



**The Influence of Voluntary Disclosure about Intangible Capital on Market Assessment of Intangible Assets Reported in French Financial Statement: The role Played by IFRS**

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## **The Influence of Voluntary Disclosure about Intangible Capital on Market Assessment of Intangible Assets Reported in French Financial Statement: The role Played by IFRS**

This study aims to investigate complementarities between mandatory and voluntary intangible capital disclosure for stock markets. More specifically, the two research questions are: (1) Does web disclosure about intangible capital enhance the value relevance of intangible assets accounted for in French financial statements? (2) What is the role played by IFRS in this matter? Our results are the following. First, it appears that under French GAAP, voluntary reporting about intangible capital allows investors to better assess the value of intangible assets. This suggests that voluntary disclosure improves the ability of markets to assess the existence of unbooked intangible assets, which implies complementarities between mandated and voluntary reporting. Second, the value relevance of voluntary disclosure about intangible capital decreases with IFRS, an accounting referential that provides more detailed information on intangible assets. Finally, unlike the voluntary reporting about clients or innovation, under French GAAP we observe a substitution effect between disclosure on human and intellectual capital and intangible assets accounted for in financial statements, in French GAAP or IFRS.

Key words: IFRS, intangible assets, intangible capital, Web Reporting.

## **Valeur et complémentarité du reporting obligatoire et volontaire sur le capital immatériel des sociétés françaises : Incidence des IFRS**

Cette étude vise à étudier la complémentarité entre le reporting obligatoire et volontaire à propos du capital immatériel pour les marchés boursiers. Les deux questions de recherche sont les suivantes : (1) Les informations volontaires sur le capital immatériel augmentent-elles la capacité des marchés boursiers d'évaluer l'information comptable sur les actifs incorporels ? (2) Le passage aux IFRS a-t-il modifié cette dynamique ? Nos résultats sont les suivants. Premièrement, sous le référentiel comptable français, les actifs incorporels comptabilisés aux états financiers sont valorisés par les marchés boursiers, mais le sont davantage en présence d'un haut niveau de reporting volontaire sur le capital immatériel. Cela donne à penser que le reporting volontaire a un caractère de complémentarité pour les investisseurs en leur fournissant des informations pertinentes dans leur évaluation des actifs incorporels. Pour les investisseurs, le reporting volontaire compenserait pour les actifs incorporels non comptabilisés. Deuxièmement, l'importance du reporting volontaire dans l'évaluation des actifs incorporels par les investisseurs diminue suite au passage aux IFRS. Les normes IFRS permettraient aux marchés boursiers de mieux intégrer l'importance des actifs incorporels dans les cours boursiers. Enfin, contrairement au reporting volontaire portant sur la clientèle ou l'innovation, nous observons un caractère de substitution entre l'information portant sur le capital humain et intellectuel et l'information comptable portant sur les actifs incorporels, en normes françaises ou IFRS.

Mots-clés : Actifs incorporels, capital immatériels, IFRS, Reporting Web.

# The Influence of Voluntary Disclosure about Intangible Capital on Market Assessment of Intangible Assets Reported in French Financial Statement: The role Played by IFRS

## Introduction

The transition to a knowledge-based economy increases the role of intangible capital in the process of creating business value (Holland, 2003). This transition has increased the level of information asymmetry between financial markets participants and managers. In addition, new technologies have brought new business practices and modes of production in which intangible capital is in constant growth (De Montmorillon, 2001). The intangible capital lies in the competence of a firm's human resources, in their creative genius and their ability to build profitable relationships with customers and other business partners. Software, patents, trademarks and customer lists are examples of intangible capital. The value of a firm can hardly be determined without regard to its intangible capital.

Generally, the strict compliance with legal obligations related to financial reporting does not always meet the information needs of investors. Managers generally go beyond disclosure regulations by providing financial and nonfinancial information for which they have more latitude.<sup>1</sup>

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<sup>1</sup> In the U.S., a recent document from the White House, A Framework for Revitalizing American Manufacturing (December 2009), proposes to study the barriers to disclosure of intangible assets in financial statements. It suggests that the SEC and the Departments of

Previous studies document a link between voluntary reporting, the cost of capital, trading volume, the financial analysts' forecasts, and bid/ask spread (see Healy and Palepu [2001] for a comprehensive study on this issue). In this regard, the website, because of its flexibility, accessibility and interactivity, is a privileged platform for voluntary disclosure the various stakeholders. The value relevance for stock markets of the information provided on the website has also been shown in previous studies (e.g. Ettredge *et al.*, 2002, Chang *et al.*, 2008, Cormier *et al.* 2009c).

