An analysis of the relationship between the voluntary disclosure of the intellectual capital and the firm value

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C H R O N I C L E	A B S T R A C T
	In this research, we perform an empirical investigation to clarify the relationship between voluntary disclosure on the intellectual capital and firm valuation. We primarily proposed a more refined conceptualization of intellectual capital through a thematic content analysis conducted via Nvivo. Then, we developed a measurement scale to quantify the voluntary disclosure of the intellectual capital by using factor analysis. Finally, by using the structural equations, our results show that the investors have exploited the information that reflects the capacity of knowledge and experience of the management team to generate future profits.

1. Introduction

Noticing the capacity of intangibles that are not mentioned in the balance sheet to explain, at least in part, the difference between market value and book value of the company, several surveys encourage the publication of non-financial information (strategic assessment results, quality processes and products, customer satisfaction, innovation, etc..) have been made since the 90s. Amir and Lev (1997) and Lev and Zarowin (1999) showed that the investors give little or no importance to the financial status where the company operates in a rapidly changing environment or in the case of an industry with high technological intensity. They react to the changes in the life of a society in real time, even before the accounting information proves these changes. Through a survey of companies which are heavily involved in the intangible investments, Collins et al. (1997) and Francis and Schipper (1999) showed that these companies are characterized by a strong correlation between market value and the information published about their intellectual capital. Thus, the market capitalization is made up of the

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value of the physical assets (book value) and an additional intangible value associated which is recognized by the financial market but ignored by the balance sheet.

A growing concern among managers and professional bodies for the publication of information on the intellectual capital begins to appear on the financial markets. The investors express their interest in such information. Therefore, a progressive enrichment of schedules and report management leads to the appearance of a current trend, aiming at promoting a specific report on the intellectual capital. The evolution is marked by (Garcia-Meca, 2005). The pressure coming from the investors and the appearance of markets which are very demanding on the quality of information as well as on the analysis of business performance, have led some groups to voluntarily disclose information to shed the light on their intellectual capital. This information completes the financial statements and provides indicators to assess the ability of firms to create value in the future and give more credibility to the information revealed in the annual statements. In this context, Guthrie et al. (2001, 2002), Bejar (2007) and Wang and Chang (2008) showed that the voluntary disclosure of the intellectual capital could reduce information asymmetries, raising some uncertainty about the opportunities for business growth and thus help the investors evaluate the company in a precise way. However, no study has tried to clarify the impact of publications on the intellectual capital on the firm valuation. In order to show this issue, it is important to deal with this question: What information did the company publish on its intellectual capital? In fact, the answer is not obvious because the definitions of the intellectual capital are inconsistent. This heterogeneity slows down the understanding and the analysis of the intangibles.

The objectives of this work are: First, we suggest a more refined conceptualization of the intellectual capital. Second, we build an instrument to measure the voluntary disclosure of the intellectual capital. Finally, we show the contribution of the publications on the intellectual capital in the evaluation of the company. To achieve these objectives, we are going to use quantitative and qualitative methodologies.

The rest of the study is organized according to the following schedule. Section 2 sets up the theoretical framework and hypotheses. Section 3 introduces the research methodology. Section 4 shows the main results of this research. A brief conclusion appears in Section 5.

2. Literature Review

The voluntary disclosure of the intellectual capital occupies an increasingly important place. Thus, it is important to analyze the structure of the information offered on the intellectual capital to understand its management. In this sense, defining the intellectual capital is an inevitable condition.

2.1. Definition of intellectual capital

It was difficult to formulate a definition of the intellectual capital. But, during the last years, the necessity has urged authors and groups in various domains to find a suitable definition, a coherent classification and a starting point of measurement for managers. Some authors indicate we have to distinguish between an economic and an accounting approach (Marois, 2003; Belkaoui, 2003). In the economic literature, the definition which has been widely cited (Edvinson & Malone, 1997). They declare that the intellectual capital is the knowledge, the experience, the technology of the enterprise, the customer relations and the skills that provide the enterprise a competitive advantage. Another definition has been frequently used is that given by Stewart (1997): the intellectual capital includes knowledge, intellectual property, experience, etc. used to create wealth.

As to the approach adopted in the accounting perspective, it permits us to consider like intellectual capital what does not appear in the financial accounts of the enterprise, but meets in the final value of the firm (Marois, 2003). However, the difference in accounting standards among countries may lead to generate different evaluation of intangibles depending on whether patents and trademarks are recognized or not and depending on whether certain elements of the intellectual capital are the object of an amortization or not. According to the FASB (2001), intellectual capital is the set of assets that

lack physical substance. In an interview published in the Los Angeles Times in 1995, Wallman (1997) included, in his definition of the intellectual capital, the assets that are valorized to zero in the balance. Other researchers include in their definitions of the intellectual capital elements such as the technology, the training of the personal and the speed of answer to customers. In the same interview, Davidow (1997) stated that it is necessary to move to a new level of accounting which stresses on the competitive position, customer satisfaction, quality, etc. Fustec and Marois (2006) defined the intellectual capital as being all the wealth of the enterprise that doesn't read in the financial statement. It is that the financial markets valorize for a long time by the market to book ratio.

To identify a model of the voluntary disclosure on intellectual capital, it would be necessary to return to the classification used in previous studies (Pierrat, 1996, 2000; Sveiby, 2000; Lev & Zarowin, 1999; Edvinsson & Malone, 1997; 1999; Werner et al., 1998; Hammerers, 1996).

