



Intellectual capital disclosure and market capitalization

Intellectual
capital disclosure

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Abstract

Purpose – This paper aims to develop a descriptive framework of the components of intellectual capital in annual reports. The paper also aims to investigate the effects of disclosure of intellectual capital on market capitalization.

Design/methodology/approach – The components of intellectual capital are used as units of analysis to content analyze the annual reports of a sample of 58 *Fortune* 500 companies over the five-year period of 1993-1997.

Findings – The frequency of disclosure of information about brand and proprietary processes has increased over the study period. The results also point to significant differences between the “new” and “old” economy sectors with respect to intellectual capital categories of brand and partnerships where there is more disclosure by “old” economy sector and information technology and intellectual property where there is more disclosure by the “new” economy sector. Finally, the results show a highly significant effect for the intellectual capital disclosure on market capitalization.

Research limitations/implications – The time period is limited to the years before the market excesses of the late 1990s and the market decline of the 2000s. The results have significant implications for setting standards of disclosure of intellectual capital in annual reports.

Originality/value – This is the first paper to provide information on disclosure of intellectual capital by fortune 500 companies in the USA. Its results have value for various users of annual reports who seek to understand the ways in which companies disclose information about their intellectual capital.

Keywords Intellectual capital, Intangible assets, Disclosure, Capitalization

Paper type Research paper

Introduction

This paper has three objectives. The first is to explore the intellectual capital (IC) literature and develop a descriptive framework of categories and components of IC. This framework is more detailed in nature than those found in the literature (e.g. Brooking, 1996; Guthrie *et al.*, 2003). The development of the detailed framework is important because it can be helpful to companies in their efforts to disclose voluntary information, particularly under the Securities and Exchange Commission’s (SEC’s) (2000) *Regulation FD*. It also responds to calls by current and former (e.g. Wallman, 1995, 1996) SEC commissioners for disclosure of IC information in annual reports. The recent collapse of Enron, a giant energy trading company whose annual reports did not adequately disclose certain accounting information about special purpose partnerships, has fueled public, congressional, and regulatory attention on

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disclosure of various types of information, including IC (see Lev, 2002)[1]. Finally, while the Financial Accounting Standards Board (FASB, 2003) has recently tabled a project on developing guidance on disclosure of intangibles that it had placed on its technical agenda in 2002 (FASB, 2002), there are calls in the financial press (e.g. Wallison, 2003) for disclosure of IC by public companies, and for FASB's attention to the issue.

The second objective of this research is to use the components of the descriptive IC framework to content analyze a sample of *Fortune* 500 companies' annual reports for evidence of IC disclosure. Specifically, the paper presents evidence on the nature and extent of disclosure of IC in annual reports over a five-year period. The data collected provide evidence of changes in disclosure over the study period. The data also present evidence on whether there are differences between "new" and "old" economy sectors. This is important because the literature (e.g. Sullivan, 2000, p. 111) suggests that the importance of IC has increased over the years, particularly for the companies in the "new" economy in the 1990s.

The final objective of this research is to investigate the effects of IC disclosure on firms' market capitalization over the five-year study period of 1993-1997. This period is appropriate for analysis because it predates the market excesses of the late 1990s, and it is not affected by the market declines of the post 2000 years[2]. While voluntary disclosure has been shown to be positively correlated with stock valuation in the past (e.g. Lang and Lundholm, 2000; Healy *et al.*, 1999), the relationship between IC disclosure and market capitalization has not specifically been investigated. This objective is important to document the effects of IC disclosure on the stock market's valuation of the firm.

In the remainder of this paper, the background literature leading to the research hypotheses is discussed. This is followed by a description of the research method used and the results. The final section provides a summary and conclusions of the findings, as well as the study limitations.

Background and hypotheses

Definition and framework

It is difficult to provide precise definitions for intangible assets and IC (Blair and Wallman, 2001, p. 9; Lev, 2001a, p. 5). Thus, the definitions found in the literature are decidedly broad. According to Stewart (1994a, p. 24), IC is composed of the intangible assets of knowledge, skill, and information systems. Based on a statement from Leif Edvinsson, the then director of Intellectual Capital at Skandia AFS, Stewart (1994b, p. 71) states that IC consists of two components of human capital and structural capital where "Human capital captures the value of a company's employees and their knowledge, while structural capital is the information systems, knowledge of market channels and customer relationships, and management focus". However, a single definition of IC adopted by one company may not generalize to other companies because IC is closely tied to the industry and the specific company it serves (Upton, 2001, p. 39).

Other definitions in the literature include Moore (1996, p. 36) who defines IC as customer capital, innovation capital, and organizational capital. The Canadian Imperial Bank of Commerce uses indices such as new ideas generated and implemented, new products introduced, and the proportion of income from new

revenue streams (Stewart, 1994b, p. 74). A more comprehensive and generic framework is presented by Brooking (1996). This framework has the following categories of IC:

- market assets (consisting of service or product brands, backlog, customer loyalty, etc.);
- intellectual property assets (patents, know-how, trade secrets, etc.);
- human-centered assets (education, work-related knowledge, vocational qualifications, etc.); and
- infrastructure assets (management philosophy, corporate culture, networking systems, etc.)

Brooking's (1996) framework has been used by researchers extensively over the years. These researchers have also extended and refined Brooking's framework to make it more encompassing. For example, Guthrie and his colleagues have used various versions of Brooking's (1996) framework to content analyze the annual reports of Australian companies. The latest refined revision is presented in Guthrie *et al.* (2003). This framework has three categories and 18 components. The three IC categories are:

- (1) internal capital with six components (e.g. intellectual property);
- (2) external capital with seven components (e.g. brands); and
- (3) human capital with five components (e.g. training).

The current study extends Guthrie *et al.*'s (2003) framework further into a more detailed framework with ten IC categories and 58 IC components. To accomplish this task, the author investigated the extant IC literature to describe various components of IC. For example, terms like "knowledge", "expertise", "competitors", "information technology", and "R&D" were adopted from Sveiby's (1997) book. Trademark, patents, copyrights, brand and R&D were addressed in a number of publications such as Rivette and Kline (2000); and proprietary process, soft assets, know-how and patents were adopted from Stewart (1994b). As can be inferred from this representative list of references, there was much overlap in the use of terms such as "R&D", "brand" or "patents" in different publications. Altogether, a list of 58 components was developed. These components were then aggregated into ten broader IC categories that are listed below in alphabetical order[3]:

- (1) *Brand* (n = 5). "Brand", "Brand recognition", "Brand development", "Goodwill", and "Trademark" – all relate to company brand name/logo as having intrinsic value in and of itself.
- (2) *Competence* (n = 11). "Intelligence", "Knowledge", "Know-how", "Education", "Competence", "Motivation", "Expertise", "Intangible skills", "Brain power", "Specialist" – these components relate to qualities possessed by employees. "Training," which is a logically separate but related concept (as it is an ongoing process, rather than an employee attribute) is also included in this category.
- (3) *Corporate culture* (n = 4). "Corporate culture", "Management philosophy", "Leadership", "Communication" – these are environmental components that facilitate a creative/productive workplace.
- (4) *Customer base* (n = 8). "Customer satisfaction", "Customer recognition", "Customer loyalty", "Customer base", and "Customer retention" – all relate to

customer base as an asset. "Customer service" and "Customer support" are also included. These components are logically separate issues (methods of retaining/expanding the customer base), but which received a significant number of hits in the financial reports and are related concepts. "Market share" is also included in this IC category because it relates to acquiring and maintaining a customer base.

