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A Review of Intellectual Capital Literature Proposing Balance Sheet Disclosures of Intellectual Capital (Plus Evaluative Commentary from a Financial Accounting Measurement Perspective)

John Morgan, Winona State University
Frederic Ihrke, Winona State University
James Hurley, Winona State University

A growing body of academic and popular literature calls for fuller balance sheet reporting of intellectual assets (also known as intellectual capital) in order to provide users of financial statements more complete explanations of total firm value. The purpose of this paper is threefold. First, we review intellectual capital literature calling for broader measurement and reporting of intellectual assets on the balance sheet. Second we review financial measurement theory as it pertains to defining assets and measuring assets. Third we provide a commentary (from a financial accounting measurement perspective) concerning the various proposals from intellectual capital literature suggesting ways to more fully measure and report intellectual assets on the balance sheet. We conclude that intractable measurement difficulties preclude any but spurious measures for most items of internally generated intellectual capital on the balance sheet. Therefore we are against these measurements.

Concept "Intellectual Capital"

More than one definition of intellectual capital presently competes in mainstream intellectual capital literature (Abeysekera, 2008). Nevertheless, intellectual capital is defined in reasonably similar ways by most of its advocates. For example, Marr (2008) suggests intellectual capital refers to the many intangible factors that contribute to delivery of an organization's strategy, including three main sub-categories: human capital (knowledge and skills residing within employees), relational capital (formal and informal relationships both internally and externally), and structural capital (databases, production routines, and codified knowledge of all sorts). Stewart (2001 and1997) defines intellectual capital as knowledge, information, intellectual property, and experience put to use by a firm to create wealth. He also conceptualizes intellectual capital as having three broad components - human capital (employees and their knowledge), structural capital (e.g. software, documents, organizational processes), and customer capital (e.g. existing customer relationships). Edvinsson (2002) argues intellectual capital is a combination of human capital and structural capital. He describes human capital as embodied in the knowledge of current employees, whereas structural capital is embodied in customer relationships, production process efficiencies implemented over time, internal databases, and other institutionalized knowledge structures. Webster and Jensen (2006) have suggested the existence of four distinct classes of intellectual capital: 1) human capital residing in the skills and knowledge of the present workforce; 2) organizational capital residing in the architecture of both formal and informal systems used by the organization; 3) marketing capital residing in existing marketing relationships and marketing networks developed over time; and 4) production capital residing in specialized production processes developed internally over time. General agreement seems to exist that intellectual capital refers to value derived from internal knowledge developed and institutionalized over time.

Interest in intellectual capital as a critical component of business success is evident from the large and growing number of academic and popular journal articles directed towards it. John Kenneth Galbraith is believed to have coined the phrase intellectual capital in a 1969 letter to fellow economist Michal Kaleck, and thereby initiated a stream of thought about the changing nature of value in modern businesses (Bontis, 2001). Management legend Peter Drucker provided significant momentum to this stream of thought by becoming an early and ardent advocate of the importance of knowledge and its artifacts to growth and success in modern business organizations. Drucker's writings were among the very first of those which later were to become an avalanche of academic and popular literature concerning the importance intellectual capital, its stewardship, and the related concepts of knowledge management, and knowledge organizations (Grossman, 2006). Drucker and those that followed pointed out that traditional physical assets represent an ever smaller fraction of total value of a firm than they have in the past. In a technology-driven world the increasing importance of internally generated knowledge and its related artifacts are now recognized as being a larger part of the ability to create future cash flows (Roslender and Fincham 2001; McNabb 1998; Stewart 1997).

Notwithstanding the particular definition of intellectual capital one adopts, it is clear that intellectual capital is believed by many of its advocates to add significant value to organizational enterprises. The increasing importance of intellectual capital relative to other assets has been noted by several intellectual capital commentators (Cezair, 2008, Lev, 2003). Lev in particular documents a systematic increase in the ratio "total firm market value to total book value" occurring over the past three decades. Lev reports that the average ratio of "total firm market value to total book value" for all Standard and Poor's 500 firms since 1980 increased from approximately 1 in 1980 to just over 7 by the year 2000 (Lev, 2005 and 2003). This remarkable increase is interpreted by Lev to be the direct function of growing unmeasured and unreported internally generated intellectual assets, necessary to success in modern high-technology firms, but unmeasured and unreported on balance sheets under traditional accounting rules. Intellectual capital commentators Robert Elliot, Tom Davenport, Leif Edvinsson, and Steven Wallman have all asserted unreported intangibles are growing both in size and relative proportion to total firm value (Maines, Bartov, Fairfield, and Hirst, et. al., 2003).