First of all, we can mention the traditional typological definition of Pierrat (1996), which relies on the accounting approach. He proposes a list of intangibles classified by increasing degrees of immateriality: rights, and the quasi-right (patents, marks, rights and processes), organizational structures, systems of information, networks of relationships. Another more generic typology has been proposed by Lev and Zarowin (1999). They identify four components of intellectual capital: assets related to the innovation in products, assets associated to the mark of a company which permit to sell products services more than its competitors, the structural assets which means the new and different ways to make business that distinguishes the enterprise from its competitors.

Based on the research led by the Swedish company of insurances and financial services 'Skandia', Edvinsson and Malone (1997) estimated that the intellectual capital generally takes two forms. The human capital: it is about the combination of the staff's knowledge, talent, and mind of innovation and capacities of each to accomplish its task. The structural capital is everything that remains in office when the employee goes home (computers, software, data bases, the organizational structure, patents, relations developed with the main customers and all capacities of organization which maintain the staff's productivity).

The most widespread classification is the one proposed by Edvinsson and Malone (1999). They distinguished three components of the intellectual capital. The human capital includes intelligence and the dynamics of an organization in a changing environment which means its creativeness and its capacity of innovation. So, this capital possesses a human aspect (training, expertise, experience, competence), a social aspect (social relations) and a cultural aspect (that encourages the innovation) (Marois, 2003). The structural capital means the expression of the human capital and its infrastructure. It is also the set of the systems of organization, including those used to transmit and to stock the knowledge (Marois, 2003). This capital can be decomposed in organizational capital (systems, knowledge), innovation capital (capacity of product renewal and services) and process capital (knowledge convenient of exploitation). The relational capital is constituted of relations developed with the main customers of the enterprise (Marois, 2003). The typology proposed by Edvinsson and Malone (1999) joins the one developed by Sveiby (2000). He identifies three components of the intellectual capital. The internal structure represents the set of technological systems, processes and tools that are specific to an organization, including the assets of intellectual property and the culture of the enterprise. The external structure is about the set of elements bound to the relation of the enterprise with its customers and suppliers such as: marks, customer service, the reputation, etc. The human capital concerns the set of knowledge and the capacity of each member to learn, to adjust and to innovate.

Until then, we have tried to present the different classifications of the intellectual capital. They regain three big components of the intellectual capital: the human capital, the relational capital and the organizational capital. The scope of the intangible has evolved in recent years from a narrow definition to a larger concept that includes human resources and capacities, the structural means (databases, technology, culture and habits) and the relational capital that includes structural processes, and networks of customers and suppliers. So, definitions tend to include the economic attributes that contribute to the creation of value as the capacity to create the knowledge, the expertise to set up a

strategy and the ability of innovation. The widening of the field of application of the intellectual capital explained the present confusion between the intangibles such as patents and commercial marks, and factors of creation of value such as skills and strategies.

A key determinant of innovation and value creation in the company seems to result from other fundamental intangibles than the R&D. A study conducted by Watson et al. (2005), shows that the activities contributing to innovation and value creation covers a wide range of complementary activities such as the dominant competitive position, means that the company uses to maintain this position and the quality of the competition. That is to say, the investors take into account in their analysis and investment decisions, other categories of intangibles as the present value of future investments and the competitive advantages (Watson et al. 2005; Rothberg & Erickson, 2002; Donaldson & Preston, 1995).

A new typology retains the three components identified by the traditional literature (Pierrat, 1996, Lev & Zarowin, 1999; Edvinsson & Malone, 1997, 1999; Sveiby 2000) and adds a new category which is the competitive capital. The later sheds light on the process of creating a sustainable competitive advantage.This vision comes from the studies of Porter (1985). He defines the competitive advantage as being the capacity of the enterprise to generate more benefits than the ones of its competitors. The competitive advantage is derived from the key factors of success of the sector. Besides, when an enterprise reaches a significant competitive advantage, it has to maintain this advantage. Thus, the enterprise must anticipate the answers of the competition by collecting different information on the strategies and the innovations. The question is not to reach a competitive advantage, but to sustain it for a long time. The competitive advantage corresponds, then, to the value creation. More precisely, an enterprise that tries to increase its profitability must look for an intellectual capital regrouping four dimensions: human capital, relational capital, organizational capital and competitive capital (Watson and al., 2005; Rothberg and Erickson, 2002; Davenport and al., 1998). Through this more general notion of intellectual capital, which aims to highlight the synergy that should exist within an organization, we try to construct a model to help companies to evaluate, to manage and to communicate on intangibles. For this reason, it is important to present the studies which deal with the voluntary disclosure on the intellectual capital.

2.2. The voluntary disclosure of the intellectual capital

For the largest listed companies, the transition to financial communication is a must: the only legal compliance the dissemination does not meet their financial goals and their need for legitimation. Thus, managers have the flexibility to add voluntary information to the annual reports which aims at enhancing corporate transparency. In addition, pressure from investors and emerging markets, very demanding on the quality of information and analysis of business performance, have led some groups to voluntarily disclose information explaining their intangible investments. This information completes the financial statements, provides evidence of the ability of firms to create value in the future and gives more credibility to the information summarized in the annual statements (Garcia-Meca, 2005). Highlighting the motivations for voluntary disclosure requires the use of stakeholder theory and legitimacy theory.