- (5) *Information technology* (n = 7). "Information technology", "Network", "Computer software", "Operating systems", "Electronic data interchange" – all relate to the hardware/software of information management. "Telecommunication" and "Infrastructure" which could relate to IT, but not necessarily so, are also included in this category.
- (6) *Intellectual property* (n = 7). "Intellectual property", "Patents", "Copyright", "Soft assets". These components are the traditional balance sheet "intangibles", which are typically defined and protected assets. Also included in this category are "Licensing agreement" and "Franchising agreement". which are separate but related concepts.
- (7) *Partnership* (n = 2). "Partnership" and "Joint venture." This category refers to working arrangements with other entities that produce something neither entity could produce individually. Each term generated numerous hits in the literature, supporting its importance as a stand-alone category.
- (8) *Personnel* (n = 7). "Human resource", "Employee satisfaction", "Personnel", "Employee retention", "Flextime", "Telecommuting", "Empowerment." – these components relate to the "People" asset of a company, either directly or referring to specific policies that help retain qualified employees.
- (9) *Proprietary process* (n = 6). "Innovation", "Innovative", "Proprietary process", "Trade secrets", and "Methodologies". These components relate to better ways of delivering goods and services. Also included in this category is "Value added", which is a separate but related concept.
- (10) *R&D* (n = 1). This component is a stand-alone category, relating to the ongoing search for new products or services. It is an important concept frequently mentioned in the literature that is logically separate from all other IC components.

As the list above shows, the largest number of IC components was 11 in the IC category, Competence. Examples of IC components in this category are "Intelligence", "Knowledge", and "Brain power" These IC components relate to qualities that employees possess and put to work for the benefit of their employer. A related group of seven components such as "Human resources", "Employee satisfaction", and "Flextime" were classified as an IC category called Personnel. This category relates to a company's policies and actions that help retain qualified employees. For example, "Flextime" is a program designed by employers to keep valuable employees who need flexible schedules due to personal needs. Customer base is an IC category that has eight components which relate to acquiring and retaining customers. Its components include "Customer satisfaction", "Customer base", and "Customer retention".

Information technology and Intellectual property are two categories with seven components in each. The former has components such as "Network", "Computer

software”, and “Electronic data interchange”, while the latter has “Patents”, “Copyrights”, and “Intellectual properties”. Some authors (e.g. Stewart, 1994b) use “Soft assets” as synonymous with patents, copyrights, and other intangibles that are generally defined as protected assets. Consequently, “Soft assets” are included as a component in the IC category “Intellectual property”.

The next category, Proprietary process, relates to ways to deliver goods and services and thus covers six components such as “Innovative”, “Trade secrets” and “Methodologies”. The categories “Brand” with five components (e.g. “Brand development”) and “Corporate culture” with four components (e.g. “Management philosophy”) are next, followed by “Partnership”, which contains the two components of “Partnership” and “Joint venture”. The final category is “R&D” with only one component, “R&D”. This category relates to the ongoing search for new products or services and is found frequently in the literature, as well as in annual reports as an important IC asset.

Disclosure of IC components in annual reports

Using the IC components identified in the previous list, the author investigates the extent of disclosure of information by a relatively large sample of *Fortune* 500 companies over the years 1993-1997. The evidence provided on the disclosure of IC in annual reports is helpful in understanding the state of IC disclosure by public companies in the 1990s – a particularly timely issue due to the renewed emphasis on transparency in disclosing information.

Very little evidence is reported in the literature on the nature and extent of disclosure of IC in annual reports, particularly for the US companies. However, small-scale studies of companies’ annual reports in other countries are reported in the literature. For example, Guthrie and Petty (2000) report on the frequency of the appearance of some IC components in annual reports of the 20 largest Australian companies. Brennan (2001) presents evidence from annual reports of 21 Irish companies, Olsson (2001) reports on the 18 largest Swedish companies, and Bozzolan *et al.* (2003) report a content analysis of the annual reports of a sample of Italian companies. Finally, Goh and Lim (2004) provide evidence of disclosure of IC in annual reports of 20 Malaysian companies. Collectively, these studies indicate that disclosure of IC in the annual reports of the companies investigated is quite limited.

Evidence from annual reports of US companies is needed because the SEC has, for many years, advocated that public companies fully disclose material and relevant information to the public, and the *Regulation FD* (SEC, 2000) prohibits the non-public release of material information to a select group such as financial analysts. *Regulation FD*’s intent, per the SEC, is to promote the full and fair disclosure of information, both good and bad, by issuers[4]. While SEC’s *Regulation FD* does not specifically identify IC disclosure, there are comments by a number of SEC commissioners (e.g. Wallman, 1995, 1996; Blair and Wallman 2001, that indicate the importance of IC disclosure by public companies.

Recognizing the benefits of increased disclosure, particularly of intangibles, the FASB has also taken significant initiatives in recent years. Specifically, it established a steering committee to study ways in which voluntary disclosure of IC could be facilitated. Although the committee’s report provides insights for enhancing voluntary

disclosure of intangible information, the FASB later recognized that stronger guidance was needed. It stated that:

Without the leadership of the FASB, the IASB, or other standard-setting or regulatory bodies, it is unlikely that companies will consistently provide financial statement users with reasonably comparable information about intangible assets (FASB, 2001).

Consequently, the FASB (2002) added to its technical agenda a project entitled “Disclosure of Information about Intangible Assets Not Recognized in Financial Statements”, with a projected final statement by the first half of 2003. However, due to the presence of more pressing agenda items the FASB tabled this issue in early 2003, stating that:

When resources become available and the Board recommences work on this project, it will establish a new target date for issuance of an Exposure Draft of a proposed Statement (FASB, 2003).

In a special research study leading to this project, the FASB’s research staff identified the importance of attention to the disclosure of intangible assets for all companies, but particularly for companies in the new economy (Upton, 2001). The report states that:

The FASB Business Reporting Research Project has found that businesses, at least the companies studied in the project, already provide significant non-financial information. Indeed, with a few changes in jargon, the AICPA and FASB could reasonably claim to have been studying “intellectual capital” since 1991 (Upton, 2001, p. 52).

However, the report acknowledges that there are difficulties in developing standardized metrics for measuring IC, resulting in the FASB’s decision to limit the scope of its technical agenda to intangible assets.