The ability of traditional financial reporting to properly inform financial markets participants in terms of intangible capital is often questioned (Amir and Lev, 1996 Lev, 1999). In general, since they adhere more to the concept of fair value and are more stringent and detailed than accounting standards they replace, IFRS (International Financial Reporting Standards) should be more informative for stock markets. In that regard, Boulerne and Sahut (2010) show that IFRS allow investors to better integrate intangible assets in the stock market in France.

In this study, we argue that the voluntary reporting on intangible capital may be complementary to information relating to intangible assets recorded in financial statements. This is particularly the case in France where, until 2005, the comparability of accounting information on intangible assets is difficult, given the diversity of choice and recognition criteria of intangible investments offered by

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Treasury and Commerce propose ways to provide investors with better tools to assess the impact of intangible capital on the reliability of financial statements and supporting the efforts of trade associations to adopt an intellectual asset management guidelines and reporting of intangible assets.

French GAAP, in particular between capitalization and expensing (Boulerle Sahut, 2010).

First, this study examines the complementarity for market participants between mandatory reporting and voluntary reporting on intangible assets. In other words, does voluntary reporting on intellectual capital complements financial reporting about intangible assets? Second, the study aims to assess the impact of IFRS on this matter.

To the best of our knowledge, this is the first study to explore the complementarity between mandatory and voluntary reporting about intangible capital and to assess the impact of IFRS on this matter.

Our results are the following. First, intangible assets are valued by the stock market and are more valued in the presence of a high level of voluntary reporting on intangible capital, suggesting complementarity between mandatory reporting and voluntary reporting. Thus, voluntary reporting provides additional information relevant to investors in the valuation of intangible assets. This suggests that voluntary disclosure about intangible capital allows the market to assess the existence of unbooked intangible assets. Second, as expected, the importance of voluntary reporting on the ability of stock markets to evaluate accounting information on intangible assets decreased following the adoption of IFRS. This result suggests that IFRS allow a better integration of intangible assets in the stock market. In this context, the voluntary reporting loses its importance for stock markets. Finally, unlike the voluntary reporting on clients or innovation which

complements intangible assets, it appears that information on the human and intellectual capital is a substitute for financial reporting on intangible assets, both under French GAAP or IFRS.

The paper is organized as follows. Section 2 deals with accounting standards on intangible assets. Section 3 presents the literature review and hypotheses. The method is described in Section 4. Results are discussed in Section 5 while concluding remarks appear in Section 6.

## **2. Accounting standards on intangible assets**

In IFRS referential, intangible assets are covered by IAS 38 and business combinations (goodwill) by IFRS 3. IAS 38 defines an intangible asset as an identifiable non-monetary asset without physical substance. To meet this definition, an intangible asset must be separable, result of contractual rights or other legal rights, those rights are transferable or separable from the entity or from other rights and obligations (IAS 38, § 12).

IAS 38 requires recognition of any intangible expense as an intangible asset if, and only if: a) it is probable that future economic benefits attributable to the asset will flow to the entity b) the cost of the asset can be measured reliably (IAS 38, § 21). An intangible investment must either be expensed or be capitalized. The treatment is not optional. Under IAS 38, an intangible asset arising from

development (or development phase of an internal project) should be recognized if and only if, an entity can demonstrate all of the following: a) the technical feasibility completing the intangible asset to its entry into service or sold b) its intention to complete the intangible asset and use or sell it c) its ability to use or sell intangible assets d) the intangible asset will generate probable future economic benefits. The entity must demonstrate, among other things, the existence of a market for the output of the asset or the intangible asset itself or, in the event that will be used internally, the usefulness of the intangible asset (IAS 38, § 58).

If an investment in intangible capital is the result of a business combination and can not be recorded as an intangible asset separately, it is included in the goodwill at the date of acquisition. Given the restrictive conditions for inclusion of an intangible investment as an asset (identifiable characteristics and control of resources), many intangible investments are expensed (marketing expenses, research expenses, training costs). Although they provide future economic benefits, many intangible investments can not be capitalized unless they are acquired in the context of a business combination. After the initial recognition, IAS 38 specifies that a depreciable intangible asset should be amortized over its useful life according to the consumption of economic benefits of the asset.

In comparison, French GAAP have little development on the criterion for the capitalization of intangible investments and the accounting treatment after their initial recognition. For depreciable assets, the method of depreciation is not strictly

defined and leaves some discretion in the application of accounting rules (Boulerle and Sahut, 2010).

Under IAS 38, the definition of an intangible asset requires that the intangible asset be identifiable to distinguish it from the goodwill in a business combination. This is not the case for French GAAP. Under IFRS 3, goodwill arising in a business combination represents a payment made by the acquirer in anticipation of future economic benefits from assets that can not be individually identified and separately recognized. The accounting treatment of goodwill acquired after its initial recognition complicates matters worse. Under French GAAP, goodwill must be amortized while IFRS 3 and IAS 36 recommend testing for impairment.

