

Valuing Intangibles? Consider the Technology Factor Method

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IRS Revenue Ruling 68-609, also known as the “formula method” or “excess earnings method,” is believed by many to be the IRS’s preferred method of determining the fair market value of intangible assets¹. The appeal of the IRS 68-609 formula is its precise and entirely quantifiable approach.

A fundamental axiom of business, though, is that for every complex problem there is a solution that is simple, straightforward and wrong. The formula method can yield an answer precise to the second decimal place, but the underlying assumptions of the method are rarely met. For example, a start-up biotech company could invent a cure for cancer that tastes like chocolate and costs a nickel, but without a track record of earnings, the formula method would value this intangible asset at zero, or less than zero.

In the R&D and dotcom marketplace, many businesses with no history of earnings can be fervently sought acquisitions. And emerging technologies are frequently bartered and sold within the business community before the first product is released. The IRS itself acknowledges the limitation of 68-609 with the warning that, “...the formula approach may be used for determining the fair market value of intangible assets of a business *only if there is no better basis therefor available.*”

So what is a sound basis for determining fair market value? The technology factor (TF) method is

¹ <http://www.equityvaluations.com/pubs/revenueruling68-609.html>

gaining ground in the valuation of intangible assets. This article explains the underlying assumptions of the older formula method and how the flexibility of the TF approach adapts it to situations where the formula method will fail. It also describes how individual expertise and group consensus contribute to the technology factor, and how this valuation task force can then provide momentum for carrying forward a business decision.

EVERY PROBLEM ISN'T A NAIL

All assets can be classified as either tangible or intangible, and the formula method exploits this principle. It values intangible assets by subtracting the return on tangible assets from the value of the total enterprise, to arrive by inference at the value of only the intangibles. The formula method was conceived during Prohibition, to compensate U.S. distilleries for lost income. To offer a simple example of the formula method, assume a distillery’s tangible assets (cash, plant and equipment) with the following valuation and earnings:

Value of Tangible Assets	\$1,000,000
Prevailing Industry Rate of Return	x 12 %
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Annual Earning Attributable To Tangible Assets	\$120,000

Now assume this distillery has average annual earnings not of \$120,000, which is to be expected

by industry standards, but of \$250,000. The difference between the \$250,000 and the \$120,000—\$130,000 in annual income—is called the “excess earnings.” These excess earnings can then be attributed to the intangible value of the product, perhaps in recognition of strong brand loyalty, a unique formula or a special aging process. This \$130,000 in excess earnings is then recapitalized at 12 percent to arrive at the intangible value of the product. In our example, this intangible value (also sometimes called “goodwill”) would be \$1,083,333, calculated by dividing \$130,000 by 12 percent. A fair market value for the distillery is thus determined. The total value of the distillery would be \$2.083 million: \$1 million for its tangible assets, and \$1.083 million for its brand name and goodwill.

But there is a saying, “when the only tool you have is a hammer, every problem looks like a nail.” The formula method is an effective valuation tool in situations where a product has an established history of earnings in a stable industry and has anticipated earnings consistent with past performance. But these caveats of past history and future earnings predictability, which were less of a concern in an industrial economy, assume crucial importance in the information age.

What is the value of a pharmaceutical that has earned \$2 million

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annually for a decade, when its patent is due to expire in three years? Clearly, its value would be closer to \$6 million (\$2 MM per year for three years) rather than a recapitalization of \$2 million in annual earnings at 12 percent. Recapitalization based on past earnings would produce a precise but fallacious valuation of \$16.7 million (\$2 MM divided by 12%). As another example, what is the value of the human genome project, which has no track record of earnings after a decade of investment costing \$3 billion? The benefits of this intangible asset are so large, complex and far-reaching they are perhaps beyond calculation—but they would still be valued at zero by the formula method.

In general, companies commercially apply less than 20 percent of the technologies created by their R&D departments. So more than 80 percent of patented technologies have no real business plan. Licensing executives, venture capitalists, the IRS, or the SEC would have difficulty using the formula approach to assign value to these patented technologies.

For most new technologies, or new applications of existing technologies, or businesses that have failed because they have not yet found their market, a value can be found. However, the appropriate valuation method isn't the old, reliable hammer of the formula approach.

A TOOLKIT, NOT ONE TOOL

In general terms, all valuation methods are based on either cost, income or market information. The cost approach has the most limited applicability, since the value of an intangible property is rarely related to its cost of development. Under the cost method, the value of penicillin might be estimated at the cost of the wasted culture dish, accidentally contaminated by *Penicillium*

notatum in 1928 at St. Mary's Hospital in London. Like the formula method, the cost method can provide a very precise answer, which can also be quite wrong.

