

Intangible Assets: Concepts and Measurements



Baruch Lev

New York University, New York, New York, USA

Glossary

comprehensive valuation of intangibles A methodology for estimating the total value of enterprise intangibles, based on their contribution to profitability.

intangible assets Sources of future benefits that lack a physical embodiment.

intellectual property Intangible assets legally protected by patents, trademarks, or copyrights.

organizational capital Business designs, processes, and employee incentive-compensation systems that create economic value.

partial excludability The inability of owners of intangibles to capture fully the benefits of these assets.

resource allocation The division of national or corporate funds among investments, tangible and intangible.

Intangible assets capture center stage among national and corporate productive investments. The measurement and valuation of these assets—derived from their costs and benefits—are challenging yet crucial to resource allocation decisions made by corporate executives, capital market investors, and public policymakers.

Introduction

The annual investment of the U.S. corporate sector in intangible assets during 2000 amounted to 1 trillion dollars—so estimated Leonard Nakamura, a senior economist with the Philadelphia Federal Reserve. To put this staggering amount in perspective, the same-year investment of the U.S. manufacturing sector in physical assets (primarily property, plant, and equipment) was about \$1.1 trillion. Thus, corporate investment in intangibles

almost matched the investment in tangible assets, and given the substantially higher rate of growth of the former, relative to the latter, the rate of investment in intangibles will soon surpass that of physical investments.

Viewed from another perspective, in October 2003, the market value (stock prices times number of shares outstanding) of U.S. publicly traded companies was five times larger than their balance sheet value, which reflects primarily the net worth of physical and financial (stocks, bonds) assets. Thus, about three-quarters of the value of public companies, as perceived by investors, reflects non-physical and nonfinancial assets. Much of this huge value constitutes intangible assets, which are absent from corporate balance sheets. Even if capital markets will slide, it would take a monumental collapse to erase a 5:1 gap between market and balance sheet equity values.

What are those intangible assets, sometimes called intellectual capital or knowledge assets, whose size surpasses the traditional physical assets of business enterprises? This question is addressed in the next two sections, and the reasons for the ascendance of intangibles to the top of corporate investments are presented in the following section. The widespread concerns of corporate managers, investors, and policy makers about the management, valuation, and reporting of intangibles are discussed in the next section, and the measurement and valuation methodologies aimed at alleviating these concerns are articulated in the final section. The aim here is to familiarize the reader with one of the major economic developments of the late 20th and early 21st centuries: intangible assets.

What Are Intangible Assets?

An intangible asset, like any other asset (a machine or a rental property), is a source of future benefits, but in

contrast with tangible assets, intangibles lack a physical embodiment. Pfizer's patents on the best-selling drug Celebrex (relief for arthritis) and the Coca Cola' brand name are examples of highly valuable intangible assets that enable their owners to generate substantial revenues and profits over extended periods. (Financial assets, such as stocks and bonds, also lack a physical embodiment, but they are not intangible assets, because they essentially represent claims on corporate assets, both tangible and intangible.) The wide scope of intangibles can be grasped by their categorization as products/services, customer relations, human resources, and organizational capital.

Products/Services

A large and constantly growing share of the gross national product of developed economies is in intangible form; this includes software products, financial and health services, and leisure and entertainment, to name a few intangible products. Furthermore, for many tangible products, such as drugs, computers, or machine tools, the physical component is overshadowed by the intangible ingredient—knowledge—embedded in them. Intangible and intangible-intensive products and services generally emanate from the discovery (research and development) and learning processes of companies. In many cases, the property rights of owners over these assets are secured by patents and trademarks, conferring on owners of such intellectual property a temporary monopoly. This patent-driven monopoly is strongly challenged these days by developing countries and many nongovernmental organizations, claiming, for example, that it puts essential drugs (e.g., for AIDS and malaria) out of reach of poor patients and hinders the technological progress of developing nations (which cannot afford to pay for expensive technology). Nevertheless, the mainstream view, supported by economic theory, is that strictly enforced patent and copyright laws are essential to provide incentives for the heavy investment in research and development, required for sustained innovation and consequent economic growth. Indeed, practically all developed countries and an increasing number of developing ones have and enforce intellectual property laws.