The cost of internally generated intangible asset comprises all directly attributable costs necessary to create, produce and prepare the asset for it to be operating in the manner intended by management. Examples of directly attributable costs include: a) costs of materials and services used or consumed in generating the intangible asset; b) the costs of salaries and fringe benefits resulting from the creation of intangible assets, c) fees for registration of a legal right d) amortization of patents and licenses that are used to generate the intangible asset, and e) the interest expense when the firm's accounting methods provide for the capitalization of interest (IAS 38, § 66).

Do not constitute a component of the cost of internally generated intangible asset: a) the marketing expenses, general expenses and other overhead costs unless

these costs can be directly attributed to preparing the asset for its use; b) inefficiencies clearly identified, and initial operating losses incurred before the asset achieves planned performance, and c) the expenditure on training staff to operate the asset (IAS 38, § 67).

Finally, for each class of intangible assets, an entity must include the following information in distinguishing between internally generated intangible assets and other intangible assets: the useful lives are indefinite or finite and, if finite, the length utility or the depreciation rates used; depreciation methods used for intangible assets with finite useful life, the gross carrying amount and any accumulated depreciation (aggregated with accumulated impairment losses) at the opening and closing balances of the period; income statement items for which the amortization of intangible assets are included and a reconciliation of the carrying amount at the beginning and end of the period showing the information required by IAS 38 (IAS 38, § 118).

The question that arises is whether this high level of details in the information required under IFRS, in particular singling out the internally generated intangible assets and other intangible assets may reduce the relevance of voluntary reporting about intangible capital.

### 3. Prior research and hypotheses

#### 3.1 *Financial reporting on intangible capital and stock markets*

Previous studies suggest that investments in intangibles are generally regarded by investors as assets rather than expenses. In the industry of biotechnology, the study by Xu (2006) explores how the R&D strategies developed by firms affect the share price volatility. Specifically, the study examines the impact of drug discovery and diversification of products in development on share price volatility. Xu (2006) focuses on the fact that in the field of biotechnology, the share price is very volatile compared to most other industries, so that the reasons for this volatility is still unknown. The main finding of this study is the significant impact of R&D strategy in terms of drug discovery and diversification of products in development on share price volatility. Firms with more diversified portfolios of products are associated with lower price volatility and lower stock returns. In contrast, firms that have more concentrated drugs portfolios are associated with increased share price volatility and a higher dividend yield.

Hirschey (1982) and Connolly and Hirschey (1984) show that advertising expenditures and R&D are positively related to the stock prices of U.S. firms. Sougiannis (1994) concludes that the increase in R&D leads to larger profits over a period of at least seven years. Lev and Sougiannis (1996) find that equity and earnings are positively associated with stock returns and prices R&D investments

are capitalized. Similarly, Aboody and Lev (1998) show that the costs of software development are positively related to stock prices and future earnings.

Since the capitalization of R&D is for all practical purposes not allowed in the United States, researchers restate the data as if the firm had opted for the capitalization of development expenditures. Therefore, results of these studies should be interpreted with caution because if it was allowed to capitalize R&D, this could have an impact on earnings management and transparency in financial reporting (Boulerle and Sahut, 2010).

However, studies in other contexts than the United States tend to confirm the overall results of U.S. studies. For example, Zhao (2002) reaches similar conclusions from a comparative study of four countries (France, Great Britain, Germany and USA). The relevance of accounting information for stock markets is higher in countries that allow the capitalization of R&D expenditures, the United Kingdom and France.

However, results of studies conducted in the French context seem in conflict with the majority of previous results. Cazavan-Jeny (2004) shows that the intensity of intangible expenditures is not associated with the ratio book-to-market. This result should be interpreted with caution because the sample covers only 63 firms, which may create a selection bias. Furthermore, studies of Cazavan-Jeny and Jeanjean (2005) and Cazavan-Jeny and Jeanjean (2006) reach the same conclusion and show that capitalization of R&D is negatively associated with stock prices and returns. The authors explain these conflicting findings by the fact that the

capitalization of R&D would give a negative signal to investors. This is in contrast with results obtained on North American data. The authors explain these findings by the fact that managers would choose to capitalize R&D for opportunistic reasons or would be unable to distinguish between profitable and non profitable R&D.

Dufour and Zemzem (2005) reached the same conclusion in a study of firms listed on the new French market.

According to Cazavan-Jeny and Jeanjean (2005 and 2006), these results call into question the merits of capitalization of R&D, as recommended by IAS 38, in a country like France where the level of shareholder protection is relatively low compared to the United States.

