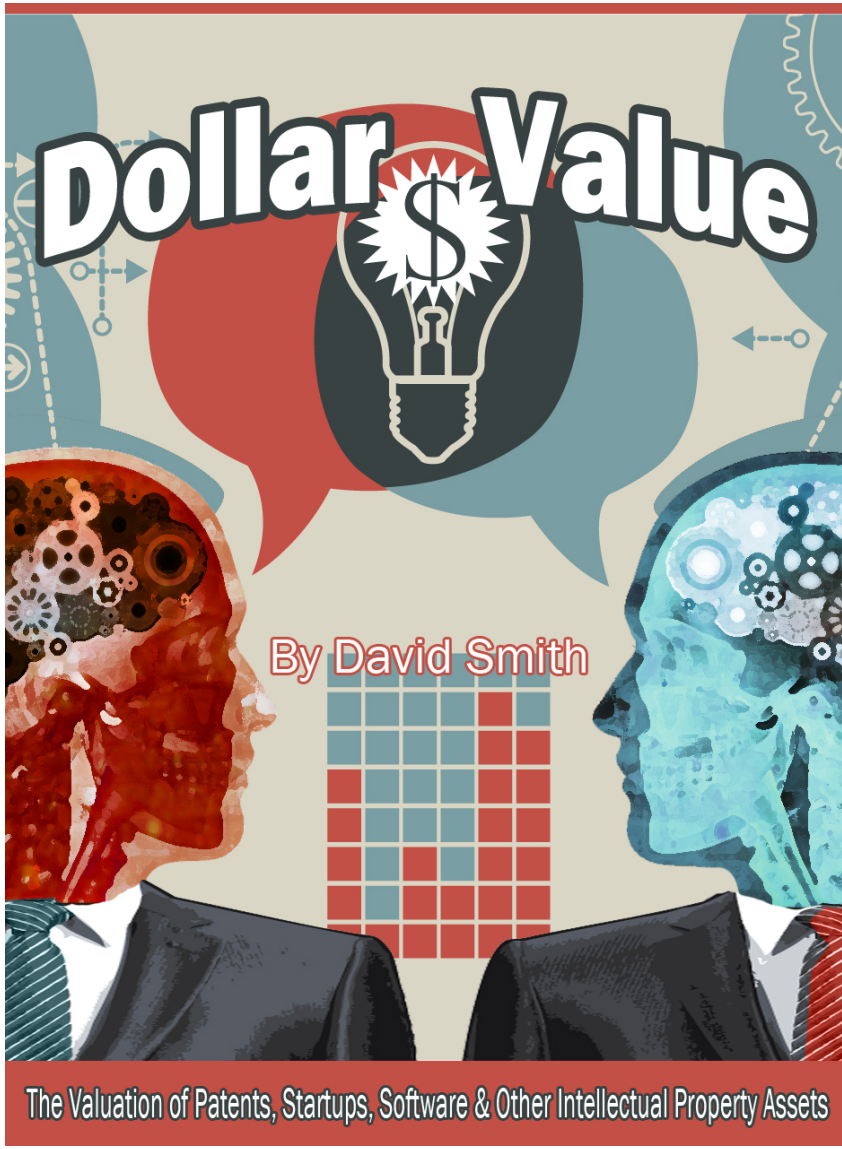


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# Introduction

The price tags attached to intangible assets such as patents and startup companies can reach hundreds of millions or billions of dollars and there's a misconception in the general public that these figures are the result of some form of black magic or insanity emanating from Silicon Valley. However, for those of us involved in negotiating transactions, where buyers acquire intangible assets such as patents and startup shares, the prices offered by buyers, and the prices ultimately accepted by sellers, are based on surprisingly solid foundations. This book describes the techniques used to assess real-world valuations of technology-oriented assets and explains how the prices offered by buyers looking to acquire the ideas and productions of inventors, creators, developers and entrepreneurs can be predicted with some accuracy.

## The Concept of Value

Value represents the degree of importance or worth of an item and the dollar value is the price a ready, able and willing buyer is prepared to pay to buy the asset today. It's as simple as that. In fact, this section is totally unnecessary as the concept of value is understood by anyone that has ever used money to buy something and needs no explanation at all.

Erm. Unfortunately, it's not quite so simple. We do often translate the value in monetary terms, but the concept of value can be rather complicated. Indeed there's a whole field of philosophy dedicated to this topic, not surprisingly referred to as "value theory". Philosophers like Plato have debated the concept of value at great length. Nevertheless, when selling an intangible asset[1] the buyers have little patience to debate value theory and even Plato would struggle to convince a buyer to pay more than the market rate.

In practice, the study of philosophy may have little bearing on the estimation of a dollar value for an asset but the study of economics does play a significant role. As we will discuss later on, the price does tend to increase with growing demand (perhaps creating a shortage), and it does tend to drop with growing supply (perhaps creating a glut). The value of an asset is affected by fluctuations in supply and

[1] Let's use the term "asset" to refer to businesses, shares and other company-related securities as well as patents, trademarks and other intangibles.

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demand, and these are affected by changes in the marketplace. Market conditions can have a significant impact on the value of an item, and prices can fluctuate with changing conditions. As an example, the value of a diamond in a large, thriving city will be much higher than the value of a bottle of water, but when conditions change and the setting moves to a dry desert miles from any water source, the value of the bottle of water could easily exceed that of the diamond. In economic terms, the supply of water in the desert is significantly smaller than the supply elsewhere, and in certain conditions, the demand for water in the desert can be significantly higher. As the technology sector is moving at a rapid pace, and markets are quickly being transformed by new products and new players, the value assigned to an asset like a patent or a startup company can be quickly rendered out-of-date. In some situations a valuation estimate can become obsolete within a matter of days.

Although we assess the value at a particular point in time, this doesn't mean there are buyers lining up to write a check on that particular day. Attaching a price tag to an item does not mean the item will sell immediately at the marked price. Priced goods often remain on store shelves for months or years before being sold. Sometimes they're not sold until the price is reduced or some sales promotion brings in a batch of eager buyers. The process of selling a company, selling shares in a company, selling patents and other assets takes time. Potential buyers need to be identified, approached and provided with information necessary for them to assess value for themselves to justify a purchase. If there are no buyers today, this does not mean the item has no value. It often means the sellers have failed to undertake sufficient marketing efforts to engage buyers. Finding, contacting, educating and convincing buyers requires effort and an outbound sales effort is usually necessary when realizing the value of a complex asset.

The appraised price for an asset is based on a number of assumptions and is affected by a number of factors. When we set a value for an asset, we can define this as the price a ready, able and willing buyer is prepared to pay to buy the asset today, but this is based on certain assumptions. For one, we are assuming the buyer is ready to buy today, but also we know that approaching the buyer can take some time and effort. The process of marketing an asset such as a patent, or shares in a startup

company often takes around 9 months, so we have something of a time-delay to deal with. We have to look at the market today and estimate what a buyer would pay today, but we don't have buyers ready to buy today, so we're making something of an assumption. This example highlights how fragile and temporary the dollar value can be. Over time, fluctuations in supply, demand and changing market conditions can have a significant impact on the value.

Ultimately, when dealing with prices, we are dealing with the perceptions and behaviors of buyers and sellers. People can be unpredictable. Peering into the mind and predicting what a person, or a group of people, might do in a buy/sell situation is not an exact science. We can, however, analyze how buyers and sellers behave today when setting prices and make predictions as to how they would determine the value of an asset based on techniques commonly adopted in similar situations. Essentially, that's what we will now proceed to do in this book.

