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The Intangible Valuation Renaissance: Five Methods

By *Antonella Puca, CFA, CIPM, CPA* (<https://blogs.cfainstitute.org/investor/author/antonellapuca/>) and *Mark L. Zyla, CFA, CPA/ABV, ASA* (<https://blogs.cfainstitute.org/investor/author/marklzyla/>)

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Intangible assets are increasingly critical to corporate value, yet current accounting standards make it difficult to capture them in financial statements. This information gap can affect valuations for the worse.

Today, valuations based on simple accounting metrics from corporate financial statements no longer suffice. Indeed, [Feng Gu and Baruch Lev have highlighted their shortcomings](https://www.cfapubs.org/doi/abs/10.2469/faj.v73.n4.4) (<https://www.cfapubs.org/doi/abs/10.2469/faj.v73.n4.4>), going so far as to herald “the end of accounting” (<https://www.wiley.com/en-us/The+End+of+Accounting+and+the+Path+Forward+for+Investors+and+Managers-p-9781119191094>)” while stressing the need for valuation methods derived (<https://blogs.cfainstitute.org/investor/2018/08/27/franchise-quality-score-a-metric->

for-intangibles/) from key performance indicators (KPIs) outside the framework (<https://blogs.cfainstitute.org/investor/2018/04/18/assessing-value-in-the-digital-economy/>) of generally accepted accounting principles (GAAP).

So what are the common methodologies for intangibles valuation that build on historical and prospective financial information within the framework of current accounting standards? And how can they be integrated with non-GAAP KPIs to assess a firm's competitive position?

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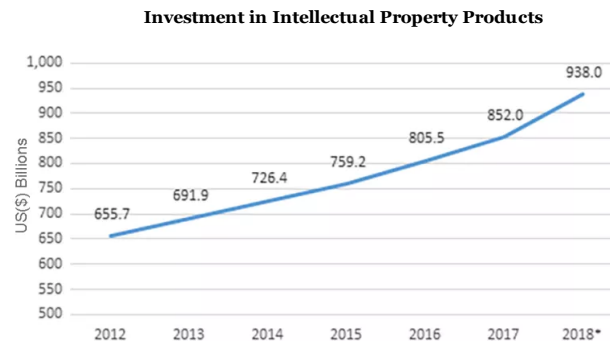
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What Are Intangible Assets?

The "International Glossary of Business Valuation Terms" (IGBVT)

(<https://www.nacva.com/content.asp?contentid=166>) defines intangible assets as "non-physical assets such as franchises, trademarks, patents, copyrights, goodwill, equities, mineral rights, securities and contracts (as distinguished from physical assets) that grant rights and privileges, and have value for the owner." For financial reporting under US GAAP, they are defined as "assets (not including financial assets) that lack physical substance." GAAP has a separate definition of goodwill: "the excess of the cost of an acquired entity over the net amounts assigned to assets acquired and liabilities assumed."

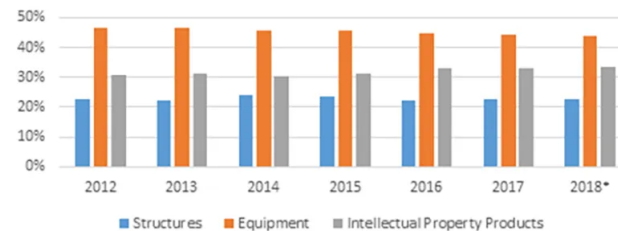
The US Bureau of Economic Analysis (BEA) (<https://www.bea.gov/>) started tracking investments in intangible capital by private enterprises as part of its GDP database in 2013. Its intangible capital metric includes accumulated spending on software, R&D, and intellectual property related to arts and entertainment — a "cost" perspective. Since 2012, the annual investment in intellectual property products by private enterprises in the United States has grown at a 6.2% annualized rate to \$938 billion as of October 2018 (annualized).



Source: US Bureau of Economic Analysis, Table 1.1.5; last revised October 2018

Investment in intellectual property now represents 33.41% of total US gross domestic investment in 2018, up from 30.95% at year-end 2012. Over the same period, investments in Structures as a percentage of total US gross private domestic investment have remained flat, while investments in Equipment have fallen.