According to stakeholder theory, an organization's management is expected to undertake activities deemed important by their stakeholders and to report on those activities back to the stakeholders. This theory suggests that all stakeholders have a right to be provided with information on how organizational activities impact them (for example, through strategies, management process, etc.), even if they choose not to use the information, and even if they cannot directly play a constructive role in the survival of the organization (Deegan, 2000). Stakeholder theory highlights organizational accountability beyond simple economic or financial performance. It suggests that organizations will elect to voluntarily disclose information about their intellectual, social, and environmental performance, over and above mandatory requirements, in order to meet real or perceived stakeholder expectations. Stakeholder theory has an ethical (moral) branch, and a positive (managerial) branch. The ethical branch argues that all stakeholders have the right to be treated fairly by an organization, and that managers should manage the organization for the benefit of all stakeholders (Deegan, 2000).

The positive branch argues that a stakeholder's power to influence corporate management should be viewed as a function of the stakeholder's degree of control over resources required by the organization (Watts & Zimmerman, 1986). The more critical the stakeholder resources are to the continued viability and success of the organization, the greater the expectation that stakeholder demands will be addressed. Thus, the positive version of stakeholder theory predicts that management is more likely to focus on the expectations of powerful stakeholders, that is, of those who control resources (Deegan, 2000). This theory can be tested in a number of ways, by using the content analysis method. The annual report is the most efficient way for an organization to communicate with those stakeholder groups deemed to have an interest in controlling certain strategic aspects of an organization. A content analysis of intellectual capital disclosures can be used to determine whether this communication is in fact taking place. Are companies responding to stakeholder expectations, real or perceived, by offering a voluntary account of their intellectual capital and the value of their intangible assets? This is a question that has received some attention, but more work is needed to form a conclusive opinion.

Legitimacy theory is bound up with stakeholder theory. It assumes that organizations constantly make sure that they operate within the bounds and norms of their respective societies. As far as legitimacy theory is concerned, a company would be required to report on activities if the management noticed that this was what the community expected. In fact, a 'social contract' between the company and the society is one of the bases of Legitimacy theory. The social contract aims at describing the variety of expectations that a society has on what an organization should do to manage its operations. The constant changes of these societal expectations requires the company to be responsive to the environment in which it operates (Deegan, 2000). Moon et al. (1994) suggest that an organization is able to set up some strategies if its legitimacy is in question. To start with, the organization can educate and inform its 'relevant publics' about the possible changes in the organization's performance and activities. Besides, it can work on changing the perceptions of the relevant publics. Also, it can manipulate the perceptions of the relevant publics and deflect their attention from the issue of concern. Finally, the organization might find ways to change and influence external expectations of its performance.

This perspective has been used by many empirical studies of Social and Environmental Reporting to shed light on the use of the voluntary disclosure of intellectual capital by firms. According to legitimacy theory, organizations don't have to operate without taking into account the societal values (Guthrie & Parker, 1989, 1990). This is often achieved through the medium of company reports. Moon et al. (1994) suggest that disclosures may be used to reveal management's concerns for societal values, or to get the community attention away from the negative influence of the organizations' activities. Some previous studies examined voluntary annual report disclosures and considered the reporting of social and environmental (SEA) information as a method used by organizations to react to public pressure; (Deegan & Rankin, 1996; Guthrie & Parker, 1989; Patten, 1991, 1992).

Legitimacy theory is linked to the reporting of intellectual capital and to the use of content analysis methods as a measure of such reporting. When companies find it difficult to legitimize their status on the basis of the hard assets, they are more likely to report on their intellectual capital. The extent of intellectual capital reporting is best measured using content analysis. Thus, legitimacy theory, intellectual capital reporting, and content analysis are interlinked.

2.3. The Analysis of the relationship between the voluntary disclosure of the intellectual capital and the value of the company

Since the 90s, researchers have suggested that there are among users, great need for information about intangibles. Collins et al. (1997), Francis and Schipper (1999), Williams (2001), Sonnier et al. (2007) and Wang (2008) showed that companies, which are strongly engaged in the intangible investments, are characterized by a strong correlation between market value and output information on their intangibles. Indeed, an increase of 10% of overall score in terms of reporting on intellectual capital has resulted in a reduction of 1.5% of the volatility of share price (Barnet, 2003). Dumay and Tull (2007) showed that the investors are interested in the information that describes the technology systems, organization processes and corporate culture. Relying on 30 Taiwanese firms, Peng et al. (2007)

declared the existence of a strong positive relationship between the intellectual capital and the financial performance of the company. Similarly, Abdolmohammad (2005) described a significant and positive relationship between voluntary disclosure of the intellectual capital and the market capitalization of 58 U.S. firms over the period from 1993 to 1997. Recently, Wang and Chang (2008) have used the Partial Least Squares (PLS) method to highlight the capacity of the voluntary disclosure of the intellectual capital to minimize the asymmetries of information and remove some uncertainties. Therefore, we put forward the following hypothesis:

> H_1: The voluntary disclosure of the intellectual capital has a direct and positive effect on the value of the company.