Calls for Additional Balance Sheet Reporting of Intellectual Assets

Intellectual capital advocates over the past two decades have increasingly expressed concerns and frustration about the growing discrepancy between reported balance sheet net assets and total firm value. Most believe that unrecorded intellectual assets are the major source of this discrepancy. For example, Sveiby in his 1997 book, The New Organizational Wealth: Managing and Measuring Knowledge-Based Assets, criticizes traditional balance sheets for failing to report intangible factors that he believes have more to do with a company's total worth than traditionally reported physical assets. Sveiby's suggests the total amount of a firm's unreported intellectual assets (which Sveiby calls invisible assets) are estimable by taking the difference between total market value of aggregate stock shares and the total reported book value of net assets on the balance sheet. Sveiby notes that this difference is often very large, even five to ten times greater than reported balance sheet assets at high tech firms such as Microsoft. Because unreported invisible assets are proportionately so large relative to reported assets, Sveiby suggests balance sheets have become barely relevant in assessing firm value.

Holmen (2005) echoes Sveiby's concern that balance sheets are increasingly irrelevant. He poses the question, "Why must we measure intellectual capital?" Holmen answers his own question by suggesting the variety of decision-making benefits that result from a fuller measurement and reporting of intellectual capital. Holmen says these benefits include assisting buyers in valuing firms during mergers and acquisitions, developing proper incentive-based compensation plans for top managers that recognize stewardship of intellectual assets, and communicating to external stakeholders the fair values of intellectual property held by the firm. If Sveiby and Holmen are to be believed, omitting measures of intellectual capital from an organization's balance sheet not only reduce its relevance, but violate the basic accounting principle of full and fair disclosure of an organization's financial position.

Other intellectual capital researchers also posit that the balance sheet is largely irrelevant since intellectual assets are not measured and reported under traditional accounting rules. Seetharaman, Sooria, and Saravanan (2002) point out that the biggest challenge facing the accounting profession today is measuring and explaining the growing gap between balance sheet net assets and stock market valuations. Rodov and Leliaert (2002) suggest standard financial reporting provides a totally inadequate accounting for intellectual assets. They believe the total value of unrecorded knowledge assets must be included on standard financial reports if those reports are to be relevant for firm valuation. Ambler (2002) argues that accountants should incorporate unreported intellectual assets into financial reporting or risk financial statements that are no longer relevant to shareholders for assessing firm value. Malhotra (2000) says balance sheets that fail to include intellectual capital are misleading measures of organizational value. Collectively these remarks make quite clear (most coming from mainstream intellectual capital literature) that more comprehensive balance sheet measures of intellectual assets are believed to be desirable, and that the accounting profession has been remiss for not advancing these measures more quickly.

Review of Asset Measurement Theory

The Financial Accounting Standards Board (FASB), the International Accounting Standards Board (IASB), the Chartered Financial Analyst Institute (CFA Institute), the Federal Accounting Standards Advisory Board (FASAB), and the Governmental Accounting Standards Board (GASB) have all acknowledged in the past the fundamental importance of the concept, asset in financial reporting. In connection with recent efforts to unify FASB accounting standards with IASB international financial reporting standards, a Joint Conceptual Framework Project was undertaken which, among other things, attempts to collaboratively define basic financial reporting elements and their measurement principles. This project resulted in the following statement about the fundamental importance of the concept, asset, to financial reporting:

"Assets are the most fundamental real-world economic phenomena that financial reporting seeks to portray. If the definition is too vague or subject to interpretation, then the foundation of financial reporting is at risk of being undermined. Therefore it is necessary that this definition is as robust as possible." (Joint Conceptual Framework, Project, Phase B, 2006, paragraph 6).

Other authoritative bodies in the past have also remarked on the central importance of the concept asset to financial reporting. The current and operative FASB definition for assets is:

"Assets are probable future economic benefits obtained or controlled by a particular entity as the result of past transactions or events." (FASB Concepts Statement 6, paragraph 25).

