



Valuing intangibles companies

An intellectual capital approach

Patrick H. Sullivan Jr and Patrick H. Sullivan Sr
ICM Group, Palo Alto, California, USA

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Abstract *There is a dramatic increase in the number of companies whose value lies largely in their intangible assets; with relatively little or no value associated with their tangible assets. Traditional methods of valuation, based on accounting principles, where the value of the firm's assets is a portion of the value, have systematically undervalued companies such as these. This article discusses the problem of valuing intangibles companies and suggests two approaches to determining their value. It also describes two common circumstances where company value is desired and discusses how value may be determined using a non-traditional perspective on the company along with traditional methods for valuation. The two circumstances examined are the going-concern value and the value under merger or acquisition circumstances (recognizing that these two circumstances produce very different valuations for the corporation).*

The number of companies whose value lies largely with their intellectual capital has increased dramatically in recent years. In 1999, Dr Margaret Blair of the Brookings Institution studied the shift in the make-up of company assets of thousands of non-financial companies over the 20-year period from 1978 to 1998. She found a significant shift in the relationship between tangible and intangible assets over time. In 1978 approximately 80 percent of corporate value was due to tangible assets, with 20 percent accounted for by intangibles. By 1998, the proportions were reversed, with 80 percent of corporate value associated with intangible assets and only 20 percent with tangibles.

Whereas one might view this shift as completely consistent with other observable shifts of the US economy (i.e. the shift toward service companies and away from traditional manufacturing, and the dramatic upward shift in the value of intellectual properties such as patents), this alone does not explain either the dramatic nature of this change in relative components of corporate value or the speed with which it has occurred.

Nevertheless, the shift has created a need for methods of calculating the worth of companies whose major assets are intellectual (that is, intangible). Traditional accounting methods, which were created to account for tangible assets, are inadequate for valuing companies whose assets are largely intangible. Indeed, traditional accounting tends to significantly understate the value of intangibles companies. This paper reviews a number of the problems that have arisen because of the shift toward intangibles. Further, the paper proposes, as at least one alternative solution to valuation, a different perspective on valuing intangibles companies. The suggested new perspective, a topic for further evaluation and discussion, is based on an intellectual capital perspective and is outlined for two valuation circumstances: determining the

value of an “intangibles company” that is a going concern, and determining the value of an intangibles company that is the target of a merger or acquisition.

Why the shift toward intangibles?

To begin, how can we explain the observable fact that a significantly greater portion of corporate value now lies with intangible assets? Is there something fundamental occurring in the US economy, or is this just a natural evolution that one might expect to see occur as a mature economy evolves? We believe that there are several underlying factors that explain, at least in part, what we observe. Among these major factors are the following:

1. The changing legal environment

The creation of the new Court of Appeals for the Federal Circuit in 1982 has had an immeasurably positive effect on the value of patents, one of the major forms of intangible assets in US firms. That court’s greater number of decisions in favor of the holder of intellectual property (IP) rights has made patent holder rights more enforceable and therefore more valuable.

In addition, the shift in the perspective of the Supreme Court away from a focus on antitrust concerns to a view that balances the monopoly rights of patent holders with antitrust considerations has further enhanced the value of IP rights. Finally, within the halls of the US Department of Justice, the lessening of what had heretofore been an almost maniacal antitrust stance to one that recognizes, and even encourages, the importance of the monopoly rights of patent holders, has also contributed to the increasing value of IP.

2. Effects of the Internet and information technology

The rapid rise of the Internet in parallel with the exponentially growing capabilities of information technology (computers, communications, etc.) has moved the industrialized world into a new economic paradigm: the economics of abundance. In the industrial era tangible assets were the major source of value; but in the information era information has more value than tangible assets.

In the old industrial paradigm companies operated under the tenets of the economics of scarcity. For example, suppose a company owned a tangible asset, such as gold. As long as the company possessed the gold and others did not, the laws of supply and demand pertained and the gold retained its high value.

In the information age things are quite different. Intangible assets such as information, different from tangible assets, increase in value the more people there are who have access to them. The economics of abundance means that when information is abundant its value goes up. One implication of the economics of abundance is that firms may give away for free the things they used to charge for, and charge for new products or services whose value is increased because of the information or intangible that has been provided for free. For example, some rock bands could probably afford to give free concerts

because the money they make on T-shirts, CDs, and similar follow-on products exceeds the income from the concerts themselves. Likewise, several Web companies have found it profitable to provide free access to their browsers and charge fees for access to the information found there.