# Common Approaches to Valuation

Valuation techniques involve looking at revenues flowing in, revenues flowing out, and the behavior and practices of buyers and sellers in the marketplace. We can look to the past to see if the asset has a history of generating revenues, we can look to the future to see what revenue and savings potential the asset might be able offer, and we can look around today at the present state of the market to see what prices are being agreed in similar transactions. Income approaches calculate value based on the future revenue streams, cost approaches mostly calculate at the cost of replacement, and market approaches calculate the value by comparisons with similar assets recently traded in the marketplace.

Let's explore the mechanics of how values are calculated using these techniques, then we can move on to see how they are applied to different types of assets.

## Comparables Approaches

When buying a house, especially a house on a street surrounded with similar or identical real estate, the value of the house is usually determined by looking at the prices similar properties have recently sold for on the open market. The house appraiser keeps track of similar properties and gauges the value of real estate based on comparisons. If your house is identical to the house next door, and that house sold for $400,000 just last week, it's not difficult to assess the value of your house at $400,000 today. The next-door property is a good comparable when it's virtually identical, in the same neighborhood and the sale was very recent in time. When assets are very similar, and there are recent asset sale transactions to indicate the state of the market, the comparables approach to valuation is very useful.

### Adjust For Differences

Often it's difficult, even in real-estate, to find highly similar properties, in the same neighborhood that have sold very recently, and adjustments have to be made when comparing one house to another. If a house a few blocks away recently sold for $500,000, but that house had an extra bedroom, and was in a better location, an appraiser might take that house into account as a comparable and adjust the price of your house to $400,000 to allow for the differences.

### Compare with Closed Transactions not Advertised Prices

It's important to compare with prices agreed by both buyer and seller—where the buyer is writing a check or otherwise tendering payment. If your neighbor loses her mind and places her two bedroom house on the market for a hundred million dollars, this price cannot be used as a comparable for your house until a real buyer agrees to the price, and ideally writes the check to close the transaction. For example, when looking at prices on eBay as a basis for valuation, you really need to look at the prices paid in sold, completed auctions, not the prices advertised by hopeful sellers. This is very true when dealing with the intangibles we are valuing in this book as many sellers advertise their patents, trademarks and other assets at very "ambitious" prices. Not surprisingly, these bazillion dollar listings result in few legitimate bids and even fewer sales. Making comparisons with advertised prices is not very useful, can be highly misleading, and we need to make sure we compare with closed transactions where buyers and sellers have reached agreement on price.

### More Data Points Means More Accurate Comparables

The comparables method works best when there are lots of data points to work from—numerous sales taking place to indicate the market is buoyant and somewhat predictable. If your house was located in a complex surrounded by hundreds of virtually identical properties, and there were numerous houses sold each month, then you would be able to predict the value of your house and you would be able to track the pricing trends over time with some accuracy. However, if your house were located in an area where very few similar houses are ever sold, predicting the value will be more speculative. In markets with thin trading, the comparables method can be a little misleading.

## Cost-Based Approaches

If your car were fully insured, but totally destroyed one evening by an asteroid hurtling out of the sky at enormous speed, you would likely claim on your insurance for the value of the car. You might be able to sell the asteroid but that's another matter. In fact, don't even think about selling the asteroid as this might send us off track. I wish I hadn't mentioned it.

Anyway, what type of claim might the insurance company be prepared to pay you? As the car is destroyed, the insurer would likely pay you the cost of replacing the

car. In many insurance situations, the car is valued at the cost of replacement. The value is based on the cost.

Let's imagine you bought some land and built a house many miles from any neighbors, how would you value the house? If you dismiss the comparables approach to valuation on the basis there are no similar houses to compare with in the same neighborhood, you could assess the value of your newly built house based on the costs you incurred in building it. Let's say you spent $100,000 on the land and $200,000 constructing the house, you could argue that the house is worth $300,000.

Cost-based approaches to valuation have some merit in certain situations and are often used when none of the other methods are suitable.

### Replication Cost Approach

The value of the asset can be estimated as the cost of replicating it—creating an identical or highly similar copy. This might involve the cost of designing and fabricating the replica.

### Replacement Cost Approach

Where the asset is fungible there are identical or highly similar assets available on the marketplace, the assets value can be estimated as the cost of buying a replacement. This approach might be considered a variation of the comparables approach to valuation, as they each require the availability of a similar asset available for sale with a market-driven price tag.

### Cost Savings Approach

Imagine you lived on one side of a river, and the nearest town was on the other side of the river. You own a small bridge that you use each day to drive to the town, and you want to assess a value for the bridge. Well, the bridge is highly convenient to you, and if you didn't have this bridge, you would have to spend $20 a day on gasoline driving to the nearest alternative bridge, many miles away. Your bridge saves you at least $20 a day in gasoline, and this could form the basis of your valuation of the bridge. The bridge saves you $7,300 per year, so over the next 10 years, this would account to savings of $73,000. If you plan on living in the house for 10 years, you could justifiably argue that the bridge is worth $73,000.

Earning $73,000 per year is very similar to saving $73,000 per year, and you may notice that the cost savings approach is somewhat related to the income approach to valuation.

## Income Approaches—Discounted Cash Flow (DCF)

The income approach to valuation assesses value today based on income streams predicted to be generated in future, and the likelihood that the income streams will materialize according to the forecast. Where an asset or business operation generates a stream of revenues, its value can be determined by calculating the total net income the asset will generate in the coming years. The time-value-of money is then factored in to discount the future revenue streams to determine what those future incomes might be worth today.

The time value of money is a concept that is simple to understand. If someone offered you the choice of having $1,000 today, or a promise to give you $1,000 in twelve months' time, you would likely go for the option paying you $1,000 today. This is the logical choice if you want to spend the money today, but it's also the logical choice if you don't need the money for twelve months, as you could invest the $1,000 and earn interest so that your money is worth more than $1,000 when it has been invested for the 12 months period. So, a dollar today is worth more than a promise of a dollar tomorrow. The difference in value is referred to as the "discount rate", and the income stream projections, when adjusted by applying the discount rate, are referred to as the "discounted cash flows". The total value today of all the discounted cash flows is referred to as the "net present value".

Hold on to your hat, we're now going to use a mathematical formula. The net present value of an asset is calculated as the sum of the discounted cash flows, and the following mathematical formula is used:

$$DCF = \frac{CF_1}{(1+r)^1} + \frac{CF_2}{(1+r)^2} + ... + \frac{CF_n}{(1+r)^n}$$

Where:

- DCF is the sum of discounted cash flows, or net present value of the future cash flow (CF).
- C is the net income (cash flows) projected for a future period;
- r is the discount rate and reflects the interest rate or the level of risk associated with the flows not materializing as projected;
- n is the time in years before the future cash flow occurs.

As an example showing how a simple discounted cash flow analysis might be applied:

- *Projected net cash flow, year 1 (after tax) = $1 m.*
- *Projected net cash flow, year 2 (after tax) = $2 m.*
- *Projected net cash flow, year 3 (after tax) = $2 m.*
- *Discount rate = 30%*
- *Discounted cash flow projection, year 1 = $1 m / (1.30) = $0.77 m.*
- *Discounted cash flow projection, year 2 = $2 m / $(1.30)^2$ = $1.18 m.*
- *Discounted cash flow projection, year 3 = $2 m / $(1.30)^3$ = $0.91 m.*
- *3 year cash flow = $1 m + $2 m + $2 m = $5 m.*
- *3 year discounted cash flow = $0.77 m + $1.18 m + 0.91 m = $2.86 m.*

This example shows that a projected cash flow of $5m with $1m in year 1, $2m in year 2, and $2 million in year 3 would have a net present value today of $2.86m after the discount rate of 30% per year is applied. If a discount rate of 5% is used instead of 30%, the value of the same ($1m+$2m+$2m) income stream is $4.49m. Clearly, under this valuation method, the value of a revenue stream is heavily affected by the discount rate that's applied. So, what discount rate do you choose for a particular income stream? The answer is driven by the risk factors involved. The

higher the probability the income streams will not materialize as projected, the higher the discount rate that should be used

If the risk factor is very low, the income is essentially guaranteed (by an unquestionably reliable guarantor), then the discount rate used should be equivalent to the rate of interest that you could earn by putting the cash in the bank, or another form of secure, interest-bearing account. If the interest rate you could earn on cash deposits is 5%, it's reasonable to use this 5% figure as the discount rate when calculating the discounted cash flows from guaranteed, secure income streams. For investors, the discount rate reflects the opportunity cost as well as the risk associated with the investment in question. If an investor is able to earn a return on an alternative investment, this is factored in to setting the discount rate to be applied to a particular investment. Investors calculate the discount rate by calculating the internal rate of return, a rate of return that is specific to their particular business.