The current operative IASB definition for assets is:

"An asset is a resource controlled by the entity as a result of past events and from which future economic benefits are expected to flow to the entity." (IASB, Framework for the presentation and preparation of financial statements, paragraph 49).

The current Federal Accounting Standards Advisory Board (FASAB) in the USA. Definition for assets is:

"An asset is a resource that embodies economic benefits or services that the federal government controls." (FASAB, SSFAC No. 5, Definitions of elements and basic recognition criteria for accrual-basis financial statements, page 1).

The current Joint Conceptual Framework Project definition for assets is:

"An asset is a present economic resource to which the entity has a present right or other privileged access." (Joint Conceptual Framework Project, Phase B, 2006, paragraph 26).

In their joint project discussions the FASB and IASB agreed that the development of a proper definition of assets was a critical first step, but not the only step guiding the recognition and reporting of assets on financial statements. A second and more difficult step would be to establish rules about the criteria for determining whether particular items meeting the definitional sense of assets could also be usefully measured for recognition and reporting in financial statements (Joint Conceptual Framework Project, 2006, Phase B, paragraph 2). This insight that not all definitional assets should be recognized and reported in financial statements is not new and has a long history in official financial reporting communities. Authoritative around the world bodies recognize that measurement uncertainties inherent to some types of assets will prohibit their useful measure. For instance, the FASB has consistently ruled that merely meeting the definition of asset, although significant, does not automatically qualify an item for inclusion in the financial statements (FASB Concepts Statement 6, appendix B). The FASB reasons that measurement uncertainties can be so large as to destroy any potential usefulness of dollar disclosures made, and may in fact harm other data.

In their joint conceptual framework project, both the FASB and the IASB concurred that not every item meeting their jointly developed working definition of asset could be usefully recognized or reported on financial statements because of measurement uncertainties (Joint Conceptual Framework Project, 2006). A similar view was expressed by the Federal Accounting Standards Advisory Board in SSFAC 5:

"This Statement establishes two basic recognition criteria that an item must meet to be a candidate for recognition in the body of a financial statement: (1) the item must meet the definition of an element (i.e. asset) and (2) the item must be measurable, meaning a monetary amount can be determined with a reasonable certainty or is reasonably estimable." (FASAB, SSFAC No. 5, Definitions of elements and basic recognition criteria for accrual-basis financial statements, page 1).

In short, the Joint Conceptual Framework Project, the FASB, IASB, and FASAB have all separately at different times concluded that meeting the conceptual meaning of asset is a necessary and important condition for financial statement inclusion, but is not by itself sufficient. Unless the item can also meet certain qualitative measurement criteria, it may not be useful to include the item as part of financial reporting. The FASB summarizes this sentiment very nicely:

"The characteristics of information that make it a desirable commodity can be viewed as a hierarchy of qualities, with usefulness for decision making of most importance. Without usefulness, there would be no benefits from information to set against its costs." (FASB Concepts Statement 2, paragraph 1).

The FASB, the IASB, and the FASAB have each identified relevance and reliability as the two primary qualities making financial information useful to decision-making. Should either of these two qualities be entirely absent, the information itself can have no decision-making value. (FASB Concepts Statement 2, paragraph 2).

With regard to the measurement of intellectual capital, it seems obvious that additional measures of intellectual capital, if possible in a meaningful way, could be relevant to firm valuation decisions and therefore would meet the relevance criterion of useful information. On the other hand, it is the reliability of these measures where the problem exists. Possible measures for most internally developed items of intellectual capital, when examined closely, are so inherently so lacking in reliability as to preclude decision utility. The commentary which follows focuses on the problems of reliability of intellectual capital measures, and not their relevance if reliably measured.

In discussing reliability, the FASB suggests information is only reliable to the extent it possesses three qualitative characteristics. The first is verifiability. Reliable information must to some degree be independently verifiable, and not purely the function of the unverifiable subjective judgments of the measurer. Utterly subjective information is thought to be without decision utility because it affords no reasonable basis for determining whether or not it is correct. If there is no reasonable basis to believe information is correct, it is unhelpful.