US Gross Domestic Investment (Percent of Total)



Source: US Bureau of Economic Analysis, Table 1.1.5 last revised October 2018

Nicolas Crouzet and Janice Eberly

(<https://www.kansascityfed.org/~media/files/publicat/sympos/2018/papersandhandouts/824180810eberlycrouzetpaper.pdf?la=en>)

recently noted that the accumulation of intangible capital has spurred market concentration in favor of those firms that can best leverage the scaling benefits of advanced technological infrastructure. They also observe that intangible capital is hard to use as collateral for financing. The increase in intangible capital investment likely reduced the proportion of overall investment financed through bank debt and may have opened the door for such non-banking players as private debt funds in corporate lending.

Financial Reporting and Valuation Challenges

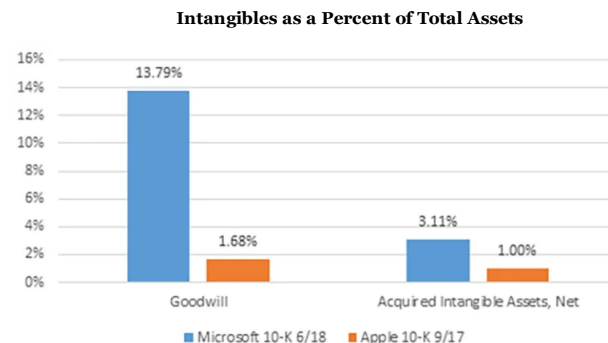
As investments in intangibles grow, assessing the value of those assets as drivers of enterprise value becomes ever more essential. Both IFRS and GAAP are “mixed models” with different ways to account for intangible assets acquired as part of a business combination compared to those that are internally developed. The former must be measured at fair value at the time of the acquisition, included in the acquirer’s balance sheet, and then subject to amortization or periodic impairment testing. Under GAAP, internally developed intangible assets tend not to appear on the balance sheet and related costs are expensed as incurred. Under IFRS, such assets are recognized only if certain criteria are met. (<https://www.wiley.com/en-us/Fair+Value+Measurement%3A+Practical+Guidance+and+Implementation%2C+2nd+Edition-p-9781118229071>).

When it comes to the income statement, an enterprise’s earnings under GAAP generally include an amortization charge for the intangible assets that are in the balance sheet and have a “determinable” useful life, and a charge in R&D or sales and administration expenses for internally developed assets that are not capitalized. It may also include an impairment amount recognized on goodwill or on the intangible assets that have been capitalized and have undetermined useful life. Analysts who compare companies across borders need to understand the specific intangibles-related differences between GAAP and IFRS.

The different accounting treatment of acquired versus internally developed intangible assets could create comparability issues for companies with different growth strategies. A firm that has developed its portfolio of intangible assets through acquisition will probably have a higher share of intangibles recognized in its balance sheet (and more goodwill) than one that developed intangible assets internally. This will affect balance sheet ratios and reported earnings.

Microsoft vs. Apple

Intangibles represent 16.9% of Microsoft's total assets but only 2.7% of Apple's, according to an analysis of their 10-Ks. This reflects, in part, Microsoft's greater appetite for acquisitions. Analysts need to grasp the varying treatments of internally developed versus acquired intangibles to ensure that appropriate valuation adjustments are made for comparability. They should also integrate differences in intangibles accounting in the algorithms they develop for automated trading and factor investing.



Valuation Models for Intangible Assets

Five of the more common valuation methods for intangible assets

(<https://www.wiley.com/en-us/Financial+Valuation%3A+Applications+and+Models%2C+%2B+Website%2C+4th+Edition-p-9781119286608>) that are within the framework of the cost, market, and income approach are described below. These approaches can be integrated into an analysis of non-GAAP KPIs and other conceptual frameworks (<https://blogs.cfainstitute.org/investor/2018/08/27/franchise-quality-score-a-metric-for-intangibles/>).

1. Relief from Royalty Method (RRM)

The RRM calculates value based on the hypothetical royalty payments that would be saved by owning the asset rather than licensing it. The rationale behind the RRM is fairly intuitive: Owning an intangible asset means the underlying entity doesn't have to pay for the privilege of deploying that asset. The RRM is often used to value domain names, trademarks, licensed computer software, and in-progress R&D that can be tied to a specific revenue stream and where data on royalty and license fees from other market transactions are available. Generally, the RRM involves the following steps:

1. Projecting financial information for the overall enterprise, including revenue, growth rates, and tax rates and estimates. The underlying data is generally obtained from the entity's management.
2. Estimating a suitable royalty rate for the intangible asset based on an analysis of royalty rates from publicly available information for similar domain names and of the industry in question. Royalty rate information is available on such databases as KTMINE (<https://www.ktmine.com/>) and RoyaltySource (<http://www.royaltysource.com/>), among others. SEC filings for similar publicly traded companies can also be useful.
3. Estimating the useful life of the asset.
4. Applying the royalty rate to the estimated revenue stream.
5. Estimating a discount rate for the after-tax royalty savings and discount to present value.