There is also recognition that IC has become a larger proportion of the assets of companies in the 1990s (see Sullivan, 2000, p. 111). Hall and Cummins (2000) estimate that the value of intangible assets has increased to approximately three times that of the replacement cost of tangible assets in the 1990s. While there is no specific evidence on the nature and extent of information on these intangible assets, the FASB special report suggests that companies have begun reporting significant non-financial information in the 1990s. The current study provides evidence on the nature and extent of IC disclosures in the 1990s, including changes in the frequency of IC disclosures during the five years under investigation (1993-1997). Based on the literature reviewed above, there is an expectation that an increasing trend in disclosure of IC in annual reports will be observed. Thus, the first hypothesis is stated as:

H_1 . The disclosure of IC components increased over the years 1993-1997.

The FASB special report recognizes that IC information is inherently idiosyncratic to particular industries and perhaps to individual enterprises (Upton, 2001, p. ix). The FASB’s report also suggests that there are differences in IC disclosures between industries, between companies within an industry, and particularly between companies in the “new” vs the “old” economy sectors. However, very little empirical evidence is reported on this issue in the literature. An exception is Bozzolan *et al.* (2003) who found industry effects in the IC disclosure by Italian companies, but no clear pattern of differences emerged from their study. Consequently, two industry effect hypotheses are stated in the null form as follows:

H_{2a} . There are significant industry effects with respect to the disclosure of IC components in annual reports.

H_{2b} . There are significant differences between “new” and “old” economy sectors with respect to the disclosure of IC components in annual reports.

While these hypotheses are stated in the null form, one can argue for disclosure of categories such as Intellectual property and Information technology to be more frequent in the annual reports of “new” economy sectors than the “old”. Conversely, the more established “old” economy companies can be expected to disclose more frequently on categories such as established Brands and Partnerships.

Effects of IC disclosure on market capitalization

A research question is whether disclosure of IC has any effect on a firm’s market capitalization. While there is no direct evidence in the literature regarding the effects of disclosure of IC components on market capitalization, studies in other contexts provide evidence of a significant effect of voluntary disclosure on trading volume and market capitalization. For example, Lang and Lundholm (2000) report that firms with high levels of disclosure experience price increases prior to their public offering. Furthermore, while firms with consistently high levels of disclosure experience only minor price declines at the offering announcement relative to the control firms, firms that substantially increase their disclosure activity in the six months before the offering suffer much larger price declines at the announcement of their intent to issue equity.

Healy *et al.* (1999) find that expanded disclosure leads investors to revise upward valuations of the firms’ stocks, increases stock liquidity, and creates additional institutional and analyst interest in the stocks. These results and those reported by Lang and Lundholm (2000) are consistent with prior literature (e.g. Verrecchia, 1983; Healy and Palepu, 1993; Skinner, 1994; Welker, 1995; Botosan, 1997), indicating that expanded disclosure, if credible, reduces misevaluation of firms’ stock prices, and improves market capitalization. These results imply a positive correlation between disclosure and market capitalization. Thus:

H_3 . The frequency of IC disclosure has a significant effect on market capitalization of the firm.

Other variables that could affect market capitalization of the firm include firm’s net worth. Choi *et al.* (1997, pp. 357-8) formulate market value as a function of total assets minus total liabilities where assets and liabilities are priced by the market “irrespective of whether or not they appear on the firm’s accounting balance sheet”. However, data on market values of net assets are difficult to find unless a firm’s fair market value is assessed for the purpose of merger or acquisition. Given this difficulty, researchers (e.g. Bowen *et al.*, 2002; Roos *et al.*, 1998) suggest the use of book value. In this study, the logarithm of the firm’s value is used as a control variable in the regression that is specified later.

Another plausible control variable is the difference between a firm’s return on assets and its industry average (ROADiff). Bowen *et al.* (2002) present market capitalization as a function of revenue, earnings, book value, and total assets of the firm. I include ROADiff as a variable to capture the essence of revenue, earnings, and total assets of a

firm *vis-à-vis* its industry. There is support for this argument in the literature (e.g. Lev, 2001b; Stewart, 1995) indicating that the return on assets (ROA) differential method is associated with the value of a firm's IC.

In summary, the logarithm of market capitalization of firm *i* in year *t* (LogMC_{it}) is used as the dependent variable in a regression model specified as:

$$\text{LogMC}_{it} = \alpha_0 + \alpha_1 \text{ICD}_{it} + \alpha_2 \text{LogBV}_{it} + \alpha_3 \text{ROADiff}_{it} + \varepsilon \quad (1)$$

where ICD is the frequency of IC disclosure, LogBV is the logarithm of the difference between total assets and total liabilities, and ROADiff is the difference between a firm's ROA and its industry average.

Data collection

A random sample of *Fortune* 500 firms was selected for content analysis of their annual reports over the five-year period of 1993-1997. The choice of *Fortune* 500 companies was made to limit the analysis to the largest companies and thus, to reduce the chances of a size effect. The literature indicates that size is associated with level of voluntary disclosure (e.g. Chow and Wong-Boren, 1987; Meek *et al.*, 1995; Eng and Mak, 2003). By using the large *Fortune* 500 companies, the analysis is limited only to large companies, thus mitigating the possibility of a size effect.

The primary sampling criterion was to have a sample small enough to allow for the highly time-consuming content analysis, and yet large enough to render a reasonable size for statistical analysis. Specifically, an initial sample of 60 companies was randomly selected, of which two companies were used for pilot study and training of the coder, leaving 58 companies (284 usable annual reports) for the main study[5].

The companies in the sample and their primary industries are presented in columns 1 and 2 of Table I. The primary industry classification is based on Dun & Bradstreet Information Services's (1993-2000) *Industry Norms and Key Business Ratios*. Column 3 presents a classification of the primary industries into "new" and "old" economy. While companies in the computer, software, electronic and semiconductors industries are classified as "new" economy, the remaining industries are coded as "old" economy companies[6]. Also provided is the average market capitalization of the firms (i.e. beginning and ending market capitalization divided by two) for the first year of analysis (1993). The market capitalization data were collected from Bloomberg and Market Guide databases. As presented in Table I, the average of the market capitalization for the "new economy" sample ($n = 23$) in 1993 was \$13,516 million with a standard deviation of \$19,478 million. In contrast, the average of the market capitalization for the "old economy" sample ($n = 35$) in 1993 was \$13,723 million with a standard deviation of \$11,251 million. These averages were not significantly different in statistical terms (t -statistic = 0.05, $p = 0.96$). Other company-specific data were compiled from Standard and Poor's Research Insight (Compustat) database and industry averages from Dun & Bradstreet Information Services (1993-2000).