Clearly, the discount rate should increase with the level of risk associated with the opportunity, but there are no hard and fast rules about which discount rate to apply to an income stream. Investors calculate the rates based on their understanding of the business or assets involved, their tolerance to risk, and the alternative investments opportunities they have available. Nevertheless, this table might represent a useful guide:

| **Risk of Income Failing to Materialize** | **Projected Income Streams** | **Discount Rate (Example)** |
|---|---|---|
| Zero, or extremely low. | Virtually guaranteed. | 5% |
| Low. | Highly predictable. | 10% |
| Moderate. | Somewhat predictable. | 20% |
| High. | Speculative. | 30% |
| Extremely high. | Highly speculative. | 40%+ |

Investors accustomed to applying discount rates to real estate investments, government bonds and securities offered by large, stable corporations are familiar with discount rates in single digits or law double digits. The traditional investors might be unaccustomed to the high discount rates applied to intangibles such as startup companies, patents and high-risk ventures such as lawsuits. The valuation of startups, especially early-stage startups involves unusually high levels of risk, so the discount rates applied in these scenarios can exceed 50 or 60%, and seed stage investors can use discount rates as high as 80%. Investors in high risk ventures such as seed stage startup companies, where more than nine out of ten investments fail, will apply high discount rates as high as 70%[2]. Intangible assets and investments in the technology sector involve some of the highest risks in business and this is reflected by use of some of the highest discount rates in valuation calculations.

[2] "Venture capitalists typically use discount rates in the range of 30 to 70 percent. During the startup stage of venture-capital financing, discount rates between 50 to 70 percent are common." WHY DO VENTURE CAPITALISTS USE SUCH HIGH DISCOUNT RATES?. Sanjai Bhagat, University of Colorado at Boulder.

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# Market Forces of Supply & Demand

In a free market, the rules of economics govern the price of companies, shares and technology assets as well the price of apples, oranges, jet planes and everything else. A principle you should consider when considering price says that the price will tend to rise when you introduce additional competing buyers; and conversely, the price will tend to fall when additional competing sellers are introduced to the marketplace.

Let's take the example of an old-school farmers' market for fruit. Let's say that on any particular market day, there are 10 farmers selling apples and 100 customers buying apples and all the apples are of similar quality. The market has settled at a price of $1 per pound and all the vendors are selling at or near the $1 per pound price. This state of affairs continues for some time, then one Monday, a passenger train breaks down nearby. A thousand hungry passengers leave the train to find food and hurriedly enter the farmers market. The 10 farmers with stalls suddenly find themselves with lines of hungry customers asking for apples. One customer standing in line realizes there are not so many apples to go around, he might go hungry and waves a $10 bill at the farmer, saying "forget your $1 asking price, I'll pay $10 for a pound of apples". The farmer duly accepts, and realizing other customers will pay the same price, he resets his price tags increasing the price for $1 to $10, then starts selling to other customers at the new $10 per pound price. Other farmers see what's happening, and they set the price at $10 per pound. As the apples become start to sell out, a farmer sets the price at $20 per pound, and even he manages to sell out of apples as customers continue to flow into the market from the train and are grow increasingly anxious to buy. Farmers call home and tell their farm hands to go out and pick as many ripe apples as they can.

**Law of Demand:**

The price will tend to rise when additional competing buyers enter the market.

The price will tend to fall when additional competing sellers enter the market.

That evening, the farmers go home with pockets filled with cash from their memorable day, tell their families and friends and one farmer is so pleased with his sales that he buys drinks for everyone that evening in the local sports bar. Word quickly spreads about the "fortunes" being made in the farmers market, and local orchards are quickly picked empty of ripe apples.

The following day instead of 10 farmers showing up at the market with their produce, there are 40 farmers, each bringing all the apples they could harvest. Stalls are piled high and the number of apples for sale on the market (supply) is huge compared with the regular daily offering.

As you guessed (but the farmers clearly didn't), overnight the train was fixed and the passengers went off on their merry way. Where there were 1,100 customers on Monday, the numbers were back to the regular 100 customer levels on Tuesday as there were no train passengers to cater for. Instead of lines of hungry customers at each stall, customers on Tuesday are few and far between. Farmers take to calling out at customers to attract them to their stalls, and quickly start to entice them with prices. The $10/pound price tags written up on Monday are quickly discarded and the old dollar a pound price tags replaced. Looking at his pile of ripe apples for sale, one farmer decides he doesn't want to haul his stock back home at the end of the day, only for them to rot and get thrown away, so instead of one pound, he starts to offer two pounds of apples for a dollar. He quickly sells out, packs his truck and heads off home. Other farmers left at the market with stockpiles of apples notice that customers numbers are dwindling. To sell their stock, farmers start to offer apples at 3 pounds, then 4 pounds for a dollar. By the end of the day, the price has dropped to ten cents per pound as farmers become desperate to sell their stocks apples while they're still fresh. Even at these prices, many farmers go home with stocks of apples and they're not too happy.

On Monday, we saw an increase in demand, new customers came into the market and the price increased as a result. Tuesday we saw an increase in supply, new sellers came into the market, and prices dropped like a stone.

Whether or not you like apples, you agree with increasing food prices for hungry, stranded train passengers, or you work on the trains, this example shows how the

price of an item is affected by fluctuations in supply and demand. These effects can be very obvious in active markets made up of large numbers of buyers, large numbers of sellers, and large numbers of transactions, but the effects can also be found in smaller markets, where there may be only a few sellers and buyers.

Let's change the hypothetical to an asset with a higher price tag. Imagine you're under financial pressure from creditors, you're selling your house to clear the debts, and you come across a buyer who offers you a reasonable price. You indicate that the offer price is reasonable and that you would be happy to accept. The buyer then suspects that you might be willing to accept a lower price, and decides to offer you a reduced price. If you're desperate to sell, and this is the only buyer in the market, you may be forced to accept the reduced price. If, however, there's another bidder equally interested in the house, you would likely refuse to accept the reduced price. What's more, knowing there's another bidder, the buyer will be less likely to try to negotiate the price and a higher price can be more easily supported. Savvy sellers will carefully play one buyer off against another, making sure each one is aware there are other bidders in the game.

In this scenario there's only one seller and a couple of buyers but the forces of supply and demand have an influence on the price. In virtually any market, adding additional competing buyers will tend to push up the price, and the price will tend to drop when additional sellers enter the fray. For sellers wanting to increase the price, engaging additional buyers is one of the most effective techniques. Buyers are aware of this, will try to engage competing sellers and can look to restrict the numbers of bidders in order to keep prices down.

Now that we've introduced the concept of the cost-based, income-based, and comparables-based valuation techniques, with the law of demand, let's investigate how these techniques might be applied to various intangible assets and valuation scenarios.