Along with the previous surveys that demonstrated the role of the voluntary disclosure of the intellectual capital, measured by an overall score, for financial markets, other studies cover the role of some specific intangibles in reducing the asymmetries of information. The majority of these studies were, however, based on R&D (Sougiannis 1994; Lev & Zarowin, 1998; Chan et al., 2001) and intellectual property often estimated by the number of patents (Griliches 1981; Cockburn & Griliches, 1988). Easton and Jarell (1996), Ittner and Larcker (1996), Lev (1996) and Mavrinac and Siesfeld (1997) reported that the indicators including, strategy, innovation, the company's ability to attract and retain skilled people, expertise, knowledge, customer satisfaction, total quality programs and personnel training, create value and are valued by the investors. Similarly, Cockburn and Griliches (1988), Chauvin and Hirschey (1994), Sougiannis (1994) and Roos (2007) have shown the existence of other elements of the intellectual capital such as advertising expenditures, patents, trademarks, customer satisfaction, and human resources that may have a potential impact on performance. Chahine and Mathieu (2003) examined the content of the annual reports of the French companies. They showed that the technology and human skills could differentiate between companies. Also, Deeds et al. (1997) emphasized on the importance of technological developments and their roles in the success or failure of high-tech companies. Similar studies showed that managers reported the quality of their business through technology variables (R&D, intellectual property ...) and human variables (competence, skills) (Guo et al., 2005; Decarolis & Deeds, 1999; Wilbon, 1999). Their reports to the financial market reveal the ability of the company to manage its resources optimally and therefore its ability to draw the best financial performance. Based on this literature review, it is important to note that the following hypothesis is worth mentioning:

> H_2: The publication of information that describes each component of the intellectual capital has a direct and positive effect on the value of the company.

3. Research methodology and the interpretation of results:

3.1. Conceptualization of the intellectual capital: A qualitative approach

The aim of this research is both to conceptualize the intellectual capital and to create a measurement scale. We are going to evoke the consistent methodology and the main results successively.
In this context, the research of a deepened typology of the intellectual capital reminds us of the method of the content analysis. This method has been traditionally used in studies of the social and environmental information in the eighties. On the other side, the content analysis is the method the most adapted to explore the voluntary disclosure (Bozzolan et al., 2006; Abdolmohammadi, 2005; Aberg & Edvinsson, 2001; Brennan, 2001; Williams, 2001). Bardin (1977) defines the content analysis like a methodological, systematic and objective exam, of the textual or visual documents, aiming to get indicators (quantitative or no). This method consists in analyzing through words and numbers expressed, ideas given out by the author of the communication. It is about taking out again the main treated themes and to classify them in the homogeneous categories. In this context, the method of the content analysis can be adapted to our problematic. It permits us to identify a list of items on intellectual

capital. To improve the internal validity of our content analysis, a computerized textual analysis was setting up. The objective of this approach is, above all, to limit the risk of only one coder subjectivity (Bournois et al., 2002; Fallery & Rodhain, 2007) and of easiness operations of carving of text and categorization (Richard, 1999; Bardin, 2003).

Our empiric analysis process consists therefore of coding the annual reports with the help of the software Nvivo. This coding requires an exam deepened of the annual reports. The principle consists in reading every corpus, fragment by fragment (words, sentences, themes), to compare narrations, to classify them in wholes and subsets according to their similarity to integrate them within categories established at the level of our conceptual typology. In other words, this stage permitted us to stock, to qualify them and to organize them information.

Groups kept for the qualitative analysis present a big diversity so much in term of activity and geographical origin. This choice permits us to avoid effects of interrelationship specific to a particular sector, to get results passing the specificities of every country and to widen the reflection on the voluntary disclosure on the intellectual capital in countries that don't have the same cultures of financial information (Garcia-Meca & Martinez, 2007; Pedrini, 2007; Abdolmohammadi, 2005; Bessieux-Ollier, 2002; Wlliams, 2001; Johanson et al., 2001).

Table 1
Characteristics of groups kept for the content analysis

Groups	Activity	Country	Sales (M$)
Royal Ahold	Distribution	Holland	41,804
Altria	Food	United States	89,610
Amerisource Bergen	Pharmacy	United States	48,870
BASF	Energy	Germany	50,817
BMW	Transportation	Germany	55,148
France Telecom	Telecommunication	France	58,658
Sony	Electronic	Japan	35,662

In the setting of this research work we will analyze the annual reports published on the sites web of companies selected (bigger accessibility to a bigger speed). This choice can be explained by several reasons to know: the pre-eminence of the annual report as source of information of the professional investors (Knutson, 1992), the easiness of access to this document, the multiplicity of the potential users of the annual report. Indeed, we can see its content integrating some specific themes (Campbell, 2000; Atkinson et al., 1997). Besides, the majority of previous study analyzes the voluntary disclosure on the intellectual capital while taking the annual reports of enterprises as a basis (Bozzolan et al., 2006; Abdolmohammadi, 2005; Abeysekera & Guthrie, 2005; Michailesco & Sranon-Boiteau, 2003; Escaffre, 2002; Williams, 2001; Guthrie & Petty, 2000; Aberg & Edvinsson, 2001; Brennan, 2001; Gray et al., 1995).

The theoretical distinction of four components of the intellectual capital is found within the annual reports. Precisely, we identified three types of information to characterize the human capital: competence of staff, the capacity of the enterprise to attract and to maintain talented people and the capacity of training this people. We identify two types of information for the relational capital: the customer capital and the reputation of the enterprise. Three types of information have been kept by enterprises to communicate on the organizational component: the process capital, the knowledge capital and R&D. The competitive component distinguishes two details: the competitive position and the analysis of risks bound to the competitive environment. The table 2 retails definitions of each of components.

This qualitative phase permitted to specify four constructed to the intellectual capital. So, a measurement scale can be constructed.