The most widely used valuation approach is the income method, which applies a discount factor to future anticipated revenues from a product. This discount factor may include global economic risk, country risk, industry risk, company risk and technology risk. The formula approach of IRS Revenue Ruling 68-609 is a very simple income method, based on a future projection of past earnings. However, there is no adjustment to the net present value (NPV) of expected cash flows in Ruling 68-609, other than a discount to reflect an expected rate of return such as 12 percent. This discount rate is used in the capitalization of the calculated excess earnings.

The market approach, unlike any version of the income method, can be considered a "valuation by proxy." The market approach considers technologies that are identical or similar to the intangible asset being valued. The difficulty of this approach is in finding an identical (or perhaps a similar) technology when none may even exist. Assuming a similar technology does exist, a second hurdle is gaining financial details, which may be private corporate data and unobtainable.

The technology factor² is a hybrid of the market and income methods and it minimizes their weaknesses by drawing on both market data and income data. The TF approach seeks the most specific market and income information available and places this information in a reasoned context. Information is considered within the framework of a specific company, a specific business and the current competitive

² Patrick H. Sullivan, *Profiting From Intellectual Capital*, John Wiley & Sons, Inc. pp 335-356, 1998

marketplace by using experts both inside and outside your organization. The TF method is best when it is considered a toolkit, rather than a specific tool. Or perhaps even better, consider it a single tool with a variety of features, like a Swiss army knife.

The TF method employs a consistent methodology from business to business. Also, the methodology is consistent for various stages of technology development, from novel technology to established global enterprises. It can be applied equally well to a single technology or product, or to a portfolio of products. The flexibility of the method allows one to consider a myriad of alternatives, such as the value of a technology to a company other than one's own, the value of a technology with no track record of performance, the value of an intangible asset near the end of its useful life or the value of a new application for an old technology. These situations, rather than being uncommon, are situations that typically prompt a need for valuation.

UTILITY AND COMPETITIVE ADVANTAGE

Valuation with the TF method can be presented as a simple formula: Value of Intangible = Technology Factor × Incremental Business NPV. NPV is the net present value of the income from products or processes that are directly tied to the technology being evaluated. This NPV is a preliminary figure, a cash flow that has only been discounted based on an expected rate of return, such as 12 percent. It has not yet been discounted by the technology factor to reflect a specific business situation and competitive environment.

The technology factor is always less than 100 percent and it is developed by considering all of the attributes of a technology that affect its potential for creating

value. What are these attributes? They fall into two categories: utility issues and competitive advantage issues. Utility issues include the technology's usefulness to your company, its usefulness to others, the capital required for implementation, the time required for implementation and the expected useful life of the technology. Competitive advantage issues include the differentiation of the technology, any available alternative technologies, legal strengths (such as the defensibility of a patent), the anticipated response from competitors, the teaching value of the patent and the owner's right to use the technology.

As shown in Exhibit 1, individuals from a variety of internal departments can best judge the impact of a specific competitive advantage issue or utility issue. These staff members, along with outside consultants and perhaps even representatives of a company negotiating a purchase of the technology, form the valuation task force. For each competitive advantage or utility issue identified, these individuals will determine whether the opportunities and concerns: add value (+), destroy value (-), or have no impact (0). An example chart is shown in Exhibit 2. It is important to note that a single issue that destroys value could outweigh all the other positive issues that create value. Through professional judgement, all issues, both positive and negative, are accumulated by individual opinion and group consensus into a single technology factor percentage.

FACTS AND EXPERTISE

The TF process is represented schematically in Exhibit 3. The technology factor is a detailed and systematic assessment of a technology and its potential role in a business, with a resulting figure that can be used in negotiating a purchase or a sale, a valuation for the

EXHIBIT 1: FUNCTION/ CONTRIBUTION CHART	
Function	Contribution
Business	Strategic fit of technology with long-term business plan
Attorney	Defines the exact boundaries of the protected intellectual property
R&D	Competitive R&D and its impact on the obsolescence of the technology being evaluated
Manufacturing	Scale-up hurdles and competitive manufacturing processes
Marketing	Product attributes, market applications, and competitive response
Business Analyst	Economic impact (profit/loss of market share of price). Calculates the incremental cash flow and the NPV of the products relevant to the technology
Technology Appraiser (if different from analyst)	Facilitates the generation of the technology factor and determines the value of the technology

EXHIBIT 2: EXAMPLE OF UTILITY AND COMPETITIVE ATTRIBUTES

Wt.	Utility Attributes	-2	-1	0	+1	+2
1	Usefulness to the Joint Ventures					X
2	Stage of the Technology				X	
1	Continued Research Support			X		
1	Acceptance in the Market		X			
2	Customer Willingness to Pay	X				
1	Marketing Effort Required		X			
1	Remaining Life of the Technology				X	
1	Time Required for Implementation					X
1	Capital Required for Implementation			X		