A second related characteristic of reliability is representational faithfulness (i.e. information must be a reasonably accurate description of what it purports to describe). In the case of financial measurement this means the dollars assigned to an item provide a reasonably accurate reflection of the valuation intended (e.g. cost or fair value). To the extent judgments or estimates are involved in establishing dollar amounts (as very often is the case in financial reporting), the judgments or estimates must derive from some logically defensible position that they are reasonably accurate. Reasonable accuracy does not mean absolute accuracy, only that the measurement is expected to contain enough information to offset its error term. The principle of reasonable accuracy, or representational faithfulness, is necessarily subjectively applied and requires some judgment in application. When estimates afford zero expectation that they are accurate, they can be of no decision-making utility. This principle explains why local weather forecasters refrain from predicting weather too far into the future. Beyond a certain future point (though potentially relevant) weather forecasts have little expectation of any accuracy and are assigned no value.

A third characteristic important to reliability is that of neutrality. Neutrality refers to the particular environment in which information has been collected and interpreted. Ideally, information is gathered in an environment free of systematic bias. Systematic bias occurs when those responsible for gathering and interpreting information also have a strong personal stake in one particular outcome above others. The environment in which information is collected may in some cases be that of disinterested objectivity and in others may be one of strong personal benefit from a particular outcome. Personal interest is well known to bias measurement especially when the required measurements are subjectively determined by those with a strong personal interest in outcomes of the measures. Concerns about systematic bias explain why tobacco industry studies on the health impacts of tobacco are viewed as less reliable than those of independent university research.

In the next section we review proposals from intellectual capital literature concerning how to more fully measure and report intellectual assets on the balance sheet. This is followed by our commentary (from an accounting measurement perspective) on the merits of these proposals.

Review of Intellectual Capital Measurement Proposals and Related Commentary

Several recent comprehensive literature reviews of intellectual capital literature identify just three broad theoretical approaches for measuring internally generated intellectual assets in that literature (Grossman, 2006; Bontis, 2001; and Petty and Guthrie, 2000). These broad approaches are referred to as: (1) market capitalization models recognizing and reporting intellectual assets in amounts equal to the difference between the cumulative trading price of all outstanding stock of a company and the book value of all its net assets currently reported; (2) return on assets models recognizing and reporting intellectual assets in amounts equal to those implied by comparing a company's return on assets ratio to an industry benchmark return on assets ratio. Under these models it is assumed that whenever a company's return on assets ratio is found to be higher than the industry benchmark, it must have unrecorded intellectual assets explaining the higher than average return on assets ratio, the amount of which is inferable using algebra. (Note if a company's return on assets ratio is lower than the benchmark, no intellectual capital is presumed to exist.) and; (3) individual elements models which attempt to exhaustively identify and list the knowledge assets thought to exist and then assign dollar amounts to each on some basis. Some of these models attempt to estimate the historical cost of developing each item on the list, others estimate current replacement costs, and still others estimate future discounted cash flows associated with each identified item.

Grossman (2006) notes a major disadvantage of the first two models is that they provide only lump-sum totals for all intellectual assets combined and provide little insight into the particular or specific assets that have presumably

been identified and measured. Bhartesh and Bandyopadhyay (2005) note that to overcome the problem of a single undifferentiated total for intellectual capital, some of these models involve a stage 2 disaggregation of total intellectual capital into various sub-groupings (e.g. human capital, structural capital, customer capital, etc).

Better known examples of market capitalization models include Sveiby's invisible balance sheet, the Investor Assigned Market Value (IMVA), and Tobin's "Q" (Grossman, 2006; Bontis, 2001; Petty and Guthrie, 2000). Protagonists of market capitalization models justify them on the basis that they provide investors information more useful for assessing total firm value than do present day balance sheets (Grossman, 2006).

From a measurement perspective market capitalization models appear to be insufficiently reliable to have decision-utility. Values assigned to total intellectual assets under this approach would be unstable and would change over time in ways suggesting the measures themselves have little representational faithfulness. The measured amount of intellectual assets would change as company stock prices fluctuate. Day-to-day changes in stock prices would likely bear little relationship to actual new investments made in intellectual assets (or the expiration of intellectual assets). As stock prices rise, so too would the measured value of intellectual assets even if there have been no new investments made in knowledge assets. If stock prices fall, computed amounts of intellectual capital would decline (or possibly go negative) in spite of the fact there may have been significant new investments made in knowledge assets. These fluctuations would not be small in proportionate terms and in some years would exceed 200% to 300% of beginning of year values. Precisely what market capitalization models are measuring is unclear relative to the specific items of intellectual capital purportedly being valued, and would behave over time in ways inconsistent with underlying inputs and expirations. This suggests to accountants lack of representational faithfulness.