Content analysis has been reported as a reasonable methodology for data collection (Krippendorff, 1980). Gray *et al.* (1995) report on the use of this method for studying accounting annual reports in general and Guthrie *et al.* (2004) detail the usefulness of the method for investigating disclosure of IC in annual reports. The main premise of content analysis is that the frequency with which a unit of analysis (i.e. a term, a sentence, or a paragraph) appears in a text indicates importance of the unit. The most

Company	Industry	New/old	1993 market cap (\$millions)
Apple Computer	Computers and office equipment	N	2,714.936
Compaq Computer Corp.	Computers and office equipment	N	6,231.208
Dell Computer	Computers and office equipment	N	8,34.438
Gateway 2000 Inc	Computers and office equipment	N	1,420.536
Hewlett Packard	Computers and office equipment	N	18,605.944
IBM	Computers and office equipment	N	32,848.308
Pitney Bowes	Computers and office equipment	N	6,544.449
Sun Microsystems	Computers and office equipment	N	3,025.068
Xerox	Computers and office equipment	N	9,305.904
Cisco Systems	Electronics and electric equipment	N	6,417.353
EMC Corp	Electronics and electric equipment	N	3,090.912
Emerson Electric	Electronics and electric equipment	N	13,232.922
General Electric	Electronics and electric equipment	N	89,526.649
Raytheon	Electronics and electric equipment	N	8,924.124
Rockwell International	Electronics and electric equipment	N	7,956.000
Seagate Technologies	Electronics and electric equipment	N	1,081.961
Intel	Semiconductors	N	25,916.000
Micron Technology	Semiconductors	N	2,140.284
Motorola	Semiconductors	N	25,700.851
Texas Instruments	Semiconductors	N	5,766.880
Autodesk	Software	N	1,228.545
Lotus Development Corp	Software	N	Not available
Microsoft Corp	Software	N	24,846.000
Allied Signal	Aircraft parts	O	12,211.444
McDonnell Douglas	Aircraft parts	O	4,208.096
Northrop Grumman	Aircraft parts	O	1,828.123
Banc One Corp	Banks	O	13,540.341
Bank America Corp	Banks	O	13,274.345
Bankers Trust	Banks	O	6,377.712
Chase Manhattan Corp	Banks	O	10,146.890
Citicorp	Banks	O	12,717.256
First Chicago NBD	Banks	O	4,781.271
First Union Corp	Banks	O	7,026.442
JP Morgan & Co.	Banks	O	13,395.411
Nations Bank	Banks	O	13,274.345
Air Products	Chemicals	O	4,423.390
Arco Chemical Co	Chemicals	O	4,151.957
Dow Chemical	Chemicals	O	15,577.080
EI Du Pont	Chemicals	O	32,693.092
Lyondell Petro Chemical	Chemicals	O	1,700.000
Monsanto	Chemicals	O	8,509.739
Praxair	Chemicals	O	2,235.231
Ford Motor	Motor vehicles and parts	O	32,185.500
General Motors	Motor vehicles and parts	O	39,515.761
Tenneco	Motor vehicles and parts	O	8,934.988
TRW	Motor vehicles and parts	O	4,418.150
Chrysler Corp	Motor vehicles and parts	O	18,836.016
Olin	Nonferrous metal	O	943.161
Occidental Petroleum	Petroleum and natural gas	O	5,195.251

Table I.
(continued) Companies in the sample

Company	Industry	New/old	1993 market cap (\$millions)
Abbott Laboratories	Pharmaceuticals	0	24,325.976
American Home Products	Pharmaceuticals	0	20,903.608
Bristol Myers Squibb	Pharmaceuticals	0	29,818.525
Eli Lilly Co	Pharmaceuticals	0	17,381.912
Johnson & Johnson	Pharmaceuticals	0	28,853.773
Merck	Pharmaceuticals	0	43,104.018
Rohm & Haas	Pharmaceuticals	0	4,024.877
Warner Lambert	Pharmaceuticals	0	9,054.450
ITT	Pumps and pumping equipment	0	10,727.441
	Total new economy	23	Mean (Std dev.): 13,516 (19,478)
	Total old economy	35	Mean (Std dev.): 13,723 (11,251) Two-sample <i>T</i> -stat (<i>P</i> -value): 0.05 (0.96)

Table I.

reliable form of content analysis is to search the text for specific terms, so that the coder does not have to make any subjective judgment about the meaning or importance of the subject matter that may be required in coding sentences and paragraphs. Content analysis also requires training of the coder. The annual reports of two companies for five years were as a pilot study to train the coder who was a graduate student in accounting.

Since the objective of the study was to investigate the disclosure of any information about IC, no distinction was made between IC-Components that were recognized in the body of the financial statement (e.g. goodwill in the balance sheet), or those that were disclosed somewhere in the footnotes, or in the management discussion and analysis section of the annual report (e.g. training). Also, no attempt was made to classify the disclosed IC components as required or voluntary as this was not intended as a purpose of the study.

Results

Nature and extent of IC disclosure

Table II presents descriptive statistics on the frequency of disclosure of various IC categories in the annual reports. The mean, standard deviation, coefficient of variation (COV), and the range are provided. Three sets of statistical analyses were performed on the data in Table II. First, analysis of variance was used to test for differences in the mean number of disclosures relating to IC categories and their IC components[7]. This analysis found significant differences for the IC categories and IC components at the 0.0001 level. As shown in Table II, the IC category "Brand" has the highest frequency of disclosure with a mean of 7.23. Competence, Partnership, and Intellectual property follow this with averages of 4.82, 3.74 and 3.25 disclosures per year respectively. For the remaining IC categories, the mean frequency of disclosure per year is between two and three.

Category	Mean	Average per category		Range
		Std dev.	COV	
Brand	7.23	5.18	0.72	0-23
Competence	4.82	2.98	0.62	0-16
Corporate culture	2.02	1.39	0.69	0-10
Customer base	1.97	1.35	0.68	0-06
Information technology	2.40	1.92	0.80	0-13
Intellectual property	3.25	4.43	1.36	0-26
Partnership	3.74	3.52	0.94	0-18
Personnel	2.39	2.79	1.17	0-18
Proprietary process	2.19	1.48	0.68	0-11
R&D	2.56	2.44	0.95	0-09
Aggregate	3.26	3.40	1.04	0-26

Note: $n = 284$

Table II.
Frequency of IC
disclosure

Next, to analyze more specifically the variation between IC categories, they were classified into three levels of high, medium, and low COVs. In the “high” classification category were the two IC categories of Personnel (COV = 1.17) and Intellectual property (COV = 1.36). Three IC categories (Information technology, R&D, and Partnership) with COVs between 0.80-1.00 were classified as medium in variation, while the remaining five IC categories with COVs of 0.72 or less were classified as low in variation.

The third set of analyses relates to the aggregate results reported in the last line of Table II. The data indicate that, on average, there were 3.26 appearances per category for the ten IC categories investigated. The range was between zero and 26, which translated into a standard deviation of 3.40 and a COV of 1.04, signaling a high degree of variation between annual reports.

Changes over the years 1993-1997 (H_1)

To test for the hypothesis that disclosure of IC increased over the 1990s, an analyses of variance was performed for each of the ten IC categories, investigating the changes that have occurred in the frequency of IC disclosure over the years 1993-1997. The results are presented in Table III.

