree of importance of the independent variables used in the model.

5. Conclusions

Disclosure of the financial statements is a controversial topic: on the one hand, companies do not comply with IFRS mandatory disclosure – as demonstrated in this paper –, but on the other hand, the increase in IFRS disclosure requirements has led to a growth in the notes. In 2012, EFRAG published a Discussion Paper (EFRAG, 2012) whose objective is to "ensure that all and only relevant information is disclosed in an appropriate manner, so that detailed information does not obscure relevant information in the notes to the financial statements". In 2013 the IASB started a project, called "Disclosure Initiative" (made up of a number of implementation and research projects) in order to improve the disclosure usefulness. Our research contributes to this debate by analyzing the level of compliance with intangible assets mandatory disclosure of the Italian listed companies. The examined sample is made up of the groups listed on the Italian Stock Exchanges and belonging to the FTSE All-Share index on 31st December 2010. We determined four Dscore indexes in order to evaluate how much Italian listed companies comply with these requirements. Our findings reveal a low compliance with the intangible asset mandatory disclosure (the Dscores mean in the different configurations goes from a minimum value of .3496 to a maximum value of .7417). In order to interpret these results, it is necessary to highlight that we excluded from the sample the groups where the weight of the intangible assets on total assets is lower than 5%. Therefore, for all the companies of our sample, intangible assets are relevant: nonetheless, they do not comply with mandatory disclosure. This means that preparers have evaluated the relevance of the information and they have decided not to disclose some "mandatory" information because they believe it is not relevant even if the weight of intangible assets is significant. In our opinion, these findings contribute to the current debate on disclosure: maybe there are too many "mandatory" disclosure requirements in the current versions of IFRSs giving the companies too much subjectivity in deciding if they are relevant or not. One possible solution could be to reduce these requirements identifying only the ones that are effectively useful for the users and to make them mandatory in the strict sense.

Our research contributes also to the literature about Dscore configurations. In fact, we used four Dscore configurations: PC method and Cooke's method, both unweighted and weighted. Our findings prove that the level of compliance with intangible asset mandatory disclosure is different according to the various methods used. Moreover, the choices of the different methods and of the weights influence the identification of the significant independent variables. For example, the presence of an impairment loss is positively and significantly correlated to the DScore index only if the PC method is used (both unweighted and weighted) whereas it becomes not significant if the Cooke's method is adopted. Revenue pro-capita is significantly and negatively correlated to the DScore index only if the methods used are weighted, whereas it is not significant if the same configurations are unweighted. These results are important for researchers as well as for standard setters: the conclusion of the various papers published are enormously influenced by the methodology used and this also affects the validity of the results. Besides, another contribution of our research is the identification of an independent variable that is always significant, irrespective of the methods used. In fact, the independent variable that always affects the compliance with intangible assets mandatory disclosure in the Italian market is that of the impact of financial costs on revenues. Firms where the interests impact on the revenue more significantly are less likely to share information in their annual reports compared to firms where the impact is lower. This is an interesting result with particular reference to the Italian market, as the Italian groups have a higher leverage than other European groups and one of the main users of the financial statements is the banking system.

The next steps of this research will be to improve the analysis of the compliance with the mandatory disclosure to the entire notes of the financial statements with a comparison to the other European countries.

APPENDIX

Our research uses four Dscore configurations, each of which is characterized by different methods of calculation.

The Dscores used were taken from the main existing literature, not necessarily connected to the economic-business field.

The Dscore configurations used are as follows:

- Cooke's method unweighted;
- Cooke's method weighted;
- Partial compliance method unweighted;
- Partial compliance method weighted.

Below are analyzed the method of calculation of the different indices, including the use of examples.

Cooke's method unweighted.

The Cooke's method unweighted is a Dscore index unweighted, where all the information in the notes is equally important and therefore of the same weight.