Additionally, we note as have Jenkins and Upton (2001), that market capitalization models are circular in terms of underlying logic justifying their use. Market capitalization models typically are justified as useful for providing investors better balance sheet measures of total firm worth. The models then define unrecorded intellectual assets as the difference between reported balance sheet net assets and aggregate stock price (total firm worth) in order to better predict the total firm worth. The definition assumes knowledge of that which it is used to predict.

We also note that the decision utility of an extremely large undifferentiated total called intellectual capital measured in this way is highly questionable. No descriptive insight into the specific items purportedly being measured is gained. The undifferentiated total would be a 'black box' to users much in the same way that purchased goodwill is now, the difference being that the value would fluctuate widely as stock prices changed.

Finally we note market capitalization models are based on the assumption (incorrect in our view) that a complete list of balance sheet assets should equate with total firm value. Finance theory has long posited that firm value is not a function of summed unexpired inputs (assets), rather is a function of expected future discounted net cash inflows (outputs) (Gitman, 2003; Maines, Bartov, Fairfield, & Hirst, 2003). The point being firm valuation approaches from the summation of unexpired inputs, no matter how complete the list of inputs, are theoretically inappropriate for estimating firm value which is appropriately a function of discounted expected future cash flows. As an example, is the value of a $10 million dollar winning lottery ticket its unexpired input cost, or would it be the present value of its expected payout? Gitman (2003) notes the two most widely accepted firm valuation models in finance (e.g. the Gordon Model and the Capital Asset Pricing (CAPM) model) are both based on discounted expected future net cash inflows (adjusted for risk) not the sum of unexpired inputs.

Thus, while market capitalization models provide an easy computation for the dollar total of unrecorded intellectual assets, it is not clear the measure itself represents what is purportedly being measured, provides no additional information about total firm worth not already available, and would be a poorly understood undifferentiated total that behaves in counterintuitive ways. The degree of error evident in this measure would be large relative to its information content (if any information content exists).

The second of the three measurement models proposed in intellectual capital literature is referred to as the return on assets model. This model compares an individual company's return on assets ratios to some benchmark return on assets, usually an industry average. Total unrecorded intellectual assets are then inferred through reference to excess return on assets, presumed to exist only because unreported intellectual assets are excluded from the company's denominator (i.e. total assets). Better known return on assets models for estimating total unrecorded intellectual assets include Stewart's Economic Value Added model (EVA), the Human Resource Costing model (HRCA), and the Knowledge Capital Earnings model (Grossman, 2006; Petty and Guthrie, 2000).

Though return on assets models also provide an easily calculable dollar estimate for unrecorded intellectual assets, they have many of the same inherent measurement shortcomings of the market capitalization models (i.e. lack of representational faithfulness including irrational behavior over time and opaqueness) plus others as well.

As with market capitalization models an undifferentiated total value results from this approach that behaves in unstable and unpredictable ways. Additional shortcomings of return on assets models are apparent. Presently there is no theoretical basis for justifying how the benchmark ratio would be established for purposes of comparison

(Grossman, 2006). What factors should in fact be used to select companies for inclusion in the benchmark (e.g. industry, sector, size, risk, etc.), and how should their weightings be determined? Additionally, regardless of the benchmark selected, the benchmark companies themselves also presumably have unrecorded intellectual assets affecting them as well, a complication ignored by the proponents of the model. Additionally, return on assets models result in valuations that are highly unstable year-to-year as changes in net income occur suggesting very poor representational faithfulness of the underlying intellectual assets presumably being measured (Grossman, 2006).

Grossman (2006) also notes return on assets models provide intellectual asset valuations that bear little resemblance to intellectual asset valuations provided by market capitalization models suggesting that whatever has been measured by each model is not the same thing. A final troubling aspect of return on assets models is that companies with return on asset ratios below the selected benchmark norm are presumed to have zero intellectual capital (or negative intellectual capital), an implausible result in the case of high technology companies with good profits and trained employees. These shortcomings combined (e.g. lack of supporting theory, relative instability over time, failure to correct for the unrecorded intellectual assets in the benchmark, etc.) have caused Rodhov and Leliaert, (2002) to conclude that return on assets models hold the least promise of the three proposed approaches for adequately measuring and reporting internally generated intellectual assets.