Customer Relations

When the loyalty of customers to a product (e.g., Bayer aspirin) or a company enables a business enterprise to charge higher prices than its competitors charge or to secure a large market share (e.g., the investment bank Goldman Sachs), customer-related intangibles are present. Such intangibles are generally known as brand names, and are secured and enhanced by unique and continuously improved products/services (Microsoft operating

systems), coupled with extensive promotion, advertising campaigns, and cultivation of customers (McDonald's, or Disney). The world's 10 most valuable brands according to a *Business Week* ranking (August 5, 2002) are as follows: Coca-Cola (brand value of \$70 billion), Microsoft, IBM, General Electric, Intel, Nokia, Disney, McDonald's, Marlboro (cigarettes), and Mercedes (\$21 billion).

Human Resources

Unique human resource policies and practices, such as employee incentive and compensation systems, or on-the-job training programs, which consistently enhance labor productivity and reduce employee turnover, create intangible assets. An example of a human resource practice generating substantial benefits is provided by Edward Lazear, a Stanford economist, who has studied the consequences of the transition from a flat hourly rate to a piece-rate compensation of employees in the Safelite Glass Corp., the nation's largest installer of automobile glass. The findings were surprising: a 41% employee productivity jump, enabled in part by a 61% drop in paid sick hours. Such profit-generating human resource practices are, in fact, intangible assets.

Organizational Capital

Intangible assets increasingly come in the form of unique corporate organizational designs and business processes that allow companies to outperform competitors in generating revenues or by economizing on production costs. Dell's built-to-order computers (customers design the configuration of the products they order), Wal-Mart's supply chains (essentially shifting their inventory management to suppliers), and Citibank's online (Internet-based) banking activities are examples of organizationally related intangibles that have created sustained and considerable value for their owners. Unique information processes, such as those of the Italian apparel manufacturer Benetton, relaying real-time information about product colors from stores to production facilities, provide another example of the intangible—organizational capital.

What Is Unique about Intangibles?

Intangibles differ from physical and financial (stocks, bonds) assets in two important aspects that have considerable implications for the management, valuation, and the financial reporting of intangibles.

Partial Excludability

Although the owner of a commercial building or a bond can enjoy to the fullest the benefits of these assets (is able to exclude fully nonowners from sharing in the benefits), the owners of patents, brands, or unique business processes, and the employers of trained personnel, can at best secure some of the benefits of these intangibles for a limited duration (partial excludability). Patents expire after 20 years, but in many cases are infringed upon by competitors long before expiration; there are thousands of patent and trademark infringement lawsuits filed every year. Brand values are fickle, given severe competition in most economic sectors and frequent changes in customers' tastes, as demonstrated by erstwhile leading brands, such as Xerox, Polaroid, or the airlines Pan Am and TWA, which are now financially struggling or bankrupt. Trained employees often shift employers, taking with them the investment in human capital made by employers. In short, the property rights over intangibles are not as tightly defined and secured as are those over physical and financial assets, challenging owners of intangibles to capture large and sustained shares of the benefits.

The difficulties of fully capturing the value of intangibles increase the riskiness of owning these assets (value dissipation) and complicate their valuation by investors, because valuation generally requires a reliable estimate of future cash flows to owners. As for corporate financial reporting to investors, accountants often claim that the absence of complete control over the benefits of intangibles disqualifies these assets from recognition as such in corporate balance sheets.