However, these contradictory results may be due to the presence of endogeneity or selection bias. There is also the possibility that the models suffer from omitted variables, such as voluntary reporting on intangible capital. Indeed, it is surprising that innovation is associated with negative stock returns.

### ***3.2 Voluntary reporting on intangible capital and stock markets***

Previous studies highlight the limitations of traditional models of evaluation in situations where intangible assets are particularly dominant. Using the model of Feltham and Ohlson (1995), Amir and Lev (1996) show the lack of value relevance of accounting data in innovative sectors. The authors propose to incorporate new dimensions, including intangible assets in the traditional models and show that the

assets related to customer and market share are statistically associated with stock prices. Their results also suggest a complementarity between financial and non financial reporting in the sector of high technology.

In the pharmaceutical sector, Barth *et al.* (1998) show that the explanatory power of earnings is higher than equity, so that except for the financial sector where the reverse applies, no significant difference was observed in other sectors.

According to the authors, earnings is the proxy for assets not recognized in the model of Feltham and Ohlson (1995). Finally, the longitudinal study by Lev and Zarowin (1999) show that the relevance of accounting information has declined over the last twenty years, the explanatory power of Ohlson from goes from 92.3% in 1977 to 61.8% 1996. The authors also found an inverse relationship between the relevance of earnings for stock markets and the importance of the development expenditures.

In the resort sector, Ittner and Larcker (1998) show that disclosure of information on the degree of customer satisfaction is positively associated with excess returns over a period of ten days, suggesting that Information is only partially reflected in book values. Moreover, Jones (2007) provides evidence of the capacity of the voluntary reporting of R&D to reduce errors in analysts' forecasts.

According to previous findings, voluntary reporting on the web about the human and intellectual capital is positively associated with earnings multiple (price / earnings) (Cormier *et al.* 2009c) and with lower share price volatility (Cormier *et al.* 2009a). In addition, Cormier *et al.* (2009b) show that voluntary reporting on the

web about customers attracts financial analysts and is associated with lower share price volatility. Finally, Orens *et al.* (2009) shows that reporting on the web about customers, products and intellectual capital is associated with less information asymmetry and a lower cost of capital and debt.

### ***3.3 Hypotheses***

Previous research shows the relevance of intangible assets such as the importance of clientele and innovation for the stock market valuation. This information has traditionally been disclosed voluntarily but IFRS increase requirements on this matter. Prior research suggests a complementarity between financial and nonfinancial information in intangible capital. In addition, IFRS are much more stringent and precise than the French standards on accounting for intangible assets and previous work has shown that intangible assets are more valued according to IFRS than under French GAAP. Therefore, we anticipate that the relative value of voluntary reporting about intangible capital on stock market valuation of intangible assets will decrease under IFRS.

We propose the following two hypotheses:

*H1: Voluntary reporting improves the ability of stock markets to assess accounting information on intangible assets.*

*H2: IFRS reduces the importance of voluntary reporting in the stock market valuation of intangible assets.*

## **4. Method**

### **4.1 Sample**

The initial sample is 74 non-financial firms of the SBF 120 French stock index for the years 2002 and 2010. We initially identified 97 non-financial firms of the SBF 120 in 2002. Of these 23 were merged or delisted for a total of 74 firms. Three firms have no intangible assets, bringing the final sample to 71 firms (142 firm-years). The sample represents on average 55% of the market capitalization of French firms for the period under study. Eight industries are represented in the sample: raw materials; consumer discretionary consumption of commodity consumption, health, industrial, information technology, telecommunications, and utilities.

Voluntary reporting on intangible capital is collected from corporate web sites. The financial data used are those available at the time of data collection on the web, i.e. financial statements available in summer 2002 and spring 2010. Financial data come from the Compustat database.

## 4.2 *Empirical Model*

The basic accounting equation is the basis for several models of stock market valuation (Fetltham and Ohlson, 1995, Amir and Lev, 1996, Collins *et al.*, 1999). A growth factor is usually added to the accounting equation. To this end, we calculate a residual income and expect a positive relationship with stock price. The residual income is calculated by applying a fixed rate of 8% to shareholders' equity for all sample firms.<sup>2</sup> This approach has been used in previous studies (e.g. Bernard, 1995, Ball *et al.*, 2000).

Our empirical model is the following (data from year-end and scaled by the number of shares outstanding):

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<sup>2</sup> Variable discount rates of the European Central Bank are closer to 4% between 1998 and 2008 (ranging from 2% to 4.75%) (Board of Governors, February 2010, Banque de France, Eurosystem).