3. The leveraging effect of intellectual capital

Intellectual capital has the ability to leverage the profitability of the firm. It has allowed firms to create new products and services, new business processes, and new organizational forms. In 1979 a Swedish forest products company, Esselte, became concerned about all the talk of a “paperless office.” This company, which for over 100 years had produced paper-based products, wanted to know more about how its business was threatened and what it could do to stave off the threat. Through careful research, the company determined that the new information-based environment could offer it numerous new opportunities. For example, since Esselte owned the company that printed Swedish law books, and because those law books were printed on computer-controlled presses, the company had a computer file of all of the country’s laws. Ownership of that resource gave it the ability to provide electronic legal search services for Swedish lawyers. This is just one example of how a company learned to convert a tangible assets business into one that was based on intangibles: knowledge and information.

Another example of the leveraging effect of intellectual capital is provided by Professor Stanley Davis (1987), who predicted that for companies to be successful in the twenty-first century they would have to do several things. One of them was to put more information (intangible value) into their products. This would mean providing more intelligence in the same amount of product mass, or providing the same amount of intelligence in a smaller amount of product mass. Over the past few years Davis’s prediction has come true. Consider the automobile. Cars in 2000 are one of the major users of computer chips. Computers control the efficient operation of the engine, computers shift the gears, computers power car telephones, and computers help drivers navigate using the global positioning system. They even turn the car’s windshield wipers and lights on and off. Cars are not noticeably bigger or smaller than they used to be, but the amount of information contained in them has increased dramatically since computers were put on board.

Many other products also contain more and more information or intangible value per unit of volume: telephones, computers, appliances, children’s toys, credit cards with embedded chips, bar codes on retail products, office copiers that self-diagnose their own operating problems; the list is endless. All of these products or services are possible because they build on the innovations of the intellectual capital of their producers.

Determining the value of a knowledge company

There is a diverse audience of people interested in learning how to determine the value of a knowledge company. The CEO of the firm, for example, must

provide investors with a continuing return on their investment or risk being voted out at the next shareholders' meeting. Chief financial officers, as the internal surrogates to the CEO for financial matters, are also likely to find this topic of great interest. Outside the firm, interested parties include government regulatory agencies, business research centers, and academics. Surprisingly, there is little interest in this topic among the financial analyst community. The few financial analysts we have spoken with who expressed any interest in the relationship between intangibles and stock price view their assigned companies primarily through an accounting perspective. Thus these analysts believe that their forecasts of future income (based on past performance) already include any considerations necessary for the firm's intellectual capital.

A brief review

Companies that profit by converting knowledge into value are called knowledge companies. As a practical matter, those companies whose profits come predominantly from commercializing innovations are at the core of the knowledge company definition. Companies such as Microsoft, 3M, and IBM are examples of firms whose knowledge or intellectual capital is their major asset. A knowledge company, whose profits come primarily from the commercialization of its ideas and innovations, possesses only two fundamental sources of value: its innovations and the complementary business assets of the firm that they apply to the commercialization of those innovations. Further, there are only seven ways for firms to convert innovations into profits: direct sale, out-licensing, joint ventures to obtain and use needed complementary business assets, strategic alliances to obtain and exploit markets, integration, create a new business, and donations (tax write-offs).

For sophisticated knowledge companies, the route to maximizing profit extraction for any innovation is to maximize the number of combinations of unique complementary business assets and conversion mechanisms (see Figure 1).

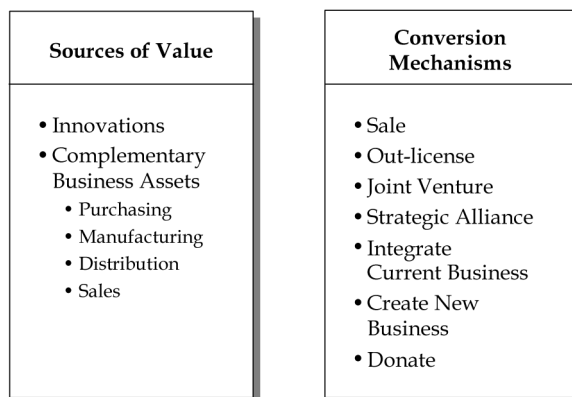


Figure 1.
Sources of value and
conversion mechanisms
in the knowledge
company

The conversion mechanisms listed in Figure 1 are an all-inclusive set. Although the list includes some conversion mechanisms that are more appropriate for IP than for uncodified knowledge, it is just as applicable to law firms and consulting firms as it is to technology companies.