# Established Businesses

In contrast to startups, which we will discuss later, an established business is generating sales revenues and has cash flows to measure and drive the valuation calculations. With company shares traded on public stock markets, a good deal of data is available for analyzing the potential value of an established business. Fortunes can be made or lost overnight on Wall Street and investors have developed sophisticated methodologies for predicting the values of companies, and the resulting values of their shares.

## Publicly Traded Company Stocks

In the Wall Street crash of 1929 many investors lost their savings, quite a number lost their shirts, and some took to jumping from tall buildings. As a result, the U.S. government formed the Securities Exchange Commission ("SEC") as a federal agency with responsibility for enforcing the federal securities laws and regulating the securities industry, the nation's stock and options exchanges, and other electronic securities markets. Securities comprise company shares, bonds and virtually any investment instruments, so the SEC has broad powers to control how companies raise finance from U.S. investors. In 1933 and 1934 the government enacted rules[3] that are still enforced today by the SEC and have the effect of requiring companies to register their shares (with the SEC) before they are allowed to be sold to the public. Registration of the shares is a costly process and triggers some onerous reporting requirements for the Company selling the shares, and its management and advisors. Following registration, the shares are able to be sold to the public in an initial public offering ("IPO").

The SEC-enforced rules are essentially designed to force companies to disclose full and accurate information to investors, and to protect small "unsophisticated" investors. So long as investors are fully informed of all material information on the business, there's no requirement that a company be solvent or be of a minimum size. As far as the SEC's concerned, you're free to sell bad eggs, as long as they are labeled as "bad eggs".

[3] Securities Act of 1933 and the Securities Exchange Act of 1934.

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At any time, a company can decide to register its shares with the SEC and then sell them to public investors. From that point on, the Company will be required to disclose detailed financial and business information to the public, and the share price will be traded, tracked and published. Calculations based on the financial reports of these companies, and the share price, provide insights into valuation.

We will learn a little later on that venture capital investors almost always structure their investments in startup companies as preferred stock and create a multi-tiered stock arrangement where founders and employees have common stock and investors hold more valuable preferred stock. This is somewhat complicated and not very appealing to public investors, so when the Company registers its shares and sells shares to the public via an initial public offering, the preferred stock is converted to common stock. The preferred stock disappears and common stock is the only type of share sold to public investors. This makes life simple when calculating valuation because the value of the Company can usually be determined directly from the current share value. A publicly traded company (with only common stock), with a current share price of $10.00 per share and 70 million shares outstanding will have a value of $700m, calculated as 70m shares at $10 each. If the share price increases to $11.00 on a Wall Street trading day, then the value of the Company increases to $770m on that day.

Where there are usually millions of shares registered for sale by any particular company, and large numbers of buyers and sellers trading in a vibrant stock market, the law of demand[4] comes into play. Forces of supply and demand are driven by information available on the Company and its financials, and these forces drive the price of any particular share at a point in time[5].

The value of individual shares traded on the public markets are driven by market forces and extrapolated to find the value of entire companies. You will see that we

[4] See Market Forces of Supply & Demand, page 16.
[5] We further investigate the relationship between information and share price in Efficient Capital Market Hypothesis, page 29.

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can use this data to assess the value of other companies, even those that are not publicly traded but privately held.

## Valuing Established Businesses Using a Comparables Approach

Comparing one company with another, or with a group of companies, is a commonly-used method of valuing established businesses. When you're looking to determine the value of a company, the ideal scenario is that you find another company with a known value in the same line of business with virtually identical financial performance and virtually identical prospects, then you can use this as a yardstick. If a company identical to yours recently sold for $10m, in the same sector with the same prospects, you can argue that your company is also worth $10m. If a company recently sold at $100m, but that one was ten times the size of your company, you could argue that your company is worth one tenth that value, i.e. $10m.

Businesses can be compared based on their profits, their overall sales and a number of criteria, and adjustments need to be made when comparing companies for the purpose of valuation.

### Liquidity Discount for Comparing Private Companies with Publicly Traded Companies

Before we explore the comparables valuation techniques, as applied to established businesses, let's investigate the differences between the values of publicly traded and private ("closely held") companies. An investor holding a share of stock registered with the SEC and publicly traded is readily able to sell that share on the public stock markets[6]. Shares in publicly traded companies (SEC reporting) are more liquid than shares in private companies as they can be sold, and converted to liquid assets—i.e. cash. Therefore, shares in private, closely held companies are considered less valuable than those in similar publicly traded companies.

A private company is normally assessed to be worth less than a public company. This is because the stock in a privately held company is not tradable—it's not liquid and is therefore less valuable to an investor. A "liquidity discount", often of the

[6] Some stocks are more liquid than others. Some shares are "thinly traded" and for under-performing company stocks, it may not always be possible for a seller to find buyers, even on public stock markets. The liquidity discount for thinly traded shares would be lower than actively traded shares, but higher than zero as the market for registered shares is open to the public, so is much larger than the market for unregistered shares.

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order of 25-33%, has to be applied when comparing private companies with public companies in the same sector.

If two companies were identical, operating in the same business sector, but one had shares that were registered and readily traded on the public stock markets whereas the second company was privately held, with shares that were restricted from public sale, the value of the private company would be estimated by applying a liquidity discount to the value of the public company.

If the share price on the public stock markets valued the public company at, say $100m, the value of an identical private company would be perhaps $70m after applying a liquidity discount of 30%.

## Comparing Revenue Multiples for Established Businesses

The value of a company can be estimated by comparing its sales revenue with the revenues of similar companies with known valuations. The valuations of companies can be known if they have recently been acquired and the purchase price is disclosed, but most often the valuations of comparable companies can be calculated from the price at which their shares trade on the public stock markets.

We can use the revenues of companies as a basis for comparison. Let's say we're estimating the value of a business operating in the widget industry where the total revenues of all the publicly traded widget companies companies over the last 12 months was $100m and the total valuation of these companies, based on their publicly traded share prices, is currently $300m. You can estimate that the revenue multiple for this industry is 3X. The value of the Company is three times the Company's annual revenue.

If our business has revenues of say $10m over the last 12 months, we would therefore estimate the value at $30m, calculated at $10m multiplied by the revenue multiple of 3 for the widget industry. If our company were private, and the shares were not registered for sale on the public markets, then we would have to apply the liquidity discount and the calculation might look as follows:

Company's revenues (for last 12 months) = $10m.

Average revenue multiple for (public co.'s) in this industry sector = 3X.

Company valuation (public company) = $30m.

However, if our company is private, and the revenue multiple was calculated by looking at comparable publicly traded companies, you have to apply the liquidity discount.

Company valuation (private company) = $22.5m (after applying liquidity discount of 25%).

If our shares were publicly traded, the Company might be worth $30m, but if it remains privately held, after applying the liquidity discount, the value might be closer to $20m.

## Comparing Earnings Multiples for Established Businesses

The revenue multiple valuation method may be subject to criticism in that it looks at the top line revenue and fails to consider if the Company is profitable. A profitable company with low revenues could well be worth more than a loss-making company with large revenues.

The earnings-multiple valuation method looks at the bottom line. The Company valuation is based entirely on its earnings performance.

Firstly, the price/earnings ratio[7] for the industry is calculated by comparing the valuation of public companies with their earnings. If all the companies in the sector generated a total of $100m in earnings and the total market value of these companies is $2Bn, the multiple is calculated at 20—the ratio of price to earnings.

[7] There are multiple versions of the P/E ratio, depending on whether earnings are projected or realized, and the type of earnings:
"Trailing P/E" uses net income for the most recent 12 month period, divided by the weighted average number of common shares in issue during the period. This is the most common meaning of "P/E" if no other qualifier is specified. Monthly earnings data for individual companies are not available, and in any case usually fluctuate seasonally, so the previous four quarterly earnings reports are used and earnings per share are updated quarterly. Note, each company chooses its own financial year so the timing of updates will vary from one to another.
"Trailing P/E from continued operations" uses operating earnings, which exclude earnings from discontinued operations, extraordinary items (e.g. one-off windfalls and write-downs), and accounting changes.
"Forward P/E": Instead of net income, this uses estimated net earnings over next 12 months. Estimates are typically derived as the mean of those published by a select group of analysts.