A third approach proposed for measuring unrecorded intellectual assets is known as the individual elements model. These models begin with identification and listing each of the separate component believed to comprise total intellectual capital. In a second step dollar amounts are estimated and assigned to each component is some manner. Each component is assigned a value without reference to any known total value in advance. Better known individual elements models include the Technology Broker, the Value Explorer, Intellectual Asset Valuation, and the Financial Method of Intangible Assets Measuring (FiMIAM) (Grossman, 2006; Rodov and Leliert, 2002; Petty and Guthrie, 2001).

Individual elements models have some theoretical appeal in the sense that they carefully elaborate the specific items of intellectual capital purportedly being measured, and are not merely opaque lump-sum totals. Unfortunately, these models are by nature utterly subjective in terms of what items are listed and what values are assigned to them. Widely differing items have been included in many different models of this type that have been developed, and widely different valuations often result, prima facie evidence of the subjectivity inherent to this approach. Rutledge (1997) despairs at the hundreds of elements most of the commercial models include. Commercially developed intellectual capital measurement instruments which have blossomed in recent years purport to identify large numbers of individual components of unrecorded intellectual capital and then value each. These instruments, though universally complex often with several hundred individual elements, lack significant agreement about what the elements are. This alone points to subjectivity in identifying the elements, let alone assigning valuations (Grossman, 2006). Advocates of individual elements models have yet to agree whether it is better to develop a single generic list of intellectual assets for all companies or to develop a unique list for each separate company or each industry (Hunter, Webster, and Wayatt, 2005). Bontis (2001) notes that commercially developed intellectual capital instruments usually include a hundred or more individual factors, and then assign equal value to each factor, a highly implausible valuation scenario in his view. He says such 'devoid-of-theory' measurements are exercises in complexity without demonstrable validity.

Advocates of individual elements models have also not agreed on the best valuation approach for assigning dollars to factors once they are identified. Some researchers argue that dollars should be assigned based historical costs to develop them over time. Others believe dollars should be assigned based on current market values, or replacement costs, or current trading prices (even though none of these values actually exist). Still others believe dollars should be assigned to components of intellectual capital based on the discounted net future cash flows expected to result from their ownership (but provide virtually no guidance as to how this might be reasonably achieved). What proponents of all valuation approaches (e.g. historical cost, replacement cost, discounted cash flows, etc.) fail to consider is that not only are the particular components of intellectual capital highly subjective, their valuations are not reasonably determinable under any valuation approach. Many of these items have been developed internally over decades. Their input costs had multiple objectives, are not easily identified, and may have expired. Any particular valuation would be as justifiable as any other, the essence of complete subjectivity, and with no reasonable basis for accepting one valuation as superior to another. Information of this sort by definition lacks decision utility. Even worse it can masks or destroy the information content of other more valid measures that are grouped with it.

In summary, individual elements models are also unacceptable in the sense of measurement reliability. They are highly subjective, and are naïve in terms of their expectations about what can be usefully measured for financial reporting. Hunter, Webster, and Wyatt, (2005), capture this sentiment by suggesting intellectual capital has unclear inputs, has uncertain legal status, is rarely accepted as collateral, is rarely bought or sold, is of uncertain value, and rarely survives separation from the organization that has developed it. Not surprisingly it is among the most difficult of all assets to measure in a decision useful way.

It seems to the authors that mainstream intellectual capital advocates while highly critical of the accounting profession for not developing better measures of internally generated intellectual assets, have only proposed measures for intellectual assets that ignore of long-recognized and intractable financial measurement constraints which limit their useful measurement and disclosure. Accounting boards around the world concur that not every definitional asset can be usefully measured. We have reviewed and evaluated the proposals coming out of intellectual capital literature and found them wanting in terms of possessing the characteristics of useful information. The fact that a particular goal (e.g. a more complete reporting of internally generated intellectual assets) may be desirable in some sense, does not also mean it is possible in a useful way. Aesop, in one of his most clever fables, relates the story of a mouse who proposed a bell be tied to the cat's neck so mice would be alerted when the cat was near and thereby avoid danger. The idea of "belling the cat" was widely applauded until one wise old mouse asked who among the mice intended to bell the cat. Aesop's moral of course was that is easy to propose impossible solutions. A careful analysis of the measurement difficulties surrounding items of internally generated intellectual capital suggests to the authors that intellectual capital protagonists may be guilty of proposing an impossible solution in this case. The present absence of internally generated intellectual capital from balance sheets is not accounting negligence, nor accountants' resistance to change, nor is it even the accounting profession's lack of imagination as has been suggested in intellectual capital literature. Rather the exclusion of items of internally generated intellectual capital from the balance sheet results from unfortunate measurement realities that limit what can be usefully measured in financial terms. Intellectual capital protagonists would be well advised to address measurement issues if they ever hope for their calls for broader reporting of internally generated intellectual assets on the balance sheet to be heeded by the accounting community.