All knowledge companies comprise three major elements: intellectual capital and two forms of structural capital (see Figure 2). One form of the latter is generic structural capital, which includes tangible assets that are widely undifferentiated and may be found generally in the marketplace. The second form of structural capital is the firm’s complementary business assets (CBAs). These are typically found in companies within the same industry, though the form and capabilities of a firm’s CBAs differentiate it from its sister companies in the industry (Sullivan, 2000).

The reason for introducing this model of a knowledge company here is that the three components of a knowledge company – intellectual capital (IC), generic structural capital, and complementary business assets – represent the three sources from which all companies create the value that subsequently is reflected in their income streams. As we shall see, these income streams have a major influence on stock price.

An intellectual capital approach to valuation

Below we describe how an intellectual capital perspective may be used to calculate the value of a company that is a going concern and one that is the target of a merger or an acquisition.

Valuing a going concern

The portion of the world’s financial community that focuses its attention on stock markets, as well as the community of financial analysts and conceptual academics, has yet to develop models that describe the relationship between stock price (market capitalization divided by the number of shares of stock outstanding) and IC. At present the world’s stock markets seem to believe that the value of a knowledge company is largely a function of the market’s perceptions and beliefs about two significant things: the “amount” of

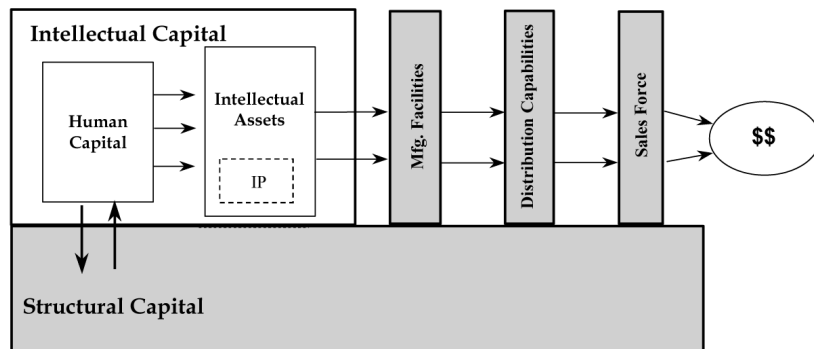


Figure 2.
A model of a knowledge company

intellectual capital the firm possesses and the firm's ability to leverage that intellectual capital in its marketplace. The leveraging factor represents the firm's ability to select the most commercializable innovations, match them with the firm's business and marketing strategies, determine how to match them with the firm's complementary business assets, and convert the innovations to cash.

An intellectual capital approach to valuation differs significantly from traditional accounting approaches. In the world of accounting, there are tangible assets and transaction-based prices. In the world of intellectual capital there are two sources of value: innovations (IC) and complementary business assets, and usually no transactions through which to value the assets directly. The differences between these two approaches are significant. The intellectual capital approach to valuation, because it recognizes that IC is one of the major sources of value for knowledge companies, tends to fully value the firm's intellectual capital. For companies wishing to convey information that fully informs about their value, the intellectual capital approach is much more thorough than the more traditional accounting approach.

Generic valuation relationship

For companies whose value is largely due to their intangibles (the ideas and innovations of the employees), a valuation based on tangible assets may seriously understate the true value of the company. Let us look at two ways in which going-concern knowledge companies are valued in order to illustrate this point.

Acme Ideas, a knowledge company, is publicly traded. The stock market, through Acme Ideas' stock price, determines the current market value of the company. This value, sometimes called the market capitalization, reflects the market's view of two things. First, it reflects the market's understanding of the value of the firm's fixed assets, those found on the company's balance sheet. Second, it reflects the market's intuition or perception of both the amounts of Acme Ideas' intellectual capital as well as its ability to leverage that IC in its marketplace.

In contrast to the way in which the market views Acme Ideas, let us look at the same elements of value from an IC perspective. First, the tangible assets of the firm are virtually the same as what the IC framework calls the firm's structural capital. Second, the market's perception of the firm's intellectual capital, when expressed in IC terms, means the expectation of future income from both the firm's innovations and the profits it will make by processing those innovations through the firm's complementary business assets.

For those who like to see relationships formalized in the form of an equation, the market value of a going concern (i.e. the stock price) may be expressed as:

$$V_m = VTA + DCF$$

where

V_m = stock market value
 V_{TA} = the value of the firm's tangible assets
DCF = the value of the discounted future cash flows the firm is
to generate.