Table 2

Intellectual capital items

Components	Informations	Items
Human	*INFO 1* Competencies of human resources	Know-how
		Expertise
		Professional qualification
		Experience
		Mind of enterprise
		Mind of innovation
		Mind of adaptation
		Directing
		Governance
		Executive Committee
	INFO 2 Capacity of the enterprise to attract and to maintain talented people	Recruiting announcement
		Recruiting method
		Recruiting criteria
		Involvement to objectives
		Detailed structure of employees
		Social Balance
	INFO 3 Human resource training	Language training
		Commercial training
		Professional training
		Training on production technology
		Center training
Relational	*INFO 4* The customer capital	Evolution of sales
		New customer
		Channels of distribution
		Trademarks
		Renewal of purchases
		Client relation service
		Club / cards of faithfulness
		To answer to waiting of customers
		Indices of satisfaction
		Market survey
	INFO 5 The reputation of the company	Deontology Charter
		Patronage
		Charitable activities
		Advertising slogan
		Target
		Supports of communication
		List of signs of the group
		Valorization in accounting
		Logo of marks
Organizational	*INFO 6* The process capital	Quality
		Environment
		Post-sales services, Maintenance
		Detail of the production
		Technical investments of production
		Organization chart
		Partnership, license
	INFO 7 The knowledge capital	Internal communication
		System of information
		Knowledge management
		Company culture
		Managerial philosophy
		Process of management
		E-commerce
		Network
		Financial relations
	INFO 8 R&D	Laboratory research
		Budget of research
		Patents
		Right of authors
		Strategic project
		Accounting valorization
		New products
Competitive	*INFO 9* Dominant competitive position	Leader
		Competitive position
		Number one
		Competitive advantage
		Distinctive Character
	INFO 10 Analysis of risks bound to the competitive environment	Competitors/ competition
		Competitive environment
		Competitive disadvantage
		Capacity of competition
		Price control
		Intensify differentiation
		New competitive practices

3.2. Construction and approval of measurement scale

Sample Selection

The selected sample is made up of the multinational companies. This choice was useful for three reasons. First, multinational companies need to publish a large number of voluntary information to obtain resources at lower costs and respond to requests of more information (Cooke, 1989; Hossain et al. 1994; Hossain et al., 1995; Robb et al. 2001; BessieuxOllier, 2002). The share of intangible investment by multinational enterprises is higher than that of small and medium enterprises (Castro & Lopez-Saez, 2008; Abeysekera & Guthrie, 2005; Abdolmohammadi, 2005; Das et al. 2003; Belkaoui, 2003; Escaffre, 2002). Second, the multinational companies are characterised by its capacity to transfer the approaches of the identification and the management of the intellectual capital. Multinational companies have developed a significant portion of their business abroad and therefore depend on resources other than national. They can employ foreign workers, produce abroad, acquire assets and also seek funds on financial markets other than national (Buckley & Casson, 1976; Rugmon, 1981; Scheid & Standish, 1989). Finally, most studies dealing with the voluntary disclosure on intellectual capital have focused on samples of large companies (BessieuxOllier, 2002, Castro & Lopez Saez, 2008; Abeysekera & Guthrie, 2005; Abdolmohammad, 2005, Das et al. 2003; Belkaoui, 2003; Escaffre, 2002). Firstly, we chose the top 100 multinationals in turnover for the year 2005. Then, we eliminated firms that were the subject of transfers, mergers and splits. We attempted to obtain annual reports from the websites of these multinationals. We could get only 71 annual reports (see Table 3).

Table 3

Procedure of the sample selection

Characteristics of the sample	Number of enterprises
Multinational companies selected	100
- Exclusion of firms that were the subject of transfers, mergers and splits	19
- Exclusion of companies which annual reports are not available	10
Final sample	71

Our sample is based on diversity both in terms of sectors and in terms of geographical origin. The groups identified belong to various sectors. Companies belonging to traditional sectors (food, distribution, oil, automotive, services, aeronautics, metallurgy) represent 66.15% of the total population while firms belonging to sectors based on knowledge represent 33.85 %. The selection of many industries allowed us to have different categories of intellectual capital and avoid correlation effects to a particular sector (García-Meca & Martínez, 2007; Pedrini, 2007; Abdolmohammad, 2005; Bessieux, 2002; Wlliams, 2001, Johanson et al., 2001). Our choice is aligned with those of several researchers studying the intellectual capital reporting (Garcia-Meca, 2005, Huang & Liu, 2005; Abeysekera & Guthrie, 2005; Firer & Williams, 2003; Escaffre, 2002; Bessieux - Ollier, 2002).

Multinationals are selected from different nationalities to obtain results beyond the specific regulations of each country. Therefore, our study enlarges the knowledge of the voluntary disclosure on the intellectual capital which are taken from different cultures (Pedrini, 2007; Escaffre, 2002; Bessieux-Ollier, 2002). However, this diversity does not lead to bias because we analyze voluntary information beyond the legal requirements of financial disclosures on intellectual capital. The study can take into account the practices of 30 European companies (42.25%), 30 American companies (42.25%) and 11 Asian companies (15.5%).

Data collection

The study of information published in the annual reports called the method of content analysis (Bozzolan et al., 2006; Abdolmohammadi, 2005; Aberg & Edvinsson, 2001; Brennan, 2001; Williams, 2001). This method is about: defining the items that guide research and to calculating their frequencies. So, it is the amount of information that is most representative. In this case the author has to choose,

mainly, the evaluation unit of the annual report. Lynn (1992) prefers the page, Gray et al. (1995) and Brown and Deegam (1998) use the word because it is seen as the smallest unit and therefore it reduces the possibility of error in calculating the amount of information published (Michailesco & Sranon-Boiteau, 2003). Thus, content analysis involves the detection and enumeration of items in annual reports. This technique is often used in finance (Taffler & Breton, 2001). This is to respect a principle of objectivity to permit reproduction of the analysis regardless of the person who conducts (Kippendorff 1980, Milne & Adler, 1999).