The Cooke's method unweighted ($Tot\ Dscore_{unwe_j}$) is calculated as follows:

$$Tot\ Dscore_{unwe_j} = \frac{\sum_{i=1}^{n} d_i}{\sum_{i=1}^{n} x_i}$$

Where:

i = item analyzed
j = company analyzed
d_i = 1 if the item i is disclosed; 0 if the item i is not disclosed
x_i = 1 if the item i is relevant; 0 if the item i is not relevant

As can be seen from the formula of the Dscore, the numerator shows the sum of all the items found in the notes in the financial statements of each group, regardless of the individual standard under investigation.

Each piece of information may be disclosed ($d_i = 1$), not disclosed ($d_i = 0$), relevant ($x_i = 1$) or not relevant ($x = 0$).

Through the indication of the attribute "relevant-not relevant information" we avoid penalizing companies that do not provide a specific information since it is not required.

Consider the following example.

Example 1.

The company Alpha applies three IFRS, each of which requires specific items. The analysis reveals the situation shown in the following table.

Standard	Items required	Items relevant	Items shown
IFRS A	2	2	1
IFRS B	6	5	3
IFRS C	10	7	5
TOTAL AMOUNT	18	14	9

If you wanted to calculate the Dscore, regardless of whether each item is relevant (or not), the calculation is as follows:

$$Dscore = \frac{Items\ reported\ in\ the\ notes\ at\ the\ statement}{Items\ requested\ from\ the\ beginning} = \frac{9}{18} = 50\%$$

The Dscore calculated in our research, which takes into account the fact that an information is or is not relevant, is instead the following:

$$Dscore_{Unwe} = \frac{Items\ reported\ in\ the\ notes\ at\ the\ statement}{Relevant\ items} = \frac{9}{14} = 64,28\%$$

Cooke's method weighted.

The Cooke's method weighted ($Tot\ Dscore_{we_j}$) is similar to the Cooke's method unweighted by its calculation method, with the addition of a weight for each item.

The formula is as follows:

$$Tot\ Dscore_{we_j} = \frac{\sum_{i=1}^{n} a_i d_i}{\sum_{i=1}^{n} x_i}$$

Where:

i = item analyzed
j = company analyzed
d_i = 1 if the item i is disclosed; 0 if the item i is not disclosed
x_i = 1 if the item i is relevant; 0 if the item i is not relevant
a_i = weight attributed to each item i

With regard to the attribution of a weight to each item, different methodologies are used in literature (Stanga 1976; Incausti 1997; Ali, Ahmed & Henry 2004).

The main limitation associated with the identification of a weight for each item lies in the discretion inherent in the attribution of the weight itself.

To work around this limit, in our research we use the approach known as Saidin Index appropriately adapted.

Under this method, the weights assigned to each piece of

information do not depend on the subjective will of the researcher, but on the importance attached by the companies analyzed.

The formula for calculating the weight a_i is the following:

$$a_i = 1 - \frac{\sum_{j=1}^{m} d_j}{\sum_{j=1}^{m} x_j}$$

Where:

i	=	item analyzed
j	=	company analyzed
d_j	=	1 if the item i of the company j is disclosed; 0 if the item i of the company j is not disclosed
x_j	=	1 if the item i of the company j is relevant; 0 if the item i of the company j is not relevant

In other words, the weight of each information is calculated as follows:

$$a_i = 1 - \frac{Number\ of\ times\ in\ which\ the\ information\ is\ reported\ by\ the\ analyzed\ groups}{Number\ of\ times\ in\ which\ the\ information\ should\ have\ been\ reported}$$

In this way it determines the ability of each piece of information to be reported in the notes for the financial statements of the groups analyzed.

The weight value of each information will have a value between 0 and 1. It will be 0 if the information is reported by all groups subject to analysis, 1 otherwise.

Example 2

Consider the same values given in Example 1 with regards to the items analyzed, assuming the presence of three groups subject to analysis.

Each information is reported by the groups under analysis with the frequency reported in the following table.