As shown at the bottom of Table III, the aggregate frequency of IC disclosure has gradually increased over the five-year period from 3.06 in 1993 to 3.52 in 1997. While the overall increase is not significant in statistical terms (F -statistic = 1.69, $p = 0.149$), the detailed results show variations in IC categories. For example, while for eight IC categories there were no statistically significant changes over the years, the increases in the disclosure of Brand ($p = 0.004$) and Proprietary process ($p = 0.012$) were statistically significant. Specifically, the frequency of disclosure of Brand steadily increased over the five-year period from an average of 5.25 in 1993 to 8.71 in 1997. Similarly, the frequency of disclosure of Proprietary process steadily increased over the five-year period from 1.88 in 1993 to 2.16 in 1996 with a significant jump to 2.79 in 1997[8]. Thus, H_1 is supported only for the increases in IC categories Brand and Proprietary process.

Table III.
Mean and standard
deviation of IC category
disclosure frequency by
year

IC categories	1993		1994		1995		1996		1997		F-stat.	Sig.
	Mean	Std dev.										
Brand	5.25	4.72	6.75	5.00	7.39	5.31	8.07	5.44	8.71	4.90	3.90	0.004*
Competence	5.16	3.44	4.91	3.06	4.81	2.85	5.11	3.87	4.13	2.60	1.09	0.361
Corporate culture	1.98	1.58	1.77	0.82	1.95	0.83	1.98	1.36	2.41	1.96	1.65	0.163
Customer base	2.02	1.38	2.05	1.32	1.81	1.26	1.88	1.26	2.11	1.53	0.49	0.744
Information technology	2.44	2.21	2.32	1.86	2.18	1.69	2.42	2.15	2.66	1.62	0.49	0.746
Intellectual property	2.51	3.01	3.14	3.98	2.91	4.04	3.81	5.28	3.91	5.39	1.03	0.392
Partnership	4.11	3.90	3.75	3.42	3.56	3.00	3.53	3.79	3.75	3.53	0.24	0.915
Personnel	2.80	3.57	2.67	2.64	2.47	2.91	1.93	2.39	2.07	2.25	1.01	0.401
Proprietary process	1.88	1.12	2.00	1.32	2.12	1.67	2.16	1.42	2.79	1.69	3.26	0.012*
R&D	2.46	2.54	2.37	2.35	2.44	2.40	2.84	2.56	2.68	2.38	0.37	0.830
Aggregate	3.06	3.19	3.17	3.21	3.16	3.31	3.37	3.67	3.52	3.58	1.69	0.149

Note: * Highly significant

Industry differences (H_{2a} and H_{2b})

The industry classification in Table I was used to investigate industry as a source of variation. However, three industries (Petroleum, Nonferrous metals, and Pumps and pumping equipment) were coded as “Other industries” for data analysis purposes because there was only one company per each of these industries in the sample.

Industry differences (H_{2a}). A series of analyses of variance were used to compare the frequencies of IC disclosure between industries for each of the ten IC categories. The results are summarized in Table IV. As expected, there were significant industry effects in the sense that, of the ten IC categories, eight showed statistically significant differences between industries. Only the Personnel and the Proprietary process categories show insignificant industry effects. For the Competence category, software companies and banks had the largest frequency of disclosure (means 7.17 and 6.26, respectively). For the Corporate culture category, the Motor vehicles and Other industries show the highest frequencies with means of 2.64 and 2.80, respectively. For the Partnership category, Chemicals, Banks, and Motor vehicles industries had the highest frequency of disclosure, and for the Brand category all industries had a relatively high frequency of disclosure except for the Aircraft and Semiconductor industries, with means of 3.43 and 3.60, respectively.

In the Customer base category, the Motor vehicles industry shows the highest frequency of disclosure, while in the R&D category, the Aircraft and Software industries show the highest frequencies. The Software industry ranks highest in the disclosure of Intellectual Property with a mean of 9.67, followed by Pharmaceuticals (5.42), Semiconductors (6.05) and Computers (5.62). Finally, while the Pharmaceuticals, Chemicals and Aircraft industries report very little about their Information Technology, the remaining industries report significantly more. Thus, as expected, there were significant industry differences in IC disclosure in annual reports.

“Old” vs “new” economy sectors (H_{2b}). The industry differences discussed above indicate significant variation in IC disclosure between industries, but they do not present a clear pattern. The differences between “new” and the “old” economy sectors were analyzed using the two-sample *t*-test. A summary of the results is presented in Table IV. These results show that there were significant differences in the level of disclosure between the “old” and “new” economy sectors for four IC categories: Partnership, Brand, Intellectual property, and Information technology. For the Partnership and Brand categories, the “old” sector provided significantly more IC

IC categories	Significant industry differences	
	10 industries	“Old” vs “new”
Brand	Yes	Yes
Competence	Yes	No
Corporate culture	Yes	No
Customer base	Yes	No
Information technology	Yes	Yes
Intellectual property	Yes	Yes
Partnership	Yes	Yes
Personnel	No	No
Proprietary process	No	No
R&D	Yes	No

Table IV.
A summary of industry effects

disclosure (mean = 4.30 and 7.67 respectively) than the “new” sector (mean = 2.88 and 6.55, respectively). The opposite was true for the IC categories of Intellectual property and Information technology, where the “new economy” sector discloses more information (mean = 5.03 and 3.19, respectively) than the “old economy” sector (mean = 2.10 and 1.89, respectively)[9].

Effects of IC disclosure on market capitalization (H₃)

The results of the regression model in (1) are presented in Table V. Also presented in Table V are the means and standard deviations of the three explanatory variables. The mean frequency of disclosure of IC regardless of its category or component is 32.57 per year with a standard deviation of 11.12. The mean book value of the firm per year is \$7,416 million with a standard deviation of \$7,314 million. Finally, on average each of the companies in the sample had 2.77 percent (Standard deviation = 8.27 percent) greater ROA than its industry averages.

As Table V shows, with an *F*-statistic of 8.54 the regression model is highly significant at the 0.000 level. The corresponding *R*-square statistic is 15.4 percent (unadjusted) and 13.6 percent (adjusted). Thus a significant variation in market capitalization is explained by the model. Specifically, in support of *H₃*, significant effect of IC disclosure on market capitalization is observed. This variable indicates a *t*-statistic of 4.35 which is significant at the 0.000 level. However, neither book value nor ROADiff indicate significant explanatory effect on market capitalization. Since the intercept of 8.95 is highly significant with a coefficient of 8.95 (*t*-statistic = 13.15, *p* = 0.000), important other explanatory variables are missing from the model.