This equation simply means that the value of a company is viewed as the sum of two things:

- (1) the value of its tangible assets (defined and valued on the company's balance sheet) and,
- (2) the net present value of the company's expected future cash flows (typically this is expressed as the firm's discounted cash flow or DCF).

But we can express the same relationship in intellectual capital terms in the following way:

$$V_m = V_{sc} + V_{ic}$$

where

V_m = stock market value
sc = structural capital
ic = intellectual capital

We must be careful at this juncture to point out that the intellectual capital term in the above equation is almost identical in meaning and function to the DCF term in the prior equation. In intellectual capital companies, the IC *creates* the innovations that are used to generate cash flow. To put it more succinctly: Intellectual capital is the driver of cash flow!

Knowledge company valuation relationship

The income stream generated by the firm's innovations is one of a knowledge firm's major sources of cash-based value. Companies such as 3M are known for their ability to continually generate new innovations. One would expect most of the value of such companies to derive from their innovation-based income stream. Another source of value for knowledge companies is the firm's complementary business assets, which economists define as the differentiable portion of the firm's structural capital. Knowledge firms that generate income from their complementary business assets, typically firms with large physical plants, can usually demonstrate that the cash flow produced by their complementary business assets is a result of the unique relationship between these assets and the innovations of the firm's intellectual capital. Nevertheless, for firms such as these, it is the income stream from the CBAs that provides the cash stream that affects the firm's stock price. The third component of a knowledge firm is its generic structural capital. Although in theory these assets

are not considered to be a source of value for knowledge companies, in practice they can be significant. Consider the case of GE Capital. This financial arm of General Electric has been the source of significant profits for the company, in addition to the profits generated by its intellectual capital and its complementary business assets.

Thus any formula used to forecast the earnings of a firm must use three specific terms. There must be a term in the equation for the earnings stream associated with the income generated by the firm's innovations or intellectual capital; there must be a term that accounts for the earnings generated by the firm's complementary business assets; and finally there must be a term that accounts for any earnings associated with the firm's generic structural capital. Such an equation for total earnings might look like the following:

$$V_m = V_{TA} + \text{NPV of earnings from the firm's intellectual capital} \\ + \text{NPV of earnings from the firm's complementary business assets} \\ + \text{NPV of earnings from the firm's generic structural capital.}$$

A more traditional version of the above relationships between value and its sources would look like this:

$$V_m = V_{TA} + \text{NPV} \begin{pmatrix} \text{Earnings}_{\text{SIC}_A} \\ + \\ \text{Earnings}_{\text{SIC}_B} \\ + \\ \cdot \\ \cdot \\ \cdot \\ \text{Earnings}_{\text{SIC}_N} \end{pmatrix} + \text{NPV} \begin{pmatrix} \text{Earnings}_{\text{SCBA}_i} \\ + \\ \text{Earnings}_{\text{SCBA}_j} \\ + \\ \cdot \\ \cdot \\ \cdot \\ \text{Earnings}_{\text{SIC}_P} \end{pmatrix} + \text{NPV} \begin{pmatrix} \text{Earnings}_{\text{SGSC}_q} \\ + \\ \text{Earnings}_{\text{SGSC}_r} \\ + \\ \cdot \\ \cdot \\ \cdot \\ \text{Earnings}_{\text{SGSC}_z} \end{pmatrix}$$

where:

V_m = Market value (market capitalization) of the firm

V_{TA} = The value of the firm's tangible assets

IC = Innovations of the firm's intellectual capital

CBA = Complementary business assets

SCG = Generic structural capital

Several things should be said about the above equation. First, concerning the value of the firm's tangible assets, purists might argue that because some tangible assets are involved in the generation of earnings, counting them here may be equivalent to doubling their value. This is surely true, but as a practical matter the value of most knowledge firms' tangible assets is quite small in comparison with their intangible assets. For firms such as this, simply

including all of the tangible assets in the equation for value may be a time-saving step that does not affect its valuation. Firms whose value includes substantial tangible assets should spend the time to separate those that are involved with creating the firm's income streams from those that are not.

Second, firms that wish to positively affect stock price and whose value derives largely from their IC-generated income should emphasize to investors and financial analysts all of the aspects of their IC that create the firm's income streams. Equally, for firms whose source of value lies with their complementary business assets, the approach to investors and analysts should emphasize the income streams emanating from their business assets. Completing the set, firms whose sources of value derive from combinations of intellectual capital and complementary business assets should be stressing the income streams that result from these combinations.