Market Value =

$$\begin{aligned} & \beta_0 + \beta_1 \text{ Equity adjusted (i.e., less intangible assets)}_{it} + \\ & \beta_2 \text{ Intangible assets}_{it} + \beta_3 \text{ Intangible assets}_{it} * \text{ Web intangible capital}_{it} + \\ & \beta_4 \text{ Residual income}_{it} + \beta_5 \text{ Intangible assets}_{it} * \text{ IFRS}_{it} + \\ & \beta_6 \text{ Intangible assets}_{it} * \text{ Web intangible capital}_{it} * \text{ IFRS}_{it} + \\ & \beta_7 \text{ Web intangible capital}_{it} * \text{ IFRS}_{it} + \beta_8 \text{ Residual income}_{it} * \text{ IFRS}_{it} + \\ & \beta_9 \text{ Web intangible capital}_{it} + \beta_{10} \text{ IFRS}_{it} + \varepsilon \end{aligned}$$

To isolate intangible assets allows for the appreciation of its market value. The interaction term *Intangible assets\*Web intangible capital* captures the ability of voluntary disclosure to improve the assessment by the stock markets of intangible assets accounted for in financial statements. The interaction term *Intangible assets\*Web Intangible capital\*IFRS* captures the impact of IFRS on this matter.

If IFRS, by their increasing requirements for reporting on intangible capital, inform the stock market more than domestic GAAP such as French GAAP, we expect the coefficient on *Web intangible capital* to be positive and the coefficient on the interaction term *Web intangible capital\*IFRS* to be negative. In other words, the voluntary disclosure about intangible capital loses its value as accounting standards are more stringent and more detailed in terms of measurement and disclosure.

In the French context, under French GAAP or IFRS, Boulerne and Sahut (2010) find no difference between the market valuation of goodwill and intangible assets in total. In addition, coefficients on Goodwill are almost similar in French GAAP and in IFRS. Therefore, we focus our analysis on the total amount of intangible assets (available in the Compustat database).<sup>3</sup>

### ***4.3 Measurement of variables and coding instrument***

We combine years 2002 and 2010, years for which we coded the websites of French non-financial firms (SBF120). Voluntary reporting on intangible capital is coded from the websites of sample firms. Only documents in HTML are coded. Most PDF documents (e.g. financial statements, press releases, annual reports, proxy statements) are also published on paper format and, therefore, the voluntary nature of reporting is less certain. Our coding scheme presented in the appendix includes 33 items grouped under three categories: clients, innovation and human & intellectual capital. The web content is coded according to indicative/general aspect (1 point), descriptive / qualitative (2 points) and quantitative / monetary (3 points). This approach is similar to that used by Orens *et al.* (2009) and is based on indicators proposed by Kaplan and Norton, 1996, Ittner and Larcker, 1998 and Robb *et al.* (2001).

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<sup>3</sup> Furthermore the study of Boulerne and Sahut (2010) shows a shift between goodwill and other intangible assets in 2004. French firms seem to have transferred intangible assets that are not clearly identified to the goodwill as these assets are subject to more restrictive conditions under IFRS.

The coding of web sites was conducted by two research assistants for all sample firms. Disagreements were then reviewed by one of the co-researchers. According to previous work in non-financial reporting, we removed redundancies and repetitions (Lang Lunholm, 1993; AIMR, 2002; Botosan, 1997; Healy *et al.*, 1999).<sup>4</sup>

## 5. Results

Results presented in Table 1 show that intangible assets increased slightly from 2002 to 2008 (mean of € 20.46 per share versus € 17.95 per share and 27% of total assets versus 22%). Regarding web-based voluntary reporting on intangible capital, there is relatively little variation between the two periods. *Web client* (mean of 6.49 € versus 7.18 €) and *Web innovation* (mean of 7.62 € vs. € 10.22) slightly decreased while *Web human and intellectual capital* has increased slightly (mean of 13.18 € vs. 11.22 €).

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<sup>4</sup> Coding procedures, instructions and standardized coding sheets have been prepared in advance. The coders were trained in the application of encoding instructions and using the coding sheets. They were unaware of the research hypotheses. The initial differences in the identification of elements of the grid have averaged 5% of the maximum number of objects identified. From these differences, less than 10% requested conciliation by a co-researcher. Disagreements between coders occurred mostly early in the coding process (mainly for the twenty largest firms in the sample). A co-researcher has reconciled disagreements over 5% of highest score between the two coders. Minor disagreements have been resolved by the two coders themselves. Overall, we believe that this coding process provides a reliable measure of web reporting as shown by internal consistency tests (Cronbach's Alpha see Table 1).

Furthermore, the Cronbach's alpha shows that the variance is quite systematic in reporting scores (alpha ranging from 0.64 to 0.85). These numbers are higher than that of Botosan (1997) who found an alpha of 0.64 for an index based on five components of reporting in annual reports. The Cronbach's alpha estimates the proportion of variance that can be attributed to true score variance. It can vary from 0 (no variance is consistent) to 1.00 (if all variances are consistent). According Nunnaly (1978), a score of 0.70 is acceptable.