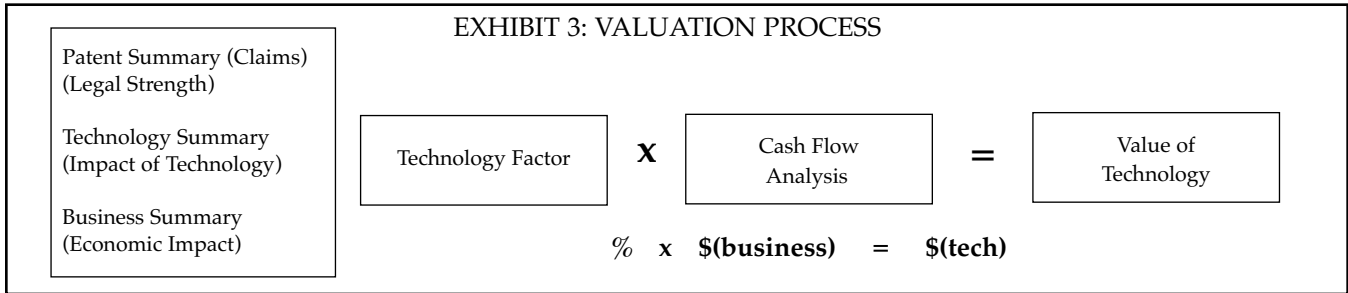
Wt.	Competitive Attributes	-2	-1	0	+1	+2
1	Alternative Technology		X			
2	Legal Strength				X	
1	Differentiation			X		
1	Strategic Positioning				X	
2	Anticipated Competitive Response	X				
1	Costs of Complementary Assets		X			
1	Displacement Potential				X	
1	Complexity of the Technology				X	

IRS, or in making an investment decision. The quality of the TF valuation is highly dependent on the quality of the assumptions and data. The greater the extent to which actual—rather than assumed or hypothetical—data is available, the more certain and supportable the inferences and the more accurate

and realistic the calculated value. The composition of the team and the expertise of the individuals are likewise crucial to the accuracy of the valuation.

In addition to a quantitative numerical result, one of the benefits of TF method is the achievement of a consensus. This consensus can add

EXHIBIT 3: VALUATION PROCESS



its own value, by accelerating speed-to-market momentum or by smoothing a purchase negotiation. The valuation task force can form the core of an implementation task force, with a personal relationship between departments and lines of communication and reporting already in place.

The American Society of Appraisers and outside consultants recommend that any valuation of a technology be done using more than one method. A second valuation approach, in addition to the TF method, will help establish and validate a price range

KNOW YOUR ASSUMPTIONS

Albert Einstein said, "Every problem should be made as simple as it can be, but not more so." The formula method and several other popular approaches often fail by making the valuation problem simpler than it is. Capitalization of excess earnings is appropriate only when a business growth rate is constant and the intangible assets go on into perpetuity. But we know that intellectual properties such as patents, trade secrets, know-how and copyrights have a limited legal life and perhaps even a shorter business life. And we know that any value achieved is only created in a specific business setting and in spite of competitive adversity.

The TF approach accepts the inherent complexities of valuing intellectual assets, deconstructs the problem into manageable issues and brings individual expertise to bear on each issue. This consider-

able professional expertise and the source data it employs are then reassembled into a single percentage, called the technology factor.

What is the first rule in valuing intangible assets? Understand your assumptions. Then, with these assumptions understood, know what situations lend themselves to a particular methodology. Also note the difference between facts that can be used as-is and facts that need to be qualified or interpreted. This will allow you to flag scenarios where the formula approach is clearly wrong, as well as identify how the TF method may apply.

Although elements of the TF approach (such as identifying discount factors for organizational fit and competitive environment) are subjective, it has emerged as one of the most accurate means for obtaining quantitative results from qualitative insights. This is especially true when valuations are required of individual assets using limited data. After 10 years of empirical validation, with follow-up studies performed to compare actual with projected results, what is the strongest argument for the TF approach? It works.

CONCLUSION

In conclusion, I would like to clarify the issues outlined above by differentiating the value of all intangibles to a business from the valuation of a specific technology. In determining the current market value of the total business, including the intangibles, then the for-

mula method could give an indication of the intangible value (assuming the business will maintain the same effort of research and advertising budgets to maintain its continuous contribution to the business into perpetuity). This statement indicates that any portion of an intangible bundle could lose its value, but the business will be able to generate new technology of similar or higher value. That might be a logical assumption in valuing a business, but it is not meaningful for the licensing executive who would like to license an individual technology. If an appraiser is valuing a technology protected by a patent or trade secret, then the formula method is inaccurate, and the TF method should be considered because it is designed to isolate the value of the technology from the business value and measure the risk associated with that unique patent. The analysis covers the life of the technology and does not overestimate the value of the technology by calculating its value into perpetuity. This analysis reflects real market analysis situations because the fact is that technology protection is a timed event and new innovations render many existing technologies obsolete, yet a business could continue well after the expiration of the any specific patent.