Nonmarketability

Although many physical and most financial assets are traded in competitive markets (stock exchanges, used car dealerships), intangibles are by and large not traded in active and transparent markets (i.e., those in which prices and volumes of trade are observable). To be sure, there are frequent transactions in some intangibles, particularly the licensing and sale of patents and occasionally of trademarks, but these transactions are not transparent—details of the deals are generally not publicly disclosed. The major reasons for the “nontradability” of intangibles are the incomplete property rights, mentioned previously, and serious information asymmetries, i.e., differences in knowledge about intangible assets between buyer and seller. Thus, for example, developers of drugs or software know about these intangibles and their profit potential much more than do outsiders, and it is difficult to convey to the fullest such information in a credible way. Trade in assets when owners possess a significant information advantage over potential buyers is often limited or nonexistent.

The nontradability of intangibles causes serious valuation problems for investors and managers, because valuation techniques are often based on “comparables,” which are observed values (prices) of similar assets traded in transparent markets. Nontradability also increases the risk of owning intangibles, given the difficulties or impossibility of selling them before or after completion of development (no exit strategy). For many accountants, the absence of markets disqualifies intangibles from being considered as assets in corporate balance sheets. Intangibles thus differ inherently from physical and financial assets, and the management, valuation, and financial reporting of intangible assets are challenging. Of particular concern in the early 21st century is the vulnerability of intangibles, as expressed by Federal Reserve chairman Alan Greenspan, in testimony (February 27, 2002) to the House of Representatives: “As the recent events surrounding Enron have highlighted, a firm is inherently fragile if its value added emanates more from conceptual [intangible] as distinct from physical assets. A physical asset, whether an office building or an automotive assembly plant, has the capability of producing goods even if the reputation of the managers of such facilities falls under a cloud. The rapidity of Enron's decline is an effective illustration of the vulnerability of a firm whose market value largely rests on capitalized reputation.”

Whence the Ascendance of Intangibles?

If intangibles are so risky, their benefits so difficult to secure, and their liquidity (tradability) low, how did they ascend in the last quarter of the 20th century to become the most valuable corporate assets? What is the upside (benefit) of intangibles? The answer lies in the confluence of two major international economic developments: the ever-increasing intensity of business competition and the commoditization of physical assets. Regarding competition, the globalization of trade and the far-reaching deregulation of vital economic sectors, such as transportation, financial services, and telecommunications, have intensified significantly the competitive environment in which business enterprises operate throughout the world. This severe competitive environment makes innovation—the continuous introduction of new products/services, and of cost efficiency mechanisms—literally a matter of life or death for business enterprises. Computer and semiconductor companies, drug manufacturers, health care providers, and television networks that fail to generate new products continuously and to cut costs soon fall hopelessly behind competitors. Chemical and oil companies that do not constantly economize on costs will fall by the wayside, and retailers that do

not improve on inventory management and delivery channels to customers will end up in Chapter 11 (bankruptcy).

How is the necessary level of innovation achieved? Primarily by intangible investments: research and development aimed at generating new products and cutting costs, collaboration with other companies and universities to share technology and minimize risk, training employees to better serve customers, enhancing brand and trademark values to secure competitive positions, and developing unique business processes to streamline operations. Thus, as the competitive pressures intensify, companies respond with enhanced innovation, brought about primarily by intangible investments.

The second economic development to escalate the importance of intangibles is the commoditization (equal access to competitors) of physical assets. These assets, such as machine tools, car-producing robots, or computer-aided design systems, initially conferred significant competitive advantages to their early owners. Nowadays, however, most physical assets are commodities, available to all competitors. For example, all pharmaceutical companies, from the giants Merck and Pfizer to the smaller biotech companies, use state-of-the-art laboratory equipment and computer systems in drug development; General Motors, Ford, and Toyota avail themselves of the most advanced car design and manufacturing systems; and Citibank, Bank of America, and even smaller banks can afford the most advanced computer systems. When competitors have equal access to physical assets, such assets obviously cannot generate abnormally high profits and create sustained values.

In contrast, permanent profits and shareholder value are created by intangible assets, which by their nature are unique to the enterprise: patents, brands, in-house employee-training systems, or cost-cutting business processes. This unique ability of intangibles to enable companies to withstand competitive pressures and prevail is responsible for their remarkable ascendance to the role of premier corporate and national assets. In a sense, intangibles are high-risk/high-reward assets.