If the Company's earnings (for last 12 months) were $10m,

The Average Price/Earnings ('P/E') ratio for (public co.'s) in this industry sector is 20X.

Then the Company valuation (for a public company) is $200m.

After applying liquidity discount, the value of a privately held Company might be $150m.

## Valuing Established Companies Using an Income-Based Approach

With a projection of the future profits to be generated by the Company, it is possible to use discounted cash flow analysis to determine the Company's valuation. Indeed, this method is adopted by the courts (especially Delaware courts[8] which is most active in business cases) to determine a "fair market value" of a business in cases where shareholders are asking the court to settle a dispute and provide an appraisal on a company's value.

The value of a business is estimated to be the net present value of the cash flows generated by the business in the coming years, and the discount rate applied is determined by assessing the risks that the projected cash flows are likely/unlikely to materialize. If we take the cash flow example we discussed previously[9] and assume these cash flows were forecast by a company, we would see that the company was estimating profits of $1m in year one, and $2m in years 2 and 3. The total net profits are $5m over the next 3 years, but after applying a discount rate of 30%, the net present value is calculated at $2.86m today. So, in this scenario, the value of this profitable business is estimated at $2.86m.

As you can see, the discounted cash flow method of appraisal adopted by the courts can set a relatively low valuation, especially when dealing with sectors like high-technology where the P/E ratios are high. Let's say our company in the example above (with projected net income streams of $1m, $2m and $2m) reported a net income over the last 12 months of $1m, and the P/E ratio for companies in this sector is 20X. This would provide us with a valuation using the comparables P/E

[8] For example, see Gearreald v. Just Care, Inc., C.A. No. 5233-VCP (Del. Ch. Apr. 30, 2012); In re Appraisal of The Orchard Enterprises, Inc., C.A. No. 5713-CS (Del. Ch. July 18, 2012).
[9] See Income Approaches—Discounted Cash Flow (DCF) page 13.

approach of $20m—somewhat higher than the $2.86m valuation driven by the discounted cash flow method. So using an earnings multiple approach, a profitable technology-oriented business could be valued significantly higher than it would be appraised by the court using a discounted cash flow method. However, the discounted cash flow calculation is not discarded as being unrealistic in the technology sector.

The discounted cash flow method can be applied to any form of income stream, which makes this technique useful for comparing shares, bonds, real-estate investments and many different forms of investments. Perhaps that's why this technique is used by the courts. By constantly comparing the revenue streams and discount rates across a wide range of investment types, the value of companies should theoretically be kept in check—the income returns generated by a company and its stock will be compared with those generated by alternative assets[10].

## Valuing Established Companies Using a Cost-Based Approach

How do you calculate the cost of replicating or replacing an established business? As it takes many years to establish a business, building goodwill and a reputation in the industry, replicating or replacing a business as a going-concern is not a simple task.

It might be reasonable to use the costs incurred in forming a business, or the total cost of funds invested in the business as the basis for valuation of a startup or an early-stage company, but as the Company matures into an established business, it becomes increasingly difficult to estimate the costs associated with generating goodwill. This is a book about valuation of intangibles, but assessing the costs associated with building all the intangibles associated with an established business is highly speculative. We can estimate the costs associated with building the framework of a business, but the magical elements that go into turning the framework into a profitable venture are too intangible to estimate with an acceptable degree of accuracy. The replacement, replication and cost-savings approaches to valuation are not very suitable for established businesses.

[10] Nevertheless, sometimes investors lose their heads and bubbles, such as the dot com bubble, grow as company valuations get extremely high, then fall through the floor as bubbles burst with dramatic effect.

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## Exploring Wall Street Behavior & the Valuations Attributed to Businesses by the Public Stock Markets

A great deal of research has been undertaken with regard to understanding the motivations and activities of Wall Street and investors in the public stock markets. The various valuation methods adopted by Wall Street investors are well documented and studied. In this book, I'm trying to focus on valuation scenarios that are not so well understood, like intellectual property and startups, and I will not be covering many of the methods adopted by investors to value options, bonds and many of the derivatives that are traded on the public markets. There are many books available to explain these methods. However, some of the principles and theories adopted by public investors do have a bearing on the valuation of I.P., startups and intangibles, so let's briefly take a look at the efficient capital market hypothesis, the capital asset pricing model and an introduction to behavioral finance.

### Efficient Capital Market Hypothesis

We know from the law of demand[11] that the price of a stock at any point in time is driven by supply and demand for that stock at that time. The efficient market hypothesis ("EMH") investigates the relationship between the information available to investors regarding the Company issuing the stock, and their decisions to buy (increase demand) or sell (increase the supply). The hypothesis asserts that financial markets are highly efficient in the way information translates to stock prices. Proponents of the 'strong" version of the hypothesis believe share prices instantly reflect all the information about a company and its prospects, even hidden or "insider" information. They believe investors are highly efficient at gathering all the relevant information and making buy/sell decisions quickly based on this information. The "weak" form EMH claims that prices on traded assets (e.g., stocks, bonds, or property) already reflect all past publicly available information. The semi-strong-form EMH claims both that prices reflect all publicly available information and that prices instantly change to reflect new public information.

The price of a stock certainly reflects the information available to the investors and the capital market as a whole. However, the degree of efficiency is something debated by scholars and some lawyers who oppose the insider trading rules adopted by the SEC to restrict executives and other company insiders from trading on shares

[11] See Market Forces of Supply & Demand, page 16.

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using inside information, at the expense of public investors. It's useful for us to be aware of this hypothesis, if only to shed more light on the way information affects supply, demand and ultimately the price of shares in publicly traded companies.

## Capital Asset Pricing Model (CAPM)

Some stocks fluctuate wildly in price and are more volatile than others. Highly volatile stocks are more risky, yet more potentially profitable. Under the Capital Asset Pricing Model, β refers to the volatility. The average level of volatility for the whole market is determined and given a value of 1. A stock with average volatility has $\beta=1$. The Capital Asset Pricing Model relates the volatility of the stock to its price. A stock with $\beta>1$ is more volatile than the market average.

Under the Capital Asset Pricing Model, volatility is a factor considered by buyers, and some stocks are clearly more volatile than others. Highly volatile stocks are more risky, yet potentially more profitable.

Valuing the Company using the discounted cash flow method, the discount rate applied should reflect the β or volatility rate for the Company according to this model.

## Behavioral Finance

Behavioral finance studies behavior of buyers and sellers and is based on the notion that investors are human, and often act irrationally. People hold on to stocks that a rational computer would sell, and sell stocks that a rational computer would hold. Egos and emotions come into play. Many decisions are driven by greed and fear. People don't want to be proved wrong and sometimes avoid making difficult decisions.

> "I can calculate the movement of the stars, but NOT the madness of men." — Sir Isaac Newton, after losing a fortune (£20,000) in the South Sea bubble, 1720.

Investors tend to flock. When one sells, others are influenced to sell as well. When one buys others will follow. This human behavior is not restricted to publicly traded stocks and appears in buyers and sellers of all assets.

Analysts predicting the value and movement of a stock have to take into consideration investor behavior, and cannot assume that all humans act rationally all the time. The value of a share, and the aggregated valuation for the whole company, are not exact and are subject to the vagaries of human nature.