The RRM contains assumptions from both the market (royalty rate) and income approach (estimate of revenue, growth rates, tax rates, discount rate). To see how it works in practice, we conducted a hypothetical domain name valuation using the RRM:

Valuation of Domain Name: Royalty Relief Method

| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6-31 |
|---------------------------------|-------------|-------------|-------------|-------------|-------------|----------------|
| Revenue | 125,000,000 | 131,250,000 | 139,125,000 | 147,472,500 | 153,371,400 | 330,759,421.93 |
| Growth Rate | | 5.00% | 6.00% | 6.00% | 4.00% | 3.00% |
| Pretax royalty savings | 1,250,000 | 1,312,500 | 1,391,250 | 1,474,725 | 1,533,714 | 3,307,594 |
| Less: taxes | (262,500) | (275,625) | (292,163) | (309,692) | (322,080) | (694,595) |
| After-tax royalty savings | 987,500 | 1,036,875 | 1,099,088 | 1,165,033 | 1,211,634 | 2,612,999 |
| PV of after-tax royalty savings | 58,927 | 936,235 | 827,008 | 730,523 | 633,120 | 11,927 |
| Sum of PV of savings | 3,197,741 | | | | | |
| Amortization benefit multiplier | 1.04 | | | | | |
| Preliminary value | 3,324,673 | | | | | |
| Concluded value (rounded) | 3,325,000 | | | | | |

Keep in mind the domain name's fair value includes an amortization benefit multiplier that incorporates the value of the tax benefit resulting from the amortization of the asset. The amortization benefit is calculated as the present value of the tax savings that results from a 15-year amortization of the asset. In calculating the amortization adjustments for US companies, analysts should be mindful of the corporate tax rates changes resulting from recent US tax reform and estimate their impact on intangible amortization over the period considered in the valuation.

2. Multiperiod Excess Earnings Method (MPEEM)

The MPEEM is a variation of discounted cash-flow analysis. Rather than focusing on the whole entity, the MPEEM isolates the cash flows that can be associated with a single intangible asset and measures fair value by discounting them to present value. The MPEEM tends to be applied when one asset is the primary driver of a firm's value and the related cash flows can be isolated from the firm's overall cash flows. Early stage enterprises and technology firms are prime candidates for this approach. Computer software and customer relationships are among the sorts of assets that frequently generate such cash flows and could be assessed with fair value measurement using the MPEEM. The MPEEM usually involves the following steps:

1. Projecting financial information (PFI) — cash flows, revenue, expenses, etc. — for the entity.
2. Subtracting the cash flows attributable to all other assets through a contributory asset charge (CAC). The CAC is a form of economic rent for the use of all other assets in generating total cash flows that is composed of the required rate of return on all other assets and an amount necessary to replace the fair value of certain contributory intangible assets.
3. Calculating the cash flows attributable to the intangible asset subject to valuation and discount them to present value.

Assessing the CAC can be a challenge with MPEEM. The required returns on CAC must be consistent with an assessment of the risk of individual asset classes and should reconcile overall to the enterprise WACC. Also, the projection period for the PFI used in the model should reflect the estimated useful life of the subject asset. That may involve significant judgment.

3. With and Without Method (WWM)

The WWM estimates an intangible asset's value by calculating the difference between two discounted cash-flow models: one that represents the status quo for the business enterprise with the asset in place, and another without it. The WWM is often used to value noncompete agreements.

4. Real Option Pricing

As Aswath Damoradan noted, “the most difficult intangible assets to value are those that have the potential to create cash flows in the future but do not right now.” These assets have option characteristics that make them suitable to be valued using option pricing models and include undeveloped patent and undeveloped natural resource options, among others.

For a real option to have significant economic value, competition must be restricted in the event of the contingency. This is frequently the case for patents, which give the owner the right but not the obligation to exclude others from making, using, selling, offering for sale, or importing the patented invention. An undeveloped patent may have zero “intrinsic” value if the net present value of the underlying project is deemed to be zero or negative at the measurement date. Still, the patent may have considerable “time” value based on the possibility that the net present value of the project will turn out to be positive at some point over the life of the patent.