So, What Is the Problem?

Having noted that intangibles are fast growing and crucial to the survivorship and growth of business enterprises and national economies, why should there be concern about them? What is the problem with intangibles? In a word—measurement. The adage stating that “what’s not measured is not managed” is true for individuals (personal investments are carefully managed by most people, whereas their human capital, which is difficult to measure, rarely is), for business enterprises, and at the national level (national debt, easy to measure, is effectively managed, whereas the hard-to-measure environmental impact of

public policies is often ignored). The specific attributes of intangibles—partial excludability, high risk, and nontradability—render the measurement and valuation of intangibles a daunting task. Consider the value of a newly registered patent: like that of any other asset, the value depends on the future cash flows to be generated by it. But given the generally high technological uncertainty prevailing in most industries (competitors developing similar products), cash flows from patents are hard to predict, and consequently patent valuations are often of questionable reliability. For example, studies have shown that about 90% of registered patents turn out to be worthless, namely, their benefits do not cover costs. Even more challenging, how can a value be placed on an employee-training program, given the usually high labor turnover? And, how to value a brand that is constantly threatened by competitors’ products? In general, the softer the intangible, such as social capital (value of relationships) or environmentally-friendly policies, the harder its valuation. The absence of transparent markets for intangibles, in which similar transactions and prices can be observed, deprives managers and investors of value gauges for intangibles.

The measurement and valuation challenges raised by intangible assets are of major concern to corporate executives, capital market investors, and public policymakers. The fundamental decision of executives is how best to allocate corporate resources (funds): How much should be invested in new production facilities, international market penetration, technology acquisition, research and development, and labor force development? Such “resource allocation” decisions are generally based on a comparison of investment costs with prospective benefits, i.e., a return on investment computation. But the benefits of intangibles (e.g., cash flows from a drug under development, or future benefits from an employee-training program) are difficult to assess, complicating the decision of how much to invest in intangibles. Investors, too, encounter serious measurement problems in assessing the value of intangible-intensive enterprises. How, for example, can the value of a biotech company with a large investment in early-stage research and development that has uncertain prospects be ascertained? Indeed, empirical evidence indicates that investors systematically misprice the securities of research-and-development-intensive companies.

Accountants, the prime providers of measures and values, essentially have given up on intangibles. Practically all investments in intangibles such as research and development, brand enhancement, employee training, and systems development are expensed in corporate financial reports; such investments are not considered assets that promise future benefits. Physical and financial investments, in contrast, are considered enterprise assets. The large gap—5:1 in late 2003—between market values

of public companies and their balance sheet values is a reflection of the absence of intangibles from corporate balance sheets, due to the accounting treatment of intangibles as expenses. A ray of hope exists: accounting regulatory bodies, such as the U.S. Financial Accounting Standards Board, are currently considering ways of communicating some information on intangibles to capital markets. Difficulties in measuring intangible investments also beset policymakers in charge of fiscal policies and the measurement of national accounts (e.g., gross national product). Education and research and development, for example, are subsidized by governments throughout developed countries, but how can policymakers assess the adequacies of such intangible investments (too much, too little?) without reliable measures of their benefits (national resource allocation)? These intangibles-related measurement and valuation challenges, which surely cause misallocation of private and public resources, lead to the need to discuss measurement and valuation approaches.

The Measurement and Valuation of Intangibles

It is important to distinguish at the outset between input (cost) and output (benefits) measures of intangibles. Given an effective accounting system, there are no special problems related to the measurement of the costs of most intangible investments. The investments in research and development and software development programs are routinely tracked by business enterprises, as are the expenditures on brand maintenance (advertising, product promotion) and the design of business processes, such as Internet-based supply chains and distribution channels. More challenging is the determination of the cost of employee training. A large part of this activity involves on-the-job training, such as the mentoring of junior employees by veterans, which is not systematically accounted for by most corporations. By and large, though, input measures of intangibles are available, or they could be obtained by corporate executives. However, although available to managers, these investments, with the exception of research and development, are not disclosed to outsiders (investors, policymakers) in corporate financial reports.