Third, a firm whose major source of value is generated by its generic structural capital should recognize that the stock market is unlikely to see it as a knowledge company. Indeed, the market will see the company for what it is, a going concern whose profits arise from some application of its generic assets.

Valuing a company for merger or acquisition

The importance of complementary business assets

In a merger or acquisition context, the interest of the purchasing company – let us call it Acme Ideas – is in some particular portion of the intellectual capital of the company to be acquired – let us call it Beautiful Baubles. Acme Ideas is interested in that portion of Beautiful Baubles' intellectual assets which, when matched with the Acme's complementary business assets, should produce a particularly high return. In addition, Acme may see something in Beautiful's complementary business assets that will provide extra value to Acme. All other Beautiful intellectual capital and complementary business assets objectively should not be of much interest to Acme and typically should be viewed as having little value except for the cash they might earn by being sold.

In this case, note that Acme Ideas is primarily interested in a portion of Beautiful Bauble's intellectual capital. By applying Beautiful's IC to its own complementary business assets, Acme can create value that is significantly greater than Beautiful could have created using its less extensive complementary business assets.

Let us call the new entity that emerges from the acquisition/merger of Acme and Beautiful "Newco". The value of Newco may be expressed in equation form. You will recall the equation for the value of a going concern, where the value was equal to the sum of the value of the company's tangible assets and its discounted cash flow:

$$V_{\text{newco}} = V(\text{TA}) + \text{DCF}$$

But where Acme Ideas, call it company A, acquires another, Beautiful Baubles, call it company B, the formula is slightly modified. The new equation is also quite simple. It says that the value of Newco is the sum of all of Company A's

and Company B's tangible assets and discounted cash flows. So, the value of Newco's tangible assets is the sum of the tangible assets of both firms:

$$\text{Tangible assets of Newco} = TA_A + TA_B$$

And the cash flows of Newco are the sum of four combinations from companies A and B:

- (1) The IC of company A and the complementary business assets of Company A.
- (2) The IC of company A and the complementary business of company B.
- (3) The IC of company B and the complementary business assets of company A.
- (4) The IC of company B and the complementary business assets of company B.

$$\begin{aligned} V_{\text{newco}} &= VTA + VDCF \\ &= [VTA_A + VTA_B] + [f(V(IC)_A, CBA_A) + f(V(IC)_A, CBA_B) \\ &\quad + f(V(IC)_B + CBA_A) + f(V(IC)_B + CBA_B)] \end{aligned}$$

There is something very interesting about the four cash-flow terms (combinations from companies A and B) in the valuation equation. Several of these terms may not be important to the value of Newco and may even be ignored. For example, if company A acquired company B largely because of company B's intellectual capital, then the valuation calculation can be simplified significantly. For example:

- (1) The value of the first combination, company A's IC and company A's complementary business assets (or, the value of company A as a going concern) is already known and need not be recalculated.
- (2) The value of the IC of company A and the complementary business assets of company B is of no interest. Company A did not acquire company B for its complementary assets. Indeed, they probably hold little value for company A. This term may be ignored.
- (3) The IC of company B and the complementary business assets of company A is the key term in this valuation equation. To determine the value of this term, one must identify the particular pieces of company B's intellectual capital of interest, the kind of cash value desired, the value chain for developing this value, and the activities involved.
- (4) The final combination term, the IC of company B and the complementary assets of company B is probably not of interest because company A purchased company B in order to match up the IC of B with company A's complementary business assets. Company B's complementary business assets are of no interest. This final

combination term can be ignored. (If for any reason this term is of interest, the value of company B's IC when matched to B's complementary business assets represents the value of company B as a going concern. This value is already known.)

As the result of the foregoing, the actual equation for the value of Newco looks like this:

$$\begin{aligned} V_{\text{newco}} = & [VTA_A + VTA_B] + [f(V(IC)_A, CBA_A) + f(V(IC)_A, CBAB) \\ & + f(V(IC)_B, CBA_A) + f(V(IC)_B, CBAB)] \end{aligned}$$

One can see, then, that in calculating the value of the new enterprise, the most important terms in the valuation equation are: the value of the tangible assets, the value of company A as a going concern, and the incremental value realized by combining the IC of company B with the complementary business assets of company A. The value of the tangible assets is known (it is already on the balance sheets of the two firms), and the value of company A as a going concern is known, so the only thing the financial analyst will need to calculate is the value of the IC of company B and the complementary business assets of company A.