[Insert Table 1]

In Table 2 we present the scores for web reporting by industry. The lowest mean scores are observed for the telecom sector (Web clients = 5.91, Web innovation = 10.67, Web human and intellectual capital = 5.50). The highest mean scores are in the utilities sector (Web clients = 10.00, Web innovation = 16.00) and discretionary consumer products and health care (Web human and intellectual capital = 13.33). The level of competition in the telecom sector was rather low before 2002, which may explain a low level of reporting about clients (mean of 4.33 in 2002 versus 7.50 in 2010).

[Insert Table 2]

Since we use panel data, the problem of heteroscedasticity and

autocorrelation might be an issue. To this end, we estimate regressions by the method of feasible generalized least squares (FGLS). The test of Breusch-Pagan / Cook-Weisberg shows the presence of heteroscedasticity (Chi2 = 11.80 [0.000] for the model presented in Table 2 and 4.07 [0.043] for the model presented in Table 3). Thus, the structure of errors among the panels will be presumed heteroscedastic. In addition, to ensure that the presence of outliers does not bias our results, we remove observations with standardized residuals exceeding two. The statistical software used was STATA.

Table 3 presents results for the model of total web intangible capital reporting. Consistent with our hypothesis 1, results show that intangible assets are more valued when the firm is proactive in terms of voluntary reporting on intangible capital. Indeed, the coefficient on the interaction term *Intangible assets\*Web intangible capital* is positive and significant (0.16,  $p < 0.001$ ). Voluntary reporting improves the ability of stock markets to assess accounting information on intangible assets under French GAAP. This result shows a complementarity between mandatory reporting and voluntary reporting. Voluntary disclosure about intangible capital would allow the market to assess the existence of unbooked intangible assets. In addition, the voluntary reporting on intangible capital itself seems valued by the stock market (2.31,  $p < 0.024$ ).

Consistent with hypothesis 2, our results also show that IFRS reduces the importance of voluntary reporting in the stock market valuation of intangible assets included in the financial statements since the coefficient on the interaction term

*Intangible assets\*Web intangible capital \*IFRS* is negative and significant (-0.19, p <0.000). It also appears that earnings (residual income) are more valued under IFRS. The results remain quite similar when we use different interest rates to estimate the cost of capital (using a rate of 6% or 10%) for the calculation of residual income.

[Insert Table 3]

In Table 4, we present results when we divide the variable web intangible capital reporting into its three components: Customer, innovation, human and intellectual capital. The coefficients on interaction terms *Intangible assets\*Web client* (0.40, p <0.000) and *Intangible assets\*Web innovation* (0.47, p <0.000) are positive and significant. Under French GAAP, the voluntary information on customers or innovation improves the ability of stock markets to assess accounting information on intangible assets. This result indicates a complementarity between mandatory reporting and voluntary reporting to customers or innovation. However, the opposite is true with regard to interaction term *Intangible assets\*Web human and Intellectual capital* (0.18, p <0.043). Moreover, the coefficient on *Web human and intellectual capital* (2.44, p <0.051) is positive and significant. This result suggests that the information on the competence of human resources as well as the

ability to maintain employees in the organization is a substitute for accounting data on intangible assets under French GAAP.<sup>5</sup>

Consistent with hypothesis 2, IFRS reduces the importance of voluntary reporting in the stock market valuation of intangible assets accounted for in financial statements. The coefficients on interaction terms *Intangible assets\*Web client\*IFRS* (-0.40, p <0.000) and *Intangible assets\*Web innovation\*IFRS* (-0.35, p <0.000) are negative and significant.<sup>6</sup> However, the opposite is observed for the interaction term on *Intangible assets\*Web human and intellectual capital\*IFRS* (0.18, p <0.043).

This result suggests that the effect of substitution between the accounting information on intangible capital and reporting on the human and intellectual capital is reduced under IFRS.

[Insert Table 4]

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<sup>5</sup> A factor analysis is performed on the three performance disclosure components to assess disclosure patterns across firms. Using 0.50 as the cut-off for component matrix coefficients, two factors emerge. Results (not tabulated) show that firms reporting about their clientele also tend to report about innovation, development and growth. Human and intellectual capital loads on a single factor. Moreover, we observe that the level of intangible assets per share is higher for firms reporting intensively about Human and intellectual capital (> sample median) and lower for clientele and innovation, development & growth. These results could explain our contrasting findings.

<sup>6</sup> IFRS has generated additional information regarding not only the intangible innovation (trademarks, patents, etc.), but also regarding customers. As regards information relating to the customers, IAS 38 (including application details are specified in IFRIC 13) requires an entity to account for gift items identifiable as part of the transaction separately from other identifiable elements in the initial sale. The fair value of the consideration received or receivable in respect of the initial sale must be allocated between the gift and other items for sale. This requirement provides investors with information on customer loyalty.