Items n.1-2-3-4-5	2 groups out of 3 - group x and group y
Items n. 6-7-8-9	1 groups out of 3 - group x
Items n. 10-11-12-13-14	3 groups out of 3 - group x, group y, group z

The weight on information n. 6 for group x is the following:

$$a_i = 1 - \frac{1}{3} = 0,667$$

The weight on information n. 2 for group y is the following:

$$a_i = 1 - \frac{2}{3} = 0,334$$

Partial Compliance method unweighted

The partial compliance method finds its first application in the research conducted by Al-Shiab in 2003.

This Dscore assumes that the number of required information varies from principle to principle and, consequently, it is necessary to assess compliance by individual principle and not for individual items.

To obtain this result it is necessary to calculate the level of compliance by individual IFRS, and thereafter relate the Dscore obtained for each individual principle to the number of IFRS object of analysis.

To calculate the Dscore per single standard the formula is as follows:

$$Dscore_{unwe\,j\,z} = \frac{\sum_{i=1}^{n} d_i}{\sum_{i=1}^{n} x_i}$$

Where:

i	=	item analyzed
j	=	company analyzed
d_i	=	1 if the item i is disclosed; 0 if the item i is not disclosed
x_i	=	1 if the item i is relevant; 0 if the item i is not relevant

The final formula of Partial compliance unweighted disclosure index for each company ($PC\ method_{unwe_j}$) is:

$$PC.Dscore_{unwe,\,j} = \frac{\sum_{z=1}^{k} Dscore_{unwe\,z}}{k}$$

Where k is the total number of standards analyzed

With this method, the total Dscore for each entity is equal to the average of the information provided for each principle under analysis.

The index now outlined may lead to very different results than Cooke's method.

Consider the following example.

Example 3

We use the same data as in example 1

Standard	*Items required*	*Items relevant*	*Items shown*
IFRS A	2	2	1
IFRS B	6	5	3
IFRS C	10	7	5
TOTAL AMOUNT	18	14	9

The calculation of the PC method unweighted is made as reported below.

$$Dscore_{IFRS\,A} = \frac{1}{2} = 50\%$$

$$Dscore_{IFRS\,B} = \frac{3}{5} = 60\%$$

$$Dscore_{IFRS\,C} = \frac{5}{7} = 71\%$$

The overall Dscore index is therefore the following:

$$PC\ method_{unwe} = \frac{0,5+0,6+0,71}{3} = 60.47\%$$

Remember that with the same values the Dscore calculated with Cooke's method amounts to 52.94%.

Partial compliance method weighted

The partial compliance method weighted has the same premise and the same logic as the PC method unweighted.

What sets it apart is that in the calculation of the Dscore of the individual IFRS analyzed the weight of each item is considered.

The formula for the calculation of the Dscore for the single standard ($Dscore_{we\,z}$) is the following:

$$Dscore_{we\,j\,z} = \frac{\sum_{i=1}^{n} a_i d_i}{\sum_{i=1}^{n} x_i}$$

Where:

i	=	item analyzed
j	=	company analyzed
a_i	=	weight attributed to each item i
d_i	=	1 if the item i is disclosed; 0 if the item i is not disclosed
x_i	=	1 if the item i is relevant; 0 if the item i is not relevant

The formula for calculating the weight a_i is the following:

$$a_i = 1 - \frac{\sum_{j=1}^{m} d_j}{\sum_{j=1}^{m} x_j}$$

Where:

i	=	item analyzed
j	=	company analyzed
d_j	=	1 if the item i of the company j is disclosed; 0 if the item i of the company j is not disclosed
x_j	=	1 if the item i of the company j is relevant; 0 if the item i of the company j is not relevant

Thus, the final formula is the following [2]:

$$PC.Dscore_{we,j} = \frac{\sum_{z=1}^{k} Dscore_{we\,z}}{k}$$

Where k is the total number of standards analyzed.

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[2] For an example on how to determine the weight to be attributed to each item, see the Tot Dscorewej

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