Table VI presents a correlation matrix for the variables in equation (1). Consistent with the regression results, while LogBV is not significantly correlated with LogMC (Correlation = -0.08, *p* = 0.314) the correlation between ICD and Log MC is highly significant (Correlation = 0.228, *p* = 0.000). However, while the regression results indicate insignificant effect for ROADiff on LogMC, the correlation results indicate a significant effect (Correlation = 0.161, *p* = 0.017). Finally, the independent variables are generally not significantly correlated with the exception of ROADiff and ICD (Correlation = 0.138, *p* = 0.039). This result indicates that companies with higher levels of ROADiff had more frequency of disclosure of their ICs.

Predictor	Expected sign	Mean	Std dev.	Coefficient	<i>t</i> -stat.	Sig.
Constant				8.95	13.15	0.000
IC disclosure	+	32.57	11.12	0.04	4.35	0.000
Book value	+	\$7,416 mil	\$7,314 mil	-0.10	-1.28	0.201
ROADiff	+	2.77%	8.27%	0.02	1.57	0.119
Model <i>F</i> -statistic (sig.)		8.54 (0.000)				
<i>R</i> -square (adjusted)		15.4% (13.6%)				

Notes: *n* = 284

Model: $\text{LogMC}_{it} = \alpha_0 + \alpha_1 \text{ICD}_{it} + \alpha_2 \text{LogBV}_{it} + \alpha_3 \text{ROADiff}_{it} + \varepsilon$

where LogMC_{it} is the normal logarithm of the market capitalization of firm *i* in year *t*. ICD is disclosure frequency of intellectual capital, LogBV is the natural logarithm of the difference between total assets and total liabilities, and ROADiff is the difference between average industry ROA and firm’s ROA

Table V.
Market capitalization as a function of ic disclosure and equity

Summary and conclusions

A descriptive framework of the categories and components of IC is presented in this paper. Using content analysis of annual reports of a sample of *Fortune* 500 companies, the effects IC disclosure on market capitalization of the firm is also investigated. Specifically, based on a content analysis of 284 corporate annual reports over the years 1993-1997, empirical evidence on the nature and extent of disclosure of these IC categories and components by public companies are presented, and a highly significant and positive correlation between IC disclosure and market capitalization is found. This evidence is consistent with the literature indicating overall positive correlation between voluntary disclosure and stock market valuation. However, while neither the book value of the firm nor the difference between its ROA and its industry average had explanatory power over market capitalization, the intercept was highly significant, indicating missing explanatory variables in the regression model. Further correlation analysis indicated that the difference between a company and its industry ROA is positively and significantly associated with market capitalization and IC disclosure.

The descriptive data on the frequency of disclosure of IC components and categories provide initial evidence of disclosure of IC by public companies, with significant variation among companies within an industry, as well as between industries. While these differences did not show a clear pattern by industry, a comparison between the “old” and “new” economy sectors indicated a pattern. Specifically, these sectors do not differ on six of the ten IC categories, but while the “old economy” sector discloses significantly more about its partnerships and brands than the “new economy” sector, the opposite is true for Intellectual property and Information technology where the “new economy” sector discloses significantly more than the “old economy” sector.

The high variations between companies and industries lend support for the need for FASB’s attention to guidance on disclosure of information on corporate IC. The FASB initially placed on its technical agenda in 2002 a project called “Disclosure of Information about Intangible Assets Not Recognized in Financial Statements”, but tabled it in 2003 due to the priority of other agenda items. The initial decision to place this task on the FASB’s technical agenda was based on the result of a process that included a special report by the FASB staff (Upton, 2001) and input from constituents. The special report concluded that companies were already providing significant non-financial information in their annual reports (Upton, 2001, p. 52). However, I find evidence of an increase in the frequency of only two (i.e. Brand and Proprietary processes) of the ten IC categories over the years 1993-1997. These results indicate that the special report may have overstated the increase in the level of voluntary disclosure of intangibles over the 1990s, and thus the special report’s assessment may have

	LogMC		ICD		LogBV	
	<i>n</i>	Sig.	<i>n</i>	Sig.	<i>n</i>	Sig.
ICD	0.228	0.000				
LogBV	-0.080	0.314	0.113	0.150		
ROADiff	0.161	0.017	0.138	0.039	-0.120	0.140

Note: See Table V for variable definitions

Table VI.
Correlation matrix

understated the need for guidance from the FASB on enhanced IC disclosure. This is particularly important due to the widespread variations observed between companies even within the same industry.

The finding about industry effects also has a significant implication for authoritative guidance. The fact that some industries disclose more about some of their IC categories and components than others indicates that guidance may need to be industry-specific. For example, the results indicating that the “new” economy sector discloses more about its Intellectual property and Information systems categories than the “old economy” sector may indicate that the companies in the “new economy” either possess more of these IC categories or are more willing to disclose them. Similarly, the fact that companies in the “old economy” sector disclose more about their Brands and Partnerships may indicate that these companies either possess more of these IC categories or are more willing to disclose them. These questions need further investigation in future research.

The disclosure frequencies reported in this study are based on IC components that include both required (e.g. “Goodwill”) and voluntary (e.g. “Know-how”) elements. Since the objective of the current study was to develop a general framework of IC disclosure, the IC disclosure was not codified as required or voluntary, nor was there any attempt to differentiate the source of the disclosure in the annual reports (e.g. financial statements, notes or management discussion and analysis). There may be a need for additional research to gauge the extent of the willingness of companies to provide voluntary disclosure without giving out too much information about their proprietary processes and trade secrets. Furthermore, the issue of where in the financial statements various types of IC should be disclosed can benefit as well from further research.

There is also a cost-benefit issue relating to the nature and extent of disclosure. In order to provide disclosure, companies must make changes to their information systems to disclose IC. The design, implementation, maintenance, and operation of information systems represent additional and potentially significant costs to companies. In a commentary, the Financial Accounting Standards Committee of the American Accounting Association (AAA, 2003, p. 180) states that:

The fact that voluntary disclosures of intangible information are not widespread suggests that the net private benefits that accrue to firms from these disclosures are relatively small.

The evidence in the current study that there is a positive and significant correlation between IC disclosure and market capitalization indicates a significant benefit. It implies that there is an incentive for companies to provide voluntary disclosure about their IC. However, this benefit must be compared with the cost of accumulating and providing the information. Given the recency of the IC disclosure issues, we know very little about these costs. Thus, further research to determine specific costs and benefits will be helpful.

This study is limited to a sample of US companies that are under the accounting rules of the FASB and the disclosure requirements of the SEC. Companies in Europe and elsewhere are under different regulatory rules that may result in differing levels of disclosure. For example, some Scandinavian companies (e.g. the Swedish financial services company, Skandia) have been issuing formal and detailed IC reports with their annual reports for many years. The experience of these companies may prove to be helpful in comparative studies of European and US companies to investigate the cost and benefits of IC disclosure. For example, Skandia’s experience can be an important

source of case studies about the cost and benefits of formal IC disclosure *vis-à-vis* piecemeal approach that many US companies take in IC disclosure.