An option pricing model may be most suitable to capture the “time value” component of a patent that is not currently generating cash flows for the firm, but may have the potential to do so in the future (<https://onlinelibrary.wiley.com/doi/10.1002/9781119203308.ch9>). For instance, we can estimate the value of a patent on a drug that is undergoing the FDA approval process using a Black-Scholes option pricing formula as follows:

Inputs under Black-Scholes Option Pricing Model

- PV of Cash Flows from Introducing the Drug Now (Current Price) = \$ 520 million
- PV of Cost of Developing Drug for Commercial Use (Exercise Price) = \$ 650 million
- Patent Life (Time to Expiration) = 15 years
- Riskless Rate = 3.2% (15-year Treasury rate)
- Variance in Expected Present Values = 0.25.
- Expected Cost of Delay (Dividend Yield) = 1/t = 5.89%

Patent Value (Call Value Resulting from the Black-Scholes Formula) = \$ 26,347,850

As with stock options, a key challenge in the valuation of real options is assessing the underlying volatility. Moreover, real options require estimates for the exercise price (the cost of developing the patent in our example), and the current price of the underlying (the present value of the cash flows from introducing the drug now), which are generally observable for options on listed equities. Overall, while there is judgment involved in the application of option pricing models to intangible assets, there is also a significant amount of guidance and industry practice that has developed over time and that the analyst can refer to for implementation.

5. Replacement Cost Method Less Obsolescence

This method requires an assessment of the replacement cost for the intangible asset new, that is “the cost to construct, at current prices as of the date of the analysis, an intangible asset with equivalent utility to the subject intangible, using modern materials, production standards, design, layout and quality workmanship.” (<https://www.wiley.com/en-us/Guide+to+Intangible+Asset+Valuation%2C+Revised+Edition-p-9781937352257>).” The replacement cost is then adjusted for an obsolescence factor relative to the intangible asset. A simple replacement cost model for acquired software that adjusts for obsolescence and takes into account the tax impact of the asset’s amortization is shown below. It weighs the tax impact of the asset’s amortization, which is most relevant if the intangible asset is considered within the framework of the valuation of an overall enterprise. A pre-tax asset valuation may be more suitable under certain circumstances, particularly if the asset is valued on a stand-alone basis.

Valuation of Acquired Software: Replacement Cost Method Less Obsolescence

| Module in Place | Lines of Code | Productivity Rating | Adjusted LOC Basis | Std LOC per Hour | Hours to Recreate |
|-----------------|---------------|---------------------|--------------------|------------------|-------------------|
| | 1 | 20,000 | 3 | 6,667 | 3 |
| | 2 | 36,000 | 4 | 9,000 | 3 |
| Total | | | | | 6,222 |
| | | | | | 3,000 |
| | | | | | 5,222 |
| | | | | | 130 |
| | | | | | 678,889 |
| | | | | | (169,722) |
| | | | | 25.00% | 509,167 |
| | | | | | (106,925) |
| | | | | 21.00% | 402,242 |
| | | | | | |
| | | | | | |
| | | | | 30.00% | |
| | | | | 15 | |
| | | | | 3.72633 | |
| | | | | | 22,139 |
| | | | | | 424,381 |
| | | | | | 424,000 |

This valuation exercise considers the tax impact of the asset’s amortization, which is most relevant if the intangible asset is considered within the framework of the valuation of an overall enterprise. A pre-tax asset valuation may be more suitable under certain circumstances, particularly if the asset is valued on a stand-alone basis. The estimate of the obsolescence percentage is also a critical factor in this model, and is often developed based on inquiries with technical management personnel.

The table below provides a summary of the [cost, market, and income approach models](https://www.aicpastore.com/ForensicValuationandLitigationServices/PRDOVR~PC-732880/PC-732880.jsp) (<https://www.aicpastore.com/ForensicValuationandLitigationServices/PRDOVR~PC-732880/PC-732880.jsp>) as they typically apply to the main classes of intangible assets:

Intangible Valuation Approach Summary

| ASSET | PRIMARY | SECONDARY | TERTIARY |
|-------------------------------|---------|-----------|----------|
| Patents | Income | Market | Cost |
| Technology | Income | Market | Cost |
| Copyrights | Income | Market | Cost |
| Assembled Workforce | Cost | Income | Market |
| Internally developed Software | Cost | Market | Income |
| Brand name | Income | Market | Cost |
| Customer relationships | Income | Cost | Market |
| Source: AICPA | | | |