## Setting the Share Price (& Company Valuation) at IPO

As soon as the Company's stock is traded on an open exchange, its valuation is effectively set by market forces of buyers and sellers on Wall Street and the public stock markets, using the methodologies and techniques discussed above. How is the stock price determined at initial public offering (IPO)? This is not a simple task, as the forces of supply and demand have not yet been allowed to operate freely on account that the shares have so far been unregistered with the SEC and restricted from sale.

In the weeks running up to the IPO, the underwriters drag the CEO, CFO and other key members of the management team out of the office and parade them in front of potential investors and analysts in key cities across the country. The purpose is to generate investor interest in the Company and essentially pre-sell blocks of shares in advance of the IPO.

The road show consists of a fairly elaborate formal presentation on the Company's operations, financial condition, performance, markets, products and services—and enables investors to meet face-to-face with management. There are breakfast meetings, lunch meetings, dinner meetings, group meetings, one-on-one meetings, investors meetings, broker meetings, underwriter sales force meetings, meetings about meetings, meetings within meetings.

Road shows are normally conducted before the prospectus has met the approval of the SEC. It's at, or following, these meetings that institutions, and brokers, let the underwriters know whether they're interested in buying shares in the IPO. The underwriter gathers these commitments in a 'book' and it's at this point that the viability of the IPO can be more realistically assessed.

Normally the offering is priced just before the underwriting agreement is signed, on the day before the IPO. At IPO, the Company's shares (or some of them) are openly traded and market forces—supply and demand—set a price. As market forces set

this price, it can be argued that this is the first true valuation of the Company and its shares.

There are a number of different and conflicting forces at play in the process of pricing shares for IPO. The Company wants to set the price as high as possible, to maximize the proceeds of the share sale, the underwriter wants to set the price low enough that all the shares are sold, and the investor wants to see an early rise in the price after trading opens.

If the price is set too low and goes through the roof on trading, privileged investors, who got in at the offering price, make out like bandits—and the Company receives only a small fraction of the proceeds it might otherwise have had. If the price is set too high, the Company takes home a lot of money, but its stock could quickly plummet below the offering price as trading continues, resulting in negative publicity and unhappy investors.

Fortunately, after gauging investor interest at the road show, the underwriter will have a feel for what price the market will bear and make a recommendation as to the share price for management approval. For years, underwriters used a general rule of thumb: Value the deal so that the stock will jump about 15 percent on the first day of trading. This can be more of an art than a science.

## Driving Demand & Increasing the Price When Selling Shares in Publicly Traded Companies

Company shares cannot be promoted and marketed in the same way as products or services. In the days before the SEC and government regulation designed to protect investors, shares were hyped to generate demand and subsequently increase the share price.

Pumping up the value of a stock and then dumping it on the market is an age old scam ("pump & dump"). Here is a drawing of the night singer of shares with his magic lantern pumping stock to unwary investors in 1858. Even the smartest investors can be duped. Sir Isaac Newton lost a fortune in this South Sea Bubble when the shares of the South Sea Company grew almost ten-fold within a matter of months—only to subsequently collapse. The pump and dump strategy continues

today through organized crime and Internet scams, but is highly frowned upon by the SEC and the U.S. Justice department.

Following the Wall Street crash in 1929, Roosevelt's new deal government passed several new laws aimed at regulating banking, the sale and trading of shares and other securities. The Securities and Exchange Commission was created to enforce these and other securities-related regulations and looks carefully at the way companies promote their shares. Information disclosed to the public about the Company's performance and prospects, and about anything that might influence the buying or selling of shares is highly regulated by the SEC.

In the run up to the IPO, the SEC requires companies to enter a "quiet period" where investors are directed to the prospectus, which is approved by the SEC, and other communications by officers of the Company in the press, twitter, and any channels are highly restricted. The idea is that investors look to the prospectus for information, that the information in the prospectus is accurate and complete, and that other channels of communication are quiet for the period running up to the IPO. You may remember that the founder of Google was sanctioned by the SEC for a Playboy interview that was published just before Google's IPO. This is an example of how executives are required to refrain from promoting their companies and shares in the quiet period.

Following the IPO, the gags are released but communication with the public is still highly regulated and controlled. Where we will see later on that marketing of companies, patents, and other intellectual property assets can help attract buyers and increase the price, this is somewhat difficult when dealing with companies reporting to the SEC[12].

[12] The SEC has counterparts in all advanced countries, with very similar rules and operations.

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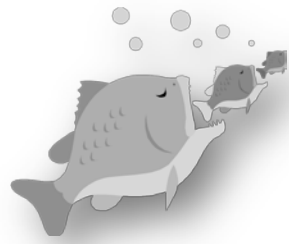
# Businesses in Mergers & Acquisition Transactions

Valuations are instrumental when companies are acquired in merger or acquisition transactions. The price paid to acquire a company sets an accurate valuation for that particular company at that point in time, especially when the acquisition is all financed in cash. When the acquisition is financed in stock, and shares in the acquirer is exchanged for stock in the acquired company, another step in the valuation process is necessary to determine the fair market price of the stock exchanged, and the valuation figures produced can be somewhat more subjective than a pure cash transaction.

## Valuation Techniques for Mergers/Acquisitions

Companies acquired in merger/acquisition transactions are usually established businesses, so the valuation techniques we discussed in the previous chapter[13], including revenue multiple, earnings multiples and discounted cash flows are the methods often used. Of course, when comparing a privately held company with a public company, we will apply the liquidity discount[14].

Investment banks and business brokers engaged to sell companies will often prepare a set of valuation metrics identifying comparable companies that have recently sold, and applying a variety of techniques. The bankers may produce a detailed report analyzing the financial performance of the business, estimating the value based on comparables of income multiples, revenue multiples, discounted cash flow estimates of the projected income streams. They select the most flattering techniques, take a weighted average of them all and produce a detailed valuation report to justify the highest valuation possible. Depending on the number of bidders interested in the acquisition, the bankers then negotiate price alongside other factors in the acquisition deal structure.



[13] See Established Businesses 24.
[14] See Liquidity Discount for Comparing Private Companies with Publicly Traded Companies, page 26.

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## Minority Discount & Control Premium

Although the forces of supply and demand are expected to set the value of a company when shares are readily traded on the stock markets, the price offered by corporate acquirers usually represents a value somewhat higher than the current price-per-share. Corporate acquirers usually pay a price 10-50% higher than the prevailing stock market rate when acquiring a controlling interest in a company. The additional value is justified as a "control premium". If the current stock market price is $10 per share, it is not unusual for an acquirer to bid $11, $12, even $15 per share when buying the whole company (or sufficient shares to control the whole company).

Although a price premium is regularly paid when acquiring control of a publicly traded company, this is not interpreted by the courts as a blanket rule that a share representing a minority interest is automatically worth less than a share held as part of a controlling interest. The Delaware courts, where most corporate disputes are resolved in the U.S., has refused to support arguments by controlling shareholders that the shares held by minority shareholders are necessarily inferior in value.

There may be a control premium, but this does not imply a minority discount. The forces of supply and demand may require a corporate acquirer to increase the offer price in order to buy a large number of shares, but this does not mean the shares held by a small shareholder are automatically junior in value to the shares held by large shareholders. We will discuss this further when we look at court appraisals.

## Court Appraisal

Minority shareholders that do not accept the acquisition offer but are forced to sell can seek a fair value for their shares from the court. The acquirer of a public company may acquire sufficient shares to control the board of directors and elect management, but some shareholders may hold out and refuse to sell. Once the acquirer has sufficient shareholding, the minority shareholders can be forced to sell their shares by law. Minority shareholders that do not accept the acquisition offer from the buyer, but are forced to sell, can seek a fair value for their shares from the

court[15]. The court then appraises the shares and determines the value. Experts can help the court determine the fair value for the shares—at the time of the merger. As we discussed earlier[16], courts prefer the discounted cash flow valuation method.