Another issue for future research is a focus on the substance of the disclosure. The evidence in this paper is based on the frequency of the appearance of keywords (i.e. IC components) in annual reports. A focus on the substance of the statements in which the key words appear will necessitate an enhanced coding structure. For example, the substance of the statements could be coded more accurately into required vs voluntary disclosure. This may be a fruitful avenue for future research.

Finally, because a keyword search was used in this study, it is unclear how much of the data relates to quantitative evidence for which either recognition or number-based footnote disclosure was provided (e.g. goodwill), and how much of the evidence is purely qualitative (e.g. training). A classification of qualitative versus quantitative IC disclosures will be desirable in future research. Related to this issue is the disclosure of quantitative measures of IC. Unfortunately, reliable measures of IC are lacking in the literature. Research is needed to provide reliable measures of IC values in the future.

Notes

1. In his testimony before the House of Representatives Committee on Energy and Commerce, Lev (2002) proposed disclosure of various components of IC (e.g. knowledge assets) as a component of a comprehensive disclosure of financial and non-financial information by public companies.
2. The selection of this period reduces the chances of the results being affected by the excesses of the late 1990s and the reversals of the fortunes in early 2000s. For example, in the late 1990s AOL was touted as a “new” economy company with tremendous IC due primarily to its customer acquisition strategies and goodwill. However, the company wrote down the value of its assets, primarily to adjust the value of its goodwill, by \$54 billion in its first quarter of 2002 (see Peers, 2002).
3. The task of searching the IC literature for IC terms, and classifying the terms into the IC components was accomplished with the help of a graduate assistant. A second graduate assistant helped with the task of grouping the 58 IC components into ten IC categories.
4. While the SEC’s (2000) FD Rule is designed to protect the investing public, full and fair disclosure of information has significant benefits for the issuing company as well because of its potential effect of reducing the cost of capital (see Lev, 2001a; Richardson and Welker, 2001). Insufficient disclosure of intangibles can have undesirable private and societal consequences of excessive cost of capital to corporations and abnormally higher insider gains by management due to the information asymmetry between management and investors (Lev, 2001a). Thus, there is a financial incentive for companies to disclose IC. The financial incentive may also include an association between the extent of disclosure and market capitalization. Disclosure of IC in annual reports has a signaling effect where IC disclosure may be positively associated with the firms’ stock price (see Healy *et al.*, 1999).
5. The sample of 58 companies over five years results in 290 annual reports. However, only 284 usable annual reports could be accessed on company websites, hard copy annual reports or electronic databases such as Global Access. The missing annual reports were due to mergers and acquisitions. For example, due to the merger of Lotus Development Corporation with IBM, Lotus’ annual reports were available only for years 1993 and 1994, resulting in three years with missing annual reports for this company.
6. Companies such as software designers for which intangible assets are highly important are classified as “new economy”. Other companies such as auto manufacturers are classified as “old

economy” only because they were established a long time ago, have standardized manufacturing technologies and high tangible assets, but are relatively less dependent on intangible assets than the newer companies. This is in line with scholars who argue that new economy companies have proportionately higher amounts of intangible assets than the old ones. For example, Baruch Lev argues that, “There has been a dramatic shift, a transformation, in what economists call the production functions of companies – the major assets that create value and growth. Intangibles are fast becoming substitutes for physical assets” (see Webber, 2000).

7. This test results in statistical significance if it detects differences with high levels of confidence of say 99 percent, which is stated as significance level of 0.01.
8. Analysis of variance was also performed for each of the 58 IC components by years 1993-1997. However, given the small means and large standard deviations, there were only two components with statistically significant changes over the years, but with little practical significance. For example, results for the IC component “Empowerment”, with an overall mean of only 0.06 frequencies per year, indicated a significant change over the five years at the 0.007 level of significance, but the frequency was too little to have practical significance. Similarly, the IC component “IT”, with an overall mean frequency of 0.28 per year, showed significant improvement (at the 0.003 level) over the five-year period, from 0.14 disclosures in 1993, to 0.43 in 1997.
9. In a series of analyses, the mean frequency of disclosures in the ten IC categories by companies within each of the ten industries was compared. Of the 100 analyses, 65 indicated significant company differences within industry. However these results were not consistent across industries or IC categories. For example, while companies within the Aircraft and the Parts industries have significantly different levels of IC disclosure in five of the ten IC categories, Pharmaceuticals companies differ significantly in nine of them. Customer base is the only IC category for which companies in every single industry show significant differences in disclosure levels. These results provide evidence of variation in the frequency of disclosure of IC in the annual reports of companies, even within the same industry.

References

- American Accounting Association (AAA) (2003), “AAA Financial Accounting Standards Committee: commentary on: implications of accounting research for the FASB’s initiatives on disclosure of information about intangible assets”, *Accounting Horizons*, Vol. 17 No. 2, pp. 175-85.
- Blair, M.M. and Wallman, S.M.H. (2001), *Unseen Wealth: Report of the Brookings Task Force on Intangibles*, Brookings Institution Press, Washington, DC.
- Botosan, C. (1997), “The impact of annual report disclosure level on investor base and the cost of capital”, *The Accounting Review*, Vol. 72, July, pp. 323-50.
- Bowen, R.M., Davis, A.K. and Rajgopal, S. (2002), “Determinants of revenue-reporting practices for internet firms”, *Contemporary Accounting Research*, Vol. 19 No. 4, pp. 523-62.
- Bozzolan, S., Favotto, F. and Ricceri, F. (2003), “Italian annual intellectual capital disclosure: an empirical analysis”, *Journal of Intellectual Capital*, Vol. 4 No. 4, pp. 543-58.
- Brennan, N. (2001), “Reporting intellectual capital in annual reports; evidence from Ireland”, *Accounting, Auditing & Accountability Journal*, Vol. 14 No. 4, pp. 423-36.
- Brooking, A. (1996), *Intellectual Capital*, International Thompson Business Press, Boston, MA.
- Choi, B., Collins, D.W. and Johnson, W.B. (1997), “Valuation implications of reliability differences: the case of nonpension postretirement obligations”, *The Accounting Review*, Vol. 72, July, pp. 351-83.
- Chow, C.W. and Wong-Boren, A. (1987), “Voluntary financial disclosure by Mexican corporations”, *The Accounting Review*, Vol. 62, July, pp. 533-41.