In practice, a grid has been designed to perform analysis of each annual report. This grid includes the items identified in Table 2. To ensure a satisfactory level of objectivity, it is preferably to initiate a nominal approach of coding data. Indeed, this method of coding allows to classify the population into homogeneous classes in which each word has the same value. The variables are numerically identified by 0 and 1. Zero is a lack of word which defines the item of intellectual capital and 1 is the presence of a word corresponding to the item of intangibles. It is therefore to make a count of words contained in the annual reports of selected companies. When words or expressions expected to appear several times in the same report, these apparitions are aggregated to each other.

Applying this methodology of measure manually, can lead to over (or under) estimation of the extent of disclosure on intellectual capital. To avoid this limitation, we used a software named "*CONCORDANCE*" that allows to make a lexical profile, to find all the places in the annual reports that fits this profile and presents them with their immediate context. Then, we had to sort out the occurrences which were unsuitable for our study, and finally, we coded instances valid in a database. The first step has posed only small problems, but the second is a real challenge. Even if the approach is purely quantitative, it requires a great effort to identify the information in each annual report through the list of items describing intellectual capital. Therefore, the difficulty of content analysis reveals why previous studies worked on small sample size (Moscarola, 2002; Abdolmohammad, 2005). For example, Williams (2001) analyzed 40 annual reports and Bozzolan et al. (2006) worked on a sample of 60 companies. Furthermore, Castro and Lopez-Saez (2008) set up their content analysis of 49 Spanish companies. Also, the studies of Abeysekera and Guthrie (2005), Abdolmohammadi (2005), Brennan (2001) and Aberg and Edvinsson (2001) are respectively based on 30, 58, 11 and 43 companies. Thus, the sample size of this research appears acceptable.

Factor analysis

To refine the variables, the method of factor analysis is highly appropriate. Based on the qualitative approach outlined above, our data consist of 72 variables applicable to the annual reports of 71 multinational companies. So, a total of (72 × 71) 5112 observations are recorded. Empirically, it is easier to summarize this information by replacing the original variables by a smaller number of variables called factors. In order to achieve data processing, it is necessary to ask about the relevance of the choice of factor analysis. Two tests are available for this purpose: the KMO and Bartlett tests have been performed to ensure that the data are gathered in terms of factors. Based on Table 6, we can say that the tests confirm the possibility of applying factor analysis.

Table 4

KMO and Barlett tests

Constructs	KMO	Barlett test		
		χ^2	Ddl	Sig
Human capital	0.803	610.204	91	0
Relational capital	0.670	249.902	136	0
Organizational capital	0.697	595.955	171	0
Competitive capital	0.691	70.654	21	0

The principal component analysis leads us to simplify the observation data and establish links between variables. According to Evrard et al. (2003), this method, allows to find the factors that come from the original variables and interpret them. According to this analysis, we noticed that no component of

intellectual capital has left the base. Four factors are kept away to define intellectual capital. Consequently, we are able to present the final structure of the voluntary disclosure on intellectual capital in terms of latent variables and items.

Table 5
Results of the factor analysis

Constructs	Items	Factor 1	Factor 2	Factor 3	Factor 4
HUMAN CAPITAL	Products training	0.900			
	Training in production technologies	0.841			
	Training center	0.636			
	Recruitment announcement		0.939		
	Recruitment criteria		0.893		
	Detailed structure of employees		0.774		
	Mind of innovation			0.715	
	Professional qualification			0.673	
	Cronbach Alpha	*0.6919*	*0.6040*	*0.4722*	
	%	*26.975*	*22.392*	*13.473*	
RELATIONAL CAPITAL	Renewal of purchases	0.815			
	Charitable activities	0.787			
	New customer	0.575			
	To answer to waiting of customers		0.778		
	Valorization of mark		0.651		
	Evolution of sales		0.604		
	Club / cards of faithfulness			0.796	
	Logo of marks			0.730	
	Target				0.741
	Channels of distribution				0.553
	Cronbach Alpha	*0.5387*	*0.3896*	*0.5099*	*0.1735*
	%	*13.016*	*12.205*	*12.107*	*8.874*
ORGANIZATIONAL CAPITAL	Managerial philosophy	0.801			
	Company culture	0.760			
	Quality control		0.766		
	Environment		0.719		
	Detail of the production		0.695		
	Knowledge management		0.594		
	Network			0.792	
	Process management			0.639	
	Cronbach Alpha	*0.6976*	*0.6272*	*0.49*	
	%	*14.682*	*14.187*	*12.989*	
COMPETITIVE CAPITAL	Competitive position	0.892			
	Competitors/ competition	0.810			
	Intensify differentiation		0.845		
	Competitive disadvantage		0.793		
	Cronbach Alpha	*0.27*	*0.5508*		
	%	*21.768*	*15.801*		

Confirmatory analysis, Measurement validation:

We use the partial least squares (PLS-Graph 3.0, Chin, 2000) approach to estimate a measurement scale of the voluntary disclosure on intellectual capital. Unlike the covariance-based approach to structural equation modeling implemented by, for example, LISREL, PLS path modeling is component based and therefore does not require multivariate normal data, places minimum requirements on measurement levels, and is more suitable for small samples (Chin, 1998; Falk & Miller, 1992; Holland, 1999; Tenenhaus et al., 2005). In addition, PLS path modeling is more appropriate for models that contain complex relationships, a large number of manifest variables (>25), both, as our conceptual model does (Chin, 1998; see Table 2).