As sensitivity analysis, we estimate separate regressions based on the two sets of accounting standards, IFRS and French GAAP. Results presented in Table 5 are consistent with those in Table 4. Under French GAAP, web reporting about customers (0.20,  $p < 0.018$ ) or innovation (0.15,  $p < 0.083$ ) improves the ability of stock markets to value accounting information on intangibles. The opposite is true in regard to web reporting about human and intellectual capital web (-0.32,  $p < 0.013$ ). Combined with a positive and significant coefficient on *Web human and intellectual capital* (4.01,  $p < 0.084$ ), this result suggests a substitution effect between the accounting information on intangible capital and web reporting on the human and intellectual capital under French GAAP.

Under IFRS, only the coefficient on *Intangible assets\*Web human and intellectual capital* is significant. The significant sign of this coefficient (-0.44,  $p < 0.000$ ) as well as the positive and significant coefficient on the variable *Web Human and intellectual capital* (6.14,  $p < 0.000$ ) confirms the substitution effect between the accounting information on intangible capital and web reporting on human capital and intellectual under IFRS. Thus, this substitution effect seems to persist regardless of the accounting referential.

[Insert Table 5]

## 6. Conclusion

This study investigates the complementarity for stock markets between mandatory and voluntary on intangible capital. Comparing two periods covering the French GAAP and IFRS, the two following research questions are addressed: (1) Does Web disclosure about intangible capital enhance the value relevance of intangible assets accounted for in French financial statements? (2) What is the role played by IFRS in this matter?

Our results are as follows. Under French GAAP, intangible assets accounted for in financial statements are valued by the stock market and are more valued in the presence of a high level of voluntary reporting on intangible capital. This suggests a character of complementarity between mandatory reporting and voluntary reporting. The voluntary reporting would provide information relevant to market participants in their valuation of intangible assets.

Secondly, the importance of voluntary reporting on the ability of stock markets to evaluate accounting information on intangible assets is substantially reduced following the adoption of IFRS. This result suggests that IFRS allow stock markets to better integrate intangible assets in the stock market.

Finally, unlike the voluntary reporting on clients or innovation, it seems that information about human and intellectual capital is a substitute for accounting information on intangible capital under French GAAP as well as IFRS.

Overall, our results suggest that IFRS have significantly improved the information content of accounting information on intangible assets. In this context, stock market participants, except for information on the human and intellectual capital, have less need to rely on additional information generated on corporate websites, at least in its current form.

Managers will have an incentive to better target their communications on the web or other media to ensure a degree of complementarity with the financial information generated by IFRS. In this sense, this study contributes to the literature of voluntary reporting.

The results of this study should be interpreted with caution for at least three reasons. First, our measure of web reporting is based on a coding instrument that assumes the value and relevance of the information collected. However, selected items may not fully capture the underlying phenomenon. A second potential limitation is the fact to restrict the coding to HTML documents and to exclude documents in PDF format. However, most PDF documents (e.g. financial statements, press releases, annual reports, newsletters) are also published on paper format and then the voluntary nature of PDF reporting is less certain. Finally, the sample size may be an issue. However, sample firms represent a wide range of industries and a significant proportion of market capitalization in France.

This study could be extended to other contexts and other local accounting standards or other reference documents such as the management discussion and analysis report (MD&A). For example, a question to address could be how IFRS

have changed the relevance of voluntary reporting on risk management of business risks?

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**Table 1****Descriptive statistics**

	Min.	Max.	Mean	Median	Std dev.	Cronbach alpha
<b>French GAAP</b>						
Intangible assets						
€ per share	0.03	195.14	17.95	9.00	32.66	
% of assets	0.00	0.58	0.22	0.23	0.14	
Web client	0	20.00	7.18	7.00	4.55	0.64
Web innovation	0	33.00	10.22	10.00	7.14	0.80
Web human & intellectuel capital	0	37.00	11.22	11.00	8.66	0.75
<b>IFRS</b>						
Intangible assets						
€ per share	0.08	183.67	20.46	13.00	27.96	
% of assets	0.01	0.68	0.27	0.27	0.15	
Web client	0	15.00	6.49	7.00	3.57	0.77
Web innovation	0	22.00	7.62	8.00	5.65	0.85
Web human & intellectuel capital	0	30.00	13.18	13.00	7.04	0.84