The buyer may be required to offer a premium over the current share price in order to buy the whole company, or sufficient shares to take control of the whole company. However, as we mentioned elsewhere[17], the courts do not apply a minority discount in these appraisals.

In a 2 step merger—when the second step involves forced acquisition of the dissenting shareholders shares, the value of the Company with the synergies of the merger are considered. So, the dissenting shareholders may resist the sale, but participate in the benefits of the merger as a result of the court appraisal.

## Driving Demand & Increasing the Price When Selling Companies in M&A Transactions

Buyers are almost always prepared to pay a higher price when bidding against others[18]. The negotiating power of the seller is strengthened when additional buyers join the bidding process. The banker or intermediary representing the seller in an M&A transaction can earn its commission, and push up the price considerably, as the result of an effective marketing campaign attracting several bidders.

Some buyers are prepared to pay more than others—a strategic buyer that's interested in the technology, patents, teams, distribution channels and other components will likely pay a higher price than a financial buyer that's solely interested in the cash flow.

[15] Pueblo Bancorporation v. Lindoe, Inc. 63 P.3d 353. Colorado. 2003; Cede & Co v. Technicolor, Inc. 684 A.2d 289. Delaware. 1996.
[16] See Valuing Established Companies Using an Income-Based Approach, page 29.
[17] See Minority Discount & Control Premium, page 34.
[18] See Market Forces of Supply & Demand, page 19.

The ideal scenario for the seller is that auction-fever takes hold with a number of strategic buyers, ideally head-on competitors with deep pockets, who bid up the price to the benefit of the entrepreneur.

Selling companies involves selling "securities", so the process is governed by rules enforced by the SEC, and the information disclosed to potential buyers has to be full, fair and accurate. It might be enticing for a company to attract bidders by making exaggerated claims about financial results, orders or future prospects, but this is against the law in the U.S.[19] and virtually every other country. It's called "fraud" and comes with some heavy penalties, so all efforts to attract buyers must be based on accurate information.

[19] See SEC Rule 10b-5 & sections 11 & 12 of the Securities Act.

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# Startup Companies in Venture Capital & Other Financings

Valuation techniques, such as comparable earnings multiples and revenue multiples, are not relevant to startup companies where there are no earnings, and often no revenues to compare. Without a history of sales revenues, venture capital and other startup investors rely on other techniques for startup valuation.

In fact, because venture investments don't involve an acquisition of the Company, or an acquisition of regular shares in the Company, there's a compelling argument that venture capital investments do not form the basis of valuation for a startup. Acquiring stock in a private company is not the same as acquiring the whole company or acquiring publicly traded stock.

## Pre- and Post- Money Valuations

This is merely terminology, but "pre-money" refers to the valuation of the Company immediately before the investment. You guessed it, "post-money" is the valuation immediately after the investment. The value of the company, following an investment of say $10m, is somewhat different to the value of the Company before the $10m is injected and added to the balance sheet. Following the $10m injection, the Company is thought to be worth $10m more than it was before.

## Return on Investment—How Venture Capital Investors Perform "Valuation" Calculations in Early Stage Startups

The valuation method commonly used by venture capital investors[20] when looking at startup companies involves a projection of the possible return on investment.

The beauty and intrigue of this method is that a value is placed on the Company with little reference to the market, the technology, the team, milestones achieved or momentum generated to date. In fact, the only information an investor requires from the Company is a copy of the capitalization table, showing a breakdown of the shares held by all the shareholders. With this information, details of the amount of money the investor is injecting, the value of the Company at a point in the future,

[20] Variations of this method are often referred to as the "Venture Capital Method" of valuation. The Venture Capital Method was first described by Professor Bill Sahlman at Harvard Business School in 1987.

say 3 years from now, and how much the VC wants its investment to be worth at that point, the investor works out how much of the Company it needs to own today—and from here they can determine the current company valuation.

As an example, the investor may estimate that, if all goes to plan, the Company would be worth $100m three years from today. At that time, the Company valuation is estimated at $100m based on comparable M&A transactions, typical earnings & revenue multiples in this business sector.

If the total number of shares issued by the Company in three years' time is estimated at 20m (after allowance for future rounds of funding), and the VC wants to own 15% of the Company[21] at this point, the investor needs to acquire 3 million shares.

If it's going to achieve a 10x (1000%) return on investment, the VC needs to buy 3m shares today at a price of $1.5m.

With 10m shares outstanding today (before shares are sold in later rounds), this sets a value for the Company of $5m today. The investors needs to buy 3m shares for $1.5m, so the share price is 50 cents per share. With 10m shares outstanding and a share price of 50 cents each, this theoretically values the Company at $5m.

Although it seems to have little relationship with the Company, the milestones achieved or momentum generated, the Return on Investment technique is commonly used by investors in seed and early stage companies.

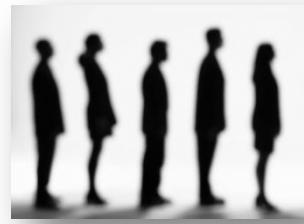
## Preferred Stock—Why Venture Capital Investments do Not Represent a Sound Basis for Company Valuation

When a venture capital investor presents a term sheet to invest in an early-stage technology-oriented startup venture, it's something of a stretch to use the financial terms of the financing to extrapolate a valuation for the whole company. Almost all

[21] The top-tier Sand Hill Road firms are looking for a substantial share of the Company—normally in the region of at least 15-20% when acting as lead investor—otherwise they can't justify placing a partner on the board of directors and committing to add the Company to the VC's portfolio of investments.

venture capital investments are structured as preferred stock financings where the investor acquires preferred stock with rights to convert to common stock and several preferential rights over and above those of common stockholders. The preferred stock arrangement has significant implications on control of the venture, and the investor has liquidation preferences that distort the distribution of proceeds when the Company is sold. The preferred stock instrument usually provides the investor with the right to appoint its own representative to the board of directors, and usually enables the investor to take voting control of the board of directors. The investor is essentially acquiring management control of a venture, and infusing funds into it with a view to taking a gamble that the team will be able to beat the odds and build a business that has a substantial value in future.

If the acquisition of preferred stock were to be used as the basis for valuation of the startup venture, how would we account for the following rights acquired by the investor?



- Liquidation preference. When the Company is acquired, or the assets liquidated, the proceeds are not shared equally among each of the shareholders. The founders and common stock holders stand in line behind the preferred-stock holding investors. Only once the preferred stockholders have redeemed all the funds they invested, or multiples of the funds they invested[22], do the common stockholders get to share in the proceeds. Often, there's nothing left after the liquidation preference has been exercised by the investors for the founders and common stock holders to share in the proceeds.
- Anti-dilution rights. Investors are protected from dilution of their shareholding through manipulation of the conversion rate that defines the rate at which preferred stock is converted to common stock at IPO[23].
- Participation rights. The investor has a right to invest to maintain a certain shareholding percentage in future rounds of financing.
- Right to appoint directors. The preferred stock comes with rights to appoint directors, and substantial rights to appoint officers and management.

[22] Almost all venture capital investments are structured using a "participating preferred" stock arrangement.
[23] The most common formulas used are the Weighted Average and the Full Ratchet.

- Voting & veto rights. Preferred-stock holding investors have a right to veto a decision to sell the Company, raise finance, and make other strategic decisions.
- Co-sale rights. The founders and common stockholders are restricted from selling shares (pre-IPO), without investors having the opportunity to sell shares.
- Drag-along rights. The majority shareholders have the power to force minority shareholders to sell shares if the majority decides to sell the Company.
- Redemption rights. The investor has the right to demand the Company repays the funds invested, often with interest.