CONCLUSION

This paper has reviewed suggestions coming out of intellectual capital literature for fuller measurement and reporting internally generated intellectual assets on the balance sheet and has found them unworkable from a measurement perspective. Each of the three proposed approaches for measuring intellectual capital found in intellectual capital literature appears deeply flawed. If implemented none would result in decision-useful measures of internally generated intellectual capital, this primarily because of their lack of reliability (i.e. lack of verifiability, representational faithfulness, and/or neutrality). Market capitalization models provide only black box dollar totals that are poor representations of the intellectual assets they purport to measure. Furthermore, market capitalization models have been justified through circular reasoning that assumes knowledge of the very market valuations they are supposed to predict. Return on assets models depend upon benchmark comparisons that have no theoretical basis, do not correct for the unrecorded intellectual assets in the denominators of the benchmarks, provide highly unstable results over time, and fail to explain why some profitable technology companies have zero or negative intellectual capital. Individual elements models are totally subjective in terms of their construction and implementation. Individual elements models provide widely differing outcomes in which no outcome is more justifiable than any other.

We conclude by commenting on a study by Lev and Zarowin (1999) in which they published empirical findings showing a consistent decline in the usefulness of historical financial accounting information (book values, cash flows, and earnings) for predicting future stock returns. Lev and Zarowin concluded (among other things) that the decline in usefulness must be in some part due to the failure of accounting numbers to accurately include the value of internally generated intellectual assets and to accurately expense them as they expire. While we readily concede the decline in the correlation between historical financial information and future stock returns, we interpret this decline differently than did Lev and Zarowin. We think a rapidly increasing rate of technological and social change explains the decline in predictability of historical numbers for the future. If rate of technological and social change is accelerating (and we believe it is), the future, itself, naturally entails a higher degree of uncertainty than it has in the past and is less predictable. Historical data in a rapidly changing environment intuitively must be less likely to accurately predict a more uncertain future than it once did in a more slowing changing world. In our view the acceleration of change is the better explanation for the Lev and Zarowin finding. More to the point, declines in the predictability of traditional financial reports would not be reversed and perhaps would even be increased by including in those historical data spurious measures of unrecorded intellectual assets.

Since proposals for measuring internally generated intellectual assets provide spurious measures that would not be useful to decision making, and since bright minds have been unable to devise any other suitable approaches to measure intellectual assets, we conclude that including a broader set of internally generated intellectual assets on the balance sheet is unrealistic in a useful way. Accordingly, there is little reason to expect the financial accounting community will change its present position on these matters. Intellectual capital advocates who argue for broader inclusion of internally generated intellectual assets on the balance sheet should first address the expressed measurement concerns of accountants if they are to successfully advance their argument.

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John Morgan is a professor in the department of accounting at Winona State University. He received his Ph.D. in accountancy from the University of Nebraska-Lincoln. His current research interests include the financial reporting issues related to intellectual capital, business school accreditation issues, CPA exam success factors, and measuring teacher effectiveness. He has published in the Journal of 21st Century Accounting, the Journal of Business and Leadership, the Clarion Business and Economic Review, and in Learning and Teaching in Higher Education-Gulf Perspectives.

Frederic Ihrke is a professor and chair in the department of accounting at Winona State University. He received his MBT from the University of Minnesota and his J.D. from William and Mitchell College of Law. His current research interests include income tax policy, income tax law, and accounting for intangible assets. He has published in the Journal of Business and Leadership.

James Hurley is an associate professor in the department of accounting at Winona State University. He received his Ph.D. in accountancy from the University of Nebraska-Lincoln. His research interests include financial accounting reporting and social audits. He has published in the Journal of Business and Leadership.