**Tableau 2**  
**Web reporting scores by industry**

	Materials	Consumer discretionary	Consumer staples	Health care	Industrial	Information technology	Telecom	Utilities
Web client	6.25	7.33	9.11	7.50	6.04	6.00	5.91	10.00
Web innovation	11.94	13.00	12.82	15.16	11.44	12.44	10.67	16.00
Web Human & intellectual	8.38	13.33	9.75	13.33	7.62	9.06	5.50	11.50
N : 142	14	10	26	12	50	16	12	2

**Table 3**  
**GLS Cross-Sectional Regression on Stock Market Valuation of Intangible Capital**

<i>Dependent variable:</i> Share price	Sign	Coefficient	p-value*
<i>Independent variables** :</i>			
Equity	+	0.51	0.000
Intangible assets	+	0.58	0.000
Intangible assets*Web Intangible capital	+	0.16	0.001
Intangible assets*Web Intangible capital*IFRS	-	-0.19	0.000
Residual income	+	1.17	0.000
Residual income*IFRS	+	1.79	0.000
Year IFRS	?	-2.12	0.024
Web Intangible capital	?	2.31	0.024
N= 142 (9 outliers)			
Wald test = 1 058 (0,000)			

\* One-tailed if directional prediction, two-tailed otherwise.

\*\*Scaled by number of shares.

**Table 4**  
**GLS Cross-Sectional Regression on Stock Market Valuation of Intangible Capital**

By Web reporting components

<i>Dependent variable:</i> Share price	Signe prévu	Coefficient	Valeur p*
<i>Independent variables** :</i>			
Equity	+	0.48	0.000
Intangible assets	+	0.67	0.000
Intangible assets*Web client	+	0.40	0.000
Intangible assets*Web innovation	+	0.47	0.000
Intangible assets*Web HIC	+	-0.33	0.001
Intangible assets*Web client*IFRS	-	-0.40	0.000
Intangible assets*Web innovation*IFRS	-	-0.35	0.000
Intangible assets*Web HIC*IFRS	-	0.18	0.043
Residual income	+	1.13	0.000
Residual income*IFRS	+	1.69	0.000
Year IFRS	?	-1.99	0.050
Web client	?	-2.67	0.045
Web innovation	?	-1.70	0.201
Web HIC	?	2.44	0.051
N= 142 (12 outliers)			
Wald test = 3 702 (0,000)			

\* One-tailed if directional prediction, two-tailed otherwise.

\*\*Scaled by number of shares.

**Table 5**  
**GLS Cross-Sectional Regression on Stock Market Valuation of Intangible Capital**  
 By Web reporting components and by accounting referential

<i>Dependent variable:</i> Share price	Sign	Coefficient	p-value*
<b><i>French GAAP</i></b>			
<i>Independent variables** :</i>			
Equity	+	0.44	0.000
Intangible assets	+	1.14	0.000
Intangible assets*Web client	+	0.20	0.018
Intangible assets*Web innovation	+	0.15	0.083
Intangible assets*Web HIC	+	-0.32	0.013
Residual income	+	1.49	0.000
Web client	?	3.38	0.055
Web innovation	?	-1.88	0.330
Web HIC	?	4.01	0.084
N = 71 (6 outliers)			
Wald test = 9 063 (0,000)			
<b><i>IFRS</i></b>			
Equity	+	0.46	0.000
Intangible assets	+	0.88	0.000
Intangible assets*Web client	+	0.07	0.261
Intangible assets*Web innovation	+	0.07	0.318
Intangible assets*Web HIC	+	-0.44	0.000
Residual income	+	3.25	0.000
Web client	?	-2.27	0.010
Web innovation	?	-1.13	0.214
Web HIC	?	6.14	0.000
N = 71 (2 outliers)			
Wald test = 1 695 (0,000)			

\* One-tailed if directional prediction, two-tailed otherwise.

\*\*Scaled by number of shares.

**Appendix 1**  
**Coding grid- Intangible Capital**

Customer profile / market segment / market share / number of customers  
Pre-sales support: • information / counsel / orders follow-up  
After-sales service / insurance  
Customer satisfaction / complaints management  
Customer loyalty  
Awards  
**Total Customers**  
Sales – new products  
Market share – new products  
Awards  
**Total new products**  
Investments in R&D  
Description of products in development  
Product testing  
Awards  
Others - R&D  
**Total R&D**  
Increase in sales / market shares  
Increase in investments  
**Total growth**  
**Total innovation, development et growth**  
Hiring / new employees  
Qualification / expertise  
Training  
Description of job requirements 1, 2, 3  
**Total competence**  
Employee empowerment / involvement  
Capacity to suggest and to implement changes  
Teamwork  
Performance assessment  
Performance based compensation  
Earnings-based compensation  
Career opportunities  
Award  
Fringe benefits  
**Total motivation/work climate**  
Employees satisfaction, survey  
Employee turnover  
Other  
**Total satisfaction**  
**Total human/intellectual capital**