In our study, we specify reflective indicators for all our constructs. To assess the psychometric properties of the measurement instruments, we specify a null model with no structural relationships. We evaluate reliability by means of composite scale reliability (CR; Chin, 1998; Fornell & Larcker, 1981) and average variance extracted (AVE; Chin, 1998; Fornell & Larcker, 1981). For all measures, the CR is well above the cut-off value of .70, and the AVE exceeds the .50 cut-off value (Fornell & Larcker, 1981). In addition, we evaluate convergent validity by inspecting the standardized loadings of the measures on their respective constructs (Chin, 1998; Howell & Aviolo, 1993) and find that all measures exhibit standardized loadings that exceed .70 (Hulland, 1999). The CR and AVE calculated on the basis of these loadings still fulfill the necessary requirements with regard to the cut-off values (Table 8).

Table 6

Convergent validity

Constructs	Items	Loadings	T Student	Composite reliability	AVE
Training capital	Product training	0.9597	10.3184	0.959	0.921
	Training in production techniques	0.9597	10.3184		
Recruitment capital	Recruitment advertisement	0.9433	20.1336	0.942	0.890
	Recruitment criteria	0.9433	20.1336		
Customer capital	Procurement Renewal	0.8525	23.9070	0.842	0.727
	Typology of new clients	0.8525	23.9070		
Process capital	Management philosophy	0.9297	43.6975	0.927	0.864
	Corporate culture	0.9297	43.6975		
Knowledge capital	Quality control	0.8493	12.7097	0.825	0.546
	Environment	0.8099	11.5425		
	Process management	0.6112	2.8658		
	Knowledge management	0.6578	3.9460		
Capital risks/ competition	Competitive disadvantage	0.8307	12.9490	0.817	0.690
	Intensify differentiation	0.8307	12.9490		

We next assess the discriminant validity of the measures. A construct should share more variance with its measures than it shares with other constructs in the model (Chin, 1998; Howell & Aviolo, 1993), so the square root of the AVE should exceed the intercorrelations of the construct with the other constructs in the model (Fornell & Larcker 1981). In our study, none of the intercorrelations of the constructs exceed the square root of the AVE of the constructs (Table 9). Consequently, we conclude that all constructs exhibit satisfactory discriminant validity.

Table 7

Discriminant validity

	Training capital	Recruitment capital	Customer capital	Process capital	Knowledge capital	Capital risks/ competition
Training capital	0.959					
Recruitment capital	0.070	0.943				
Customer capital	-0.011	0.018	0.829			
Process capital	0.518	0.104	0.429	0.929		
Knowledge capital	0.480	0.634	0.123	0.416	0.739	
Capital risks/ competition	0.012	0.260	0.427	0.407	0.250	0.758

3.3. The contribution of the publications on the intellectual capital in firm valuation

In this section, we try to clarify the relationship between voluntary disclosure on the intellectual capital and firm valuation. Therefore, we have to introduce the variables, the methods of analysis and the data.

Variables

Table 8 summarizes the variables.

Sample

The sample already used for the construction and the validation of a measurement scale of the voluntary disclosure of the intellectual capital consists of 71 multinational companies. We choose to work on multinational enterprises listed on the UK market (52 multinational companies). We only obtain the market capitalization of 41 multinational companies at the end of April 2006.

Methods of analysis

The hypotheses lead us to propose two conceptual models. The first model is to verify the impact of a global score of the voluntary disclosure of the intellectual capital on the investors' perceptions. The second model tests the contribution of publication on each intangible component to evaluate the firm. So, we use a structural equation.

Table 8
Variables

	Variables	Measures	Previous studies
Firm value	Market to Book Value	Market capitalization (closing price, end of April 2006)/Book value	Ghosh and Wu (2007), Abdolmohammadi (2005)
	TUBIN Q	Market capitalization (closing price, end of April 2006)/replacement value of fixed capital	Ghosh and Wu (2007), Abdolmohammadi (2005)
Voluntary disclosure on intellectual capital	Human capital, capital organizational, relational capital, competitive capital	Latent variables measuring the extent of publication provided by the company during the year 2005, depending on items selected following the exploratory factor analysis and confirmatory.	Wang and Chang, (2008), Abdolmohammadi (2005), Guthrie (2002), Edvinsson et Malone (1999)
Control variables	Sector	Dichotomous variable: 1 for firms whose business is based on knowledge and 0 otherwise	Béjar (2007), Bozzolan et al. (2006), Abdolmohammadi (2005), Williams (2001)
	Geographical region	0: U.S. multinational 1: European multinational 2: Asian multinational	Adams & Kuasirikun, (2000)
	International group	Number of host countries	Mihaïlesco (1998)
	Size	Total assets	Hossain et al. (1995), Belkaoui (2003)
	ROA	Return on Assets	Wang & Chang (2008), Williams (2003)
	Debt	Total debt /Equity	Williams (2003), Belkaoui (2003)