The measurement and valuation of the benefits of intangibles' is more challenging. Consider, for example, the valuation of Microsoft's respected brand name. The consistently high profits and large market share of Microsoft are jointly determined by a superior technology (research and development), highly trained employees, and an effective sales and promotion effort. But how can Microsoft's total output (revenues, profits) be allocated among the various intangibles (research and development, human

capital, brands) responsible for it, to determine, for example, the brand value and to decide whether to invest more or less in brand enhancement? Stated differently, how can Microsoft's brand be valued and managed independently (stand-alone basis) of its research and development and physical assets? This joint nature of most intangibles is a major challenge to the valuation of individual assets. In fact, most intangibles are not stand-alone assets with unique benefit streams, like a commercial real estate property; rather, they generate benefits collectively with other assets. Pfizer's top-rated scientists, along with its effective sales force and reputation for reliable drugs, are jointly responsible for the success of this company. Given such "jointness," the allocation of Pfizer's revenues to the contributing resources—research and development, sales force, and reputation (brand)—which is required for the valuation of these intangibles and for resource allocation decisions, is a daunting task. Three approaches (benefit allocation, stand-alone valuation, and comprehensive valuation of enterprise intangibles), circumventing some of the difficulties, are often used to measure and assess the desirability of investment in intangibles.

Benefit Allocation

Under certain circumstances, reasonable assumptions can be made that allow the allocation of benefits to individual intangibles, and thereby facilitate their valuation. For example, consider the estimated productivity (return on investment) of research and development and brands for a major chemical company. Return-on-investment measurement requires an evaluation of benefits against costs. The chemical company's annual costs of research and development and expenditures on brand enhancement (advertising, promotion) are routinely recorded by the accounting system. But how could the combined benefits of research and development, brands, and physical facilities—represented by the company's revenues and cash flows—be attributed to the individual intangibles to assess their productivity and value to the organization? Based on consultation with experts, the company's revenues and consequent cash flows (after first deducting a reasonable return on physical assets) can be allocated between research and development and brands according to the following criterion: a brand is manifested by an ability to charge a premium price to customers, namely, a price consistently higher than that of a close competitor. Accordingly, the portion of the company's revenues resulting from the price differential with competitors can be attributed to brands, with the remaining revenues assigned to research and development. This revenue allocation allows estimating the productivity (return on a dollar investment) of research and development and brands individually, based on their costs and benefits. Similar allocation procedures may be used to value

other intangibles in different circumstances, for the purpose of resource allocation or valuations in licensing and mergers and acquisitions cases.

Stand-Alone Valuation

Some intangible assets, particularly those with legally protected ownership (intellectual property), generate unique streams of benefits. Such intangibles can be valued on a stand-alone basis by computing the present value of the expected benefit stream. For example, the patent and technology portfolio of IBM is reported to have generated \$500 million in licensing revenues in 2001 (*The Wall Street Journal*, February 19, 2002, page A3). It is relatively straightforward to estimate the present value of the forecasted stream of licensing revenues, which yields an estimated value of IBM's licensed intellectual property. A similar approach can be used to assess values of patents, trademarks, and copyrights, as long as reliable forecasts of cash flows from these assets can be made.