Conclusion

In today’s economy, the value provided by intangible assets must be captured in enterprise valuation. Analysts have to expand the range of data sources and techniques they use in valuation and develop methodologies that are suitable to the intangible asset being valued for more reliable valuation results. Such [methodologies](https://blogs.cfainstitute.org/investor/2018/08/27/franchise-quality-score-a-metric-for-intangibles/) (<https://blogs.cfainstitute.org/investor/2018/08/27/franchise-quality-score-a-metric-for-intangibles/>) provide new perspectives on the cost, market, and income approaches and can be integrated with an analysis of non-GAAP KPIs and other conceptual frameworks.

Identifying and valuing intangible assets is critical not only in an active management framework, but also in factor investing and quantitative modeling in passive strategies that rely on financial statements data and that may need adjustments for comparability.

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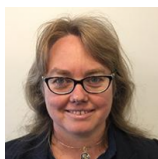
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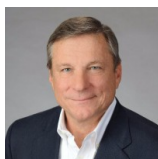


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Antonella Puca, CFA, CIPM, CPA

(<https://blogs.cfainstitute.org/investor/author/antonellapuca/>)

Antonella Puca, CFA, CIPM, CPA/ABV, CEIV, is a managing director at BlueVal Group, LLC, a valuation services firm with a focus on the valuation of privately held companies in the United States. Prior to BlueVal, she was part of the alternative investment group at KPMG/Rothstein Kass, where she helped launch RK's Bay Area practice, the global hedge fund practice of EY in San Francisco and New York, and the financial services team at RSM US LLP in New York. Puca served as a director in the ethics and professional standards group at CFA Institute and as a volunteer focused on certifications and curriculum programs. She has served as an executive committee member of the board of the CFA Society of New York and as a member of AIMA's research committee. She will be joining the Business Valuation Committee of the AICPA effective May 2019 and is currently writing a book on the Valuation of Early Stage Enterprises: A Fair Value Update with expected release in the Spring of 2020 (Wiley). Puca is licensed as a CPA in California and New York. She is accredited in business valuation (AICPA), holds the valuation analyst and the entity and intangibles valuation certifications. Puca is a member of the Italian Professional Association of Journalists. She holds a degree in economics with honors from the University "Federico II" of Naples, Italy, and a master of law studies in taxation from NYU Law School. She has been an adjunct faculty member at New York University, a research fellow at the Hebrew University of Jerusalem, and a member of the 420 Italian National Sailing Team.



(<https://blogs.cfainstitute.org/investor/author/marklzyla/>)

Mark L. Zyla, CFA, CPA/ABV, ASA

(<https://blogs.cfainstitute.org/investor/author/marklzyla/>)

Mark L. Zyla, CFA, CPA/ABV, ASA, is a managing director of Acuitas, Inc., an Atlanta-based valuation and litigation consultancy firm. Zyla is the practice leader of the firm's valuation practice. He serves as chair of the Standards Review Board of the International Valuation Standards Council

(“IVSC”) and as a member of the AICPA’s Forensic and Valuation Services Executive Committee. Zyla is a member of the Business Valuations Committee of the ASA where he also serves as chair of the Business Valuation Standards and Technical Issues subcommittees. He is on the advisory council of the master of science in finance program at the University of Texas at Austin. In 2013, he was inducted into the AICPA Business Valuation Hall of Fame. Zyla is a frequent presenter and author on valuation issues. He is on the faculty of the Federal Judicial Center and the National Judicial College teaching business valuation concepts to judges. He is author of Fair Value Measurement: Practical Guidance and Implementation 2nd ed. published by John Wiley & Sons, Inc. (2013), and of the course, “Fair Value Accounting: A Critical New Skill for All CPA,s” published by the AICPA. He is co-author of several portfolios related to Fair Value Measurement published by Bloomberg BNA. Zyla received a BBA degree in finance from the University of Texas at Austin and an MBA degree with a concentration in finance from Georgia State University. he completed the mergers and acquisitions program at the Aresty Institute of The Wharton School of the University of Pennsylvania and the valuation program at the Graduate School of Business at Harvard University. He is a chartered financial analyst and a certified public accountant, accredited in business valuation (“CPA/ABV”), certified in financial forensics (“CFF”) by the AICPA, and an accredited senior appraiser with the American Society of Appraisers certified in business valuation (“ASA”).

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