The results of the structural equations

The analysis of structural equation of the first model allows us to check the impact of the accounting performance on the market value of the company (the value of T of STUDENT is 2.3162). Contrary to that, the examination of Student's T permits us to conclude that neither the sector which the company belongs to, nor the geographical region, nor the size, nor the debt influence the value of the companies. Furthermore, the results affirm the role played by the voluntary disclosure of the intellectual capital in the evaluation of the company (T= 2.2772>1.96). Moreover, the examination of the causal relationships shows that the coefficient associated to the link between the voluntary disclosure of the intellectual capital and corporate value is statistically significant. The information, provided by the company on its intellectual capital and accounting performance, explains 54.5% of its market value. As a result, we can validate the first hypothesis (H1). Our findings reaffirm that the gap, which has steadily widened between the market value and book value, shows the increasing irrelevance of financial reporting and encourages companies to improve their non-financial publications on the intellectual capital (Sveiby, 2000, Lev & Zarowin, 1999; Edvinsson & Malone, 1997). This reminds us of the contributions of Collins et al. (1997), Francis and Schipper (1999) and Wang and Chang (2008) who show that the voluntary information provided by the company on its intellectual capital reduces information asymmetries, raising some uncertainties and thus help in evaluating companies in a more precise way.

The relationship between the voluntary disclosure of the intellectual capital and the market value of the company is negative and significant. This finding is contrary to our expectations but may still be explained. In a sample of 31 companies listed on the U.S. market during the period from 1996 to 2000, Williams (2001) shows that the added value estimated by the investors declines immediately after the publication of information on the efforts of innovation and R&D within the company. Such reporting then reveals the competitive advantages of the enterprise and the steps implemented by the company to block the competition. Similarly, Sionnier et al. (2007) show that managers of large companies reduce the content of their annual reports on the intellectual capital to maintain their competitive advantages. In this sense, companies will have no incentive to publish information disclosing their policy of differentiation (Desbrières, 1998; Martory, 1998).

In Model 2, the constructs (Comp-hum, Comp-relation, Comp-org and Comp-Comp), which measure the publications on each component of intellectual capital, are used. This model explains 64.8% of the variance. The examination of the causal relationships shows that the coefficient associated to the link between accounting performance of the company and its market value is statistically significant at the 5% significance (values of T of STUDENT is 2.6005). The revalidation of this relationship permits us to conclude the importance of the role played by the variable "accounting performance" in the assessment of the company. In addition, the analysis of the structural equation show that the investors

have taken into account the level of debt to assess the multinational companies (β=0.396, T=1.6792). Furthermore, in Model 2, we note that only the construct "Comp-Com" is significant at α=0.05 level. In other words, the publication on human capital, organizational capital and relational capital does not contribute to the evaluation of the company. Our results could be explained by the fact that the publication on the competitive capital shows the competitive advantages which the company has compared to its competitors, the means used to counter the competition and maintain a competitive advantage (Watson et al., 2005; Rothberg and Erickson, 2002). Indeed, several companies have been unable to provide the market with a successful R&D, while others have prospered without a lot of R&D, but thanks to the methodical use of their human capital and the promoting innovation within their organization (Jaruzelski et al., 2005, Wang & Chang, 2005). The information published on each component of the intellectual capital can only contribute to the evaluation of the company, if it describes the prosperity of the company. For example, the knowledge, the skills and the experience of the employees will be valued by investors if the company provides information reflecting their ability to improve the managerial strategies and innovations which in turn strengthens the relationships with the customers. These results go side by side with findings of Wang and Chang (2005) who showed that the human capital does not create wealth alone and must be combined with other intangibles. Indeed, several companies have been unable to provide the market with a successful R&D, while others have prospered without a lot of R&D, but thanks to the methodical use of their human capital and the promoting innovation within their organization (Jaruzelski and al., 2005, Wang and Chang, 2005).

Table 9
Results of structural equations

Hypotheses	Model 1		Model 2	
	ß	T	ß	T
SCOREVAL	-0,349	2,2772*	-	-
Comp-hum → VAL	-	-	0,185	0,7680
Comp-rel → VAL	-	-	0,150	0,9036
Comp-org → VAL	-	-	- 0,371	1,6212
Comp-conc → VAL	-	-	0,458	2,567*
Sector → VAL	0,107	0,5510	0,035	0,1671
Internationalisation → VAL	0,201	1,5623	0,201	1,2555
Geogaphical region → VAL	0,090	0,5044	0,152	0,8400
Size → VAL	0,298	1,5110	0,298	1,3620
Accounting perf → VAL	0,254	2,3162*	0,297	2,600*
Debt → VAL	0,400	1,5766	0,396	1,679**
R² (VAL)	0,545		0,648	

4. Conclusion

The objective of this research is to clarify the relationship between voluntary disclosure on the intellectual capital and firm valuation. The empirical verification of this issue requires a definition of the various components of the intellectual capital and a construction of the measurement scale of the voluntary disclosure of the intellectual capital. A qualitative methodology allowed us to propose a final conceptual typology of intellectual capital. The validation methodology of the index is based on factor analyses. These methodological steps identify the structure of the voluntary disclosure on the intellectual capital in four parts: the human capital (training capital, recruitment capital), the organizational capital (process capital, knowledge capital), the relational capital and the competitive capital. Finally, we proved that the publication provided by the company on its intellectual capital is informative for the financial market. Therefore it reduces information asymmetries and uncertainty. Companies adopt communication strategies that have a financial impact on the content of the annual reports. The leaders of large companies reduce their reporting on the intellectual capital to maintain their competitive advantages. So, we show the contribution of the information, which describes the ability of competitive advantages and the steps taken to counter the competitive risks, in evaluating the company by the financial market. Our findings provide investors with a means to evaluate companies and their future growth opportunities.

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