A Comprehensive Valuation of Enterprise Intangibles

The problem of jointness of intangibles is mitigated when the objective is to place a combined value on all of the company's intangibles, rather than on individual assets. In many real-world situations, such a comprehensive valuation of intangibles is all that is needed. Investors, for example, are primarily interested in the total value of a company's intangibles, which is missing from its balance sheet. Similarly, in cases of mergers and acquisitions, a comprehensive valuation of the acquired company's intangibles is needed to consummate deals. There is a methodology for such a comprehensive valuation of intangibles. The basic premise (elaborated in Gu and Lev, 2002) is that of an economic production function, whereby the earnings of an enterprise are related to the assets that generate those earnings. Three clusters of corporate or divisional assets are formed: physical, financial (stocks, bonds), and intangible. The initial valuation stage involves an estimate of "normalized earnings," that is, typical annual earnings that can be expected from the enterprise, accounting for both historical and future earnings, and abstracting from nonrecurring, abnormal items (e.g., a loss from a strike, or a gain from selling a subsidiary). The three classes of assets generate these normalized earnings. Accordingly, to isolate the earnings generated by intangibles, the contribution of physical and financial assets is subtracted from normalized earnings, leaving as a residual the "intangibles-driven earnings." An asset's contribution to earnings is based on its value and the return on the asset. The values of physical and financial assets can be obtained, with some adjustments,

from published balance sheets; the estimated returns on physical assets (contribution to earnings) are assessed from industry-wide data. The subtraction from normalized earnings of the contributions of physical and financial assets leaves as a residual the earnings contributed by the intangibles: these are the intangibles-driven earnings. The final stage of the comprehensive valuation of intangibles involves computation of the discounted (present) value of the expected stream of intangibles-driven earnings.

Table I demonstrates the outcome of this valuation methodology. It presents the estimated intangibles-driven earnings for the year 2000, along with the estimated total value of intangibles (intangible capital) for the 25 companies with the largest intangible capital in the widely watched Fortune 500 ranking. General Electric, with an estimated \$254 billion value of intangible assets captures top rank, followed closely by Pfizer and Microsoft. Walt Disney closes the list with \$47 billion of value from intangibles. It is important to note that high values of intangibles are not restricted to high-technology

Table I Comprehensive Value of Intangibles of the Top 25 Companies^a

Rank	Company	Intangible capital ^b	Intangibles-driven earnings ^b
1	General Electric	254,381	12,435
2	Pfizer	219,202	7686
3	Microsoft	204,515	8735
4	Philip Morris	188,538	10,226
5	Exxon Mobil	176,409	10,050
6	Intel	173,964	7339
7	SBC Communications	155,402	7897
8	IBM	148,679	7534
9	Verizon Communications	141,471	7494
10	Merck	139,494	7497
11	Wal-Mart Stores	99,973	5018
12	Johnson & Johnson	94,769	4976
13	Bristol Myers Squibb	85,837	4709
14	Coca-Cola	73,976	3906
15	Dell Computer	72,985	2499
16	Bellsouth	71,269	4004
17	Procter & Gamble	66,609	3931
18	Ford Motor	59,311	4310
19	Honeywell International	52,798	2533
20	Boeing	51,179	2427
21	PepsiCo	50,614	2607
22	United Parcel Service	48,508	2470
23	Home Depot	48,389	1952
24	Hewlett-Packard	48,226	2500
25	Walt Disney	46,960	2307

^aData taken from *Fortune Magazine*, April 18, 2001; values relate to the year 2000.

^bIn millions of U.S. dollars.

or science-based companies. In fact, as made clear by the table, approximately half of the top 25 companies are "old economy": Philip Morris, Exxon Mobil, Wal-Mart, Coca-Cola, Procter & Gamble, Ford, etc. The conclusion is that valuable, productive intangibles are the unique characteristic of innovative, well-run, and successful enterprises, rather than of companies operating in specific industries.

Summary

Intangible assets reached prominence in the business world in the late 20th century and will surely persist to capture center stage in the future. Intangibles are inherently different from physical and financial assets. These differences are responsible for the unique potential of intangibles to generate vast economic value and growth, at both the corporate and national levels, as well as for the serious difficulties in managing, measuring, and reporting the values of intangibles. Various methods are available to overcome the valuations challenges, but efforts to improve the measurement and reporting of intangibles should continue.

See Also the Following Articles

Business, Social Science Methods Used in • Critical Views of Performance Measurement • History of Business Performance Measurement • Knowledge Work

Further Reading

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