-
- Dun & Bradstreet Information Services (1993-2000), *Industry Norms and Key Business Ratios: Desktop Edition*, Dun & Bradstreet Information Services, Short Hills, NJ.
- Eng, L.L. and Mak, Y.T. (2003), "Corporate governance and voluntary disclosure", *Journal of Accounting and Public Policy*, Vol. 22 No. 4, pp. 325-45.
- Financial Accounting Standards Board (FASB) (2001), *Disclosure of Information about Intangible Assets Not Recognized in Financial Statements*, FASB, Norwalk, CT, January.
- Financial Accounting Standards Board (FASB) (2002), *Disclosure about Intangible Assets*, FASB, Norwalk, CT, January, available at: www.fasb.org/facts/index.html
- Financial Accounting Standards Board (FASB) (2003), *Disclosure about Intangible Assets*, FASB, Norwalk, CT, August 11, available at: www.fasb.org/project/intangibles.shtml
- Goh, P.C. and Lim, K.P. (2004), "Disclosing intellectual capital in company annual reports: evidence from Malaysia", *Journal of Intellectual Capital*, Vol. 5 No. 3, pp. 500-10.
- Gray, R.H., Kouchy, R. and Lavers, S. (1995), "Constructing a research database of social and environmental reporting by UK companies: a methodological note", *Accounting, Auditing & Accountability Journal*, Vol. 8 No. 2, pp. 78-101.
- Guthrie, J. (2001), "The management, measurement, and reporting of intellectual capital", *Journal of Intellectual Capital*, Vol. 2 No. 1, pp. 27-41.
- Guthrie, J. and Petty, R. (2000), "Are companies thinking smart?", *Australian CPA*, July, pp. 62-5.
- Guthrie, J., Petty, R., Yongvanich, K. and Ricceri, F. (2003), "Intellectual capital reporting: content approaches to data collection", paper presented at Performance Measurement Association Intellectual Capital Symposium, Cranfield, October 1-2.
- Guthrie, J., Petty, R., Yongvanich, K. and Ricceri, F. (2004), "Using content analysis as a research method to inquire into intellectual capital reporting", *Journal of Intellectual Capital*, Vol. 5 No. 2, pp. 282-93.
- Hall, R.E. and Cummins, J.G. (2000), "E capital: the link between the stock market and the labor market in the 1990s", *Brookings Papers on Economic Activity*, Vol. 2, pp. 73-102.
- Healy, P. and Palepu, K. (1993), "The effect of firms' financial disclosure strategies on stock prices", *Accounting Horizons*, Vol. 7 No. 1, pp. 1-11.
- Healy, P.M., Hutton, A.P. and Palepu, K.G. (1999), "Stock performance and intermediation changes surrounding sustained increases in disclosure", *Contemporary Accounting Research*, Vol. 16 No. 3, pp. 485-520.
- Krippendorff, K. (1980), *Content Analysis: An Introduction to Its Methodology*, Sage, Beverly Hills, CA.
- Lang, M.H. and Lundholm, R.J. (2000), "Voluntary disclosure and equity offerings: reducing information asymmetry or hyping the stock?", *Contemporary Accounting Research*, Vol. 17 No. 4, pp. 623-42.
- Lev, B. (2001a), *Intangibles: Management, Measurement, and Reporting*, Brookings Institution Press, Washington, DC.
- Lev, B. (2001b), "The knowledge scorecard: a primer", working paper, New York University, New York, NY.
- Lev, B. (2002), "The reform of corporate reporting and auditing: testimony of Baruch Lev before the House of Representatives Committee on Energy and commerce, February 6" available at: <http://pages.stern.nyu.edu/~blev/docs/reformcorporatereporting.pdf>.
- Meek, G.K., Roberts, C.B. and Gray, S. (1995), "Factors influencing voluntary annual report disclosures by US, UK and Continental European multinational corporations", *Journal of International Business Studies*, Vol. 26 No. 3, pp. 555-72.

- Moore, N.G. (1996), "Measuring corporate IQ", *Chief Executive*, November, pp. 36-9.
- Olsson, B. (2001), "Annual reporting practices: information about human resources in corporate annual reports in major Swedish companies", *Journal of Human Resource Costing and Accounting*, Vol. 6 No. 1, pp. 39-52.
- Peers, M. (2002), "AOL posts \$54.24 billion net loss", *Wall Street Journal*, April 25, p. A4, 11.
- Richardson, A.J. and Welker, M. (2001), "Social disclosure, financial disclosure and the cost of equity capital", *Accounting, Organizations and Society*, Vol. 26 Nos 7-8, pp. 597-616.
- Rivette, K.G. and Kline, D. (2000), "Discovering new value in intellectual property", *Harvard Business Review*, Vol. 78 No. 1, January-February, pp. 54-66.
- Roos, J., Roos, G., Edvinsson, L. and Dragonetti, N.C. (1998), *Intellectual Capital: Navigating in the New Business Landscape*, New York University Press, New York, NY.
- Securities and Exchange Commission (SEC) (2000), *Regulation FD: Selective Disclosure and Insider Trading*, SEC, Washington, DC.
- Skinner, D.J. (1994), "Why firms voluntarily disclose bad news?", *Journal of Accounting Research*, Vol. 32 No. 1, pp. 38-60.
- Stewart, T.A. (1994a), "Measuring company IQ", *Fortune*, January 24, p. 24.
- Stewart, T.A. (1994b), "Your company's most valuable asset: intellectual capital", *Fortune*, October 3, pp. 68-74.
- Stewart, T.A. (1995), "Trying to grasp the intangible", *Fortune*, October 20, pp. 157-9.
- Sullivan, P.H. (2000), *Value-driven Intellectual Capital: How to Convert Intangible Corporate Assets into Market Value*, John Wiley & Sons, New York, NY.
- Sveiby, K.E. (1997), *The New Organizational Wealth: Managing & Measuring Knowledge-based Assets*, Berrett-Koehler Publishers, Sydney.
- Upton, W.S. Jr (2001), *Special Report: Business and Financial Reporting: Challenges from the New Economy*, Financial Accounting Series 219-A, Financial Accounting Standards Board, Norwalk, CT, April.
- Verrecchia, R. (1983), "Discretionary disclosure", *Journal of Accounting and Economics*, Vol. 5 No. 3, December, pp. 179-94.
- Wallison, P.J. (2003), "Debating Sarbanes-Oxley: give us disclosure, not audits", *Wall Street Journal*, June 2, p. A16.
- Wallman, S.M.H. (1995), "Commentary: the future of accounting and disclosure in an evolving world: the need for dramatic change", *Accounting Horizons*, Vol. 9 No. 3, September, pp. 81-91.
- Wallman, S.M.H. (1996), "Commentary: the future of accounting and financial reporting, part II: the colonized approach", *Accounting Horizons*, Vol. 10 No. 2, June, pp. 138-48.
- Webber, A.M. (2000), "New math for new economy", *Fast Company Report*, No. 31, available at: www.fastcompany.com/online/31/lev.html.
- Welker, M. (1995), "Discretionary policy, information asymmetry and liquidity in equity markets", *Contemporary Accounting Research*, Vol. 11 No. 2, Spring, pp. 801-27.

Further reading

- Financial Accounting Standards Board (FASB) (2001), *Improving Business Reporting: Insights into Enhancing Voluntary Disclosure: Steering Committee Report, Business Reporting Research Project*, FASB, Norwalk, CT, January.
- Karlgaaud, R. (1997), "SEC loves IC: Commissioner Steven Wallman sees future for IC reporting", *Forbes*, Vol. 159, April 7, pp. 38-41.