Defining the purchase price using the IC perspective

The dollar value produced by combining the IC of company B with the complementary business assets of company A is the dollar value of the new company. The amount of this value that company A pays company B as its purchase price should reflect the portion of the newly created value that is associated with the IC. Similarly, the portion of the value that is associated with the complementary business assets of company A should remain with company A and not be included in the purchase price for B.

Calculating the purchase price using the IC perspective

The calculation of a purchase price requires that the parties understand how the intellectual assets of the acquired company will bring value to the acquiring company. The acquired company needs to understand how much value its intellectual assets will create for the acquirer in order to estimate how much it (the acquired company) should receive in compensation. Likewise, the company making the acquisition needs to understand fully what value the acquired intellectual assets will bring and can then determine how much it is willing to spend to obtain them.

Reaching an agreement on the purchase price requires the acquiring company to take several steps:

- (1) Identify the assets of interest for acquisition.
- (2) Determine how the acquired assets will be used.
- (3) Calculate the value created by acquired assets.

The results of these decisions will allow the purchasing company to determine what it considers to be a reasonable purchase price.

The following provides details on taking the steps listed above:

- (1) *Step one – which assets of the target company are of interest?* If they are intellectual assets, which ones? If they are human capital, are there particular individuals whose knowledge or know-how are particularly valuable? If they are structural capital assets, which ones, and why? How would they be integrated into the acquiring company's capital assets?
- (2) *Step two – how will the acquired assets be used?* Will they leverage existing complementary assets? Will they leverage existing intellectual assets? Will they shorten time to market? Will they help gain access to technology, markets, or position?
- (3) *Step three – how much value will be created by acquired assets?*
 - Company A should list the intellectual assets of company B subject to the acquisition and for each identify their intended use.
 - The acquiring company, company A, is in most cases interested in the company to be acquired because of one or more items of intellectual capital owned by company B. Company A is usually most interested in the intellectual capital of company B. Company A's reasoning is that company B's intellectual capital, when combined with company A's complementary business assets, will produce a significant increase in revenue or profits for company A. Company A should begin the process of determining the value of the selected pieces of intellectual capital by listing them, and for each one describing how it intends to use them in its business or operations. This list should include the intended conversion mechanisms.
 - For each intellectual asset, company A should describe the intellectual asset management activities concerned with its use.
 - Part of company A's ability to extract value from the intellectual capital it wishes to acquire from company B will be company A's ability to integrate the new intellectual capital into its business operations. The capability for such an evaluation is part of company A's intellectual asset management system (IAMS). Company A should list the activities and decisions required of the IAMS that will extract the desired value from its acquired intellectual capital.
 - For each intellectual asset, company A should identify and describe the complementary business assets to be used.
 - The identification and description of the CBAs should include a preliminary calculation of the new costs expected to be incurred by

the operation of the CBA in including the processing of the newly acquired piece of intellectual capital.

- Company A should define the chain of activities associated with creating the value that emerges from the intended use.
- The chain of activities should consist of an identification of the activities involved and, for each, the preliminary calculation of marginal costs expected to be incurred for each piece of intellectual capital processed.

Using the results of the steps taken above, the acquiring company, company A, may determine what it considers to be a reasonable purchase price. The purchaser determines the highest price it would be willing to pay to obtain the cash flow calculated in Step 3.

Likewise, the seller needs to determine the least it would be willing to accept in compensation for the lost income stream.

Summary

The increase in the value and importance of intangible assets in US corporations is due in large measure to the changing US legal environment, the effects of the Internet and information technology, and the leveraging effect of intellectual capital. The heightened value of intangibles companies has proven difficult to assess, largely because traditional accounting and financial tools, designed for the world of tangible assets, were not designed to deal with intangibles.

The increase in the number and importance of intangibles companies, as well as the inability of traditional tools to adequately value them, has led to the need to explore new or different valuation approaches. This paper has discussed two different kinds of valuation from a new perspective, based on an intellectual capital view of the firm. An intangibles company may be valued as a going concern or as a company to be acquired or merged with. In both cases, the intellectual capital perspective reveals the importance of complementary business assets in creating and extracting value from the firm's intangibles.

Calculating the value of intangibles companies based on their ability to develop and maintain cash flows by converting their ideas and innovations into revenue streams is fundamental to adequately assessing and quantifying the value of these firms.

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