It's hardly reasonably to just ignore these rights, and pretend the investor acquired regular common stock, without any of these rights, in order to use the venture investment as a basis for startup valuation. Perhaps some mathematical and business genius in future might be able to quantify each of these rights acquired by investors and factor this into the valuation calculation when appraising a venture-capital backed startup. However, I'm sure any approach is going to be subject to a great deal of debate and will be open to criticism.

**Startup Exit Scenario**

Imagine you founded a startup company. After raising $5m venture capital but you still held 50% of the shares. BigCo offers $10m to buy your company. How much do you get for your shares if you accept BigCo's offer? See next page for answer.

A Harvard study[24] reports that at least 70% of venture capital backed startups fail, and the startup venture can be considered a speculative gamble rather than a set of assets with substantial value. The odds of converting an early-stage venture capital investment into a profitable financial return are slim and the majority of venture-backed startups journeys end in a shuttering of the business and liquidation of the assets, where the Company's assets fetch prices measured in thousands rather than millions of dollars.

[24] Performance Persistence in Entrepreneurship, Harvard Business School, Gompers, Kovner, Lerner, Sharfstein http://www.hbs.edu/research/pdf/09-028.pdf: "*..a venture-capital-backed entrepreneur who succeeds in a venture (by our definition, starts a company that goes public) has a 30% chance of succeeding in his next venture. By contrast, first-time entrepreneurs have only an 18% chance of succeeding and entrepreneurs who previously failed have a 20% chance of succeeding.*"

A person can buy a casino chip for $5 but this does not mean that the plastic chip itself is worth $5 or that the value of the gaming table where the chip is gambled has a value calculated as the sum of the value of all the chips on the table. The chip represents a right to play the casino game and it's unreasonable to infer from the price paid to use the chip what the value of that chip might be worth as an independent asset, or what the value of the casino game, or the table where the game is played might be worth. Likewise, if an investor invests $1m to acquire 10% of all the common stock in a startup venture, in the form of preferred stock, this does not mean that all the assets, or the venture itself would be worth $10m to an acquirer.

Shares in a startup venture can be compared to casino chips, and it's not realistic to determine the value of an early stage startup's assets from the price the investor has paid to take control of the startup via preferred stock and take the gamble that the investor and management is able to guide this startup to success in future years. A share of preferred stock is far superior and much more valuable than a share of common stock[25]. This two-tiered stock arrangement distorts any enterprise valuation calculations derived from a sale of preferred stock to investors.

**Startup Exit Scenario** (from previous page)

You would <u>not</u> get $5m for your shares. If the liquidation preference was 1X, you would get 50% of $5m i.e. $2.5m. If the liquidation preference was 2X, you would get 50% of nothing—i.e. $0.00. The VC takes multiples of the $5m investment before you get to share in the remainder.

## Valuing Startup Companies Using a Comparables Approach

Venture capital investors are somewhat secretive about their investment transactions but there are some database services available that report the funds injected and investment terms surrounding venture capital investments[26]. From this data, it can be possible to liken one startup with others in order to make a comparables-based valuation. Trends in

[25] According to the SEC, an early-stage startup can have preferred stock valued at 10X the price of common stock.
[26] As an example, see the Valuation & Deal Term Database from VC Experts (https://vcexperts.com/vat/companies).

liquidation preferences, valuations and various issues of interest to venture capital investors are published by law firms and others involved in the Silicon Valley infrastructure[27]. These surveys can help appraisers understand market activity and determine the current trends in valuation and deal terms, generally organized by industry sector and stage of company (seed stage, early stage, etc.).

Repetition leads to familiarity and individuals involved in a large number of deals, like investors and corporate buyers, develop a rule of thumb—an awareness, conscious or unconscious—of what seems to be the market rate for companies at various stages of growth. The rule of thumb is based on comparable deals, the investors' appetite for the investment, competition among competing buyers and the momentum generated by the Company.

A hypothetical investor might value a seed stage company with fair amount of momentum at $1m to $3m; and if the Company has generated impressive momentum, perhaps achieving milestones and generating a positive buzz in the industry, the valuation range could increase to between $5m and $15m.

A company in the expansion stage with good momentum, perhaps signing up significant customers, might be valued at between $10m and $50m; and a company preparing for IPO in the mezzanine stage, with impressive momentum could be valued at $200m+.

This type of comparables-based rule of thumb guideline may not be very scientific, but it does reflect the way many seed-stage and early-stage startup companies are valued by venture capital investors.

## Valuing Startup Companies Using a Cost-Based Approach

If you formed a new startup, opened a bank account, deposited $5m into the bank and immediately ran a valuation of the Company (before incurring any debts, commitments or doing anything at all), it would be reasonable to assess the value of the Company at $5m, on the basis that this is the cost of replacing or replicating the Company. This would also represent the liquidation value, as the $5m in the bank is readily available—a highly liquid asset.

[27] As an example, see the reports and surveys published by Fenwick & West (http://www.fenwick.com).

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After the Company has been operating for some time, and the funds in the bank have been depleted, the relationship between the value of the business and the costs incurred becomes more difficult to justify. Let's imagine that after a year, the bank balance has been depleted from $5m and now the bank has a balance of $12.56. Is it reasonable to value this Company at $5m based on the fact that investors injected $5m and the Company has incurred $5m[28] in setup costs? As time passes, the argument becomes more difficult to defend.

We can, of course, estimate the cost of replacing or replicating virtually anything and there are situations where the value of a startup company could be estimated based on these costs.

Where startup has nothing more than technology, such as software, to offer a potential acquirer, the cost of replicating the technology will often be used as the basis of valuation for the acquirer. We will discuss this much further in a subsequent chapter[29].

## Valuing Startup Companies Using an Income-Based (Discounted Cash Flow) Approach

In the seed and early stages of startup development, sales and earnings projections may be so speculative that they are not taken seriously at all, and may be too unreliable to form the basis of valuation. Reflecting the highly speculative nature, and the risks involved, the discount rates commonly applied to startups by venture capital investors is in the range of 25-75% per year. As it may take the average high-technology startup 5-10 years before cash flow turns positive, the net present value of those positive cash flows can be very small after the discount rate is applied for each year. One dollar earned in year 10, with a compound discount rate of 60% (applied each year) has a net present value of less than 1 cent today. So, the earnings of the Company can never justify an investment based on a discounted cash flow analysis of the Company's projected retained earnings.

However, investors do use the discounted cash flow

[28] OK, as there's $12.56 in the bank, we can assume $4,999,987.44 has been withdrawn to cover costs.
[29] See Chapter on the valuation of Product Lines, page 47.

model when valuing early stage startups and they focus on potential terminal value—the value of the Company at the point where the investor can exit (and sell shares) via M&A acquisition or IPO. Although the cash flows generated by a technology startup may be negligible, the price paid by a corporate acquirer or a Wall Street investor in 5-10 years may be substantial, and justify an investment when discounted to net present value today.

When the discounted cash flow method does not focus on cash-flows generated by earnings, and focuses exclusively on the potential value of the entire enterprise at exit (such as IPO or M&A acquisition), this technique resembles the Return on Investment[30] method of valuation.

## Driving Demand & Increasing the Price When Selling Shares in Startup Companies

We have learned from the law of demand[31], that when management is looking to increase the price of shares, representing the valuation of the Company, the most effective technique is to introduce additional competing buyers.

If you're raising a round of funding, the introduction of additional investors, each bidding to make the investment, will help management negotiate and justify a higher price. If you're selling the whole company, several competing acquirers will likewise push up the price.

The best way of introducing buyers in the form of investors or corporate acquirers is to demonstrate marked progress in the business milestones achieved, and create a positive buzz around the Company. Customer wins, growing sales results, positive press coverage and customer testimonials all demonstrate positive momentum in the Company and attract potential investors and acquirers.

## Valuation for Later-Stage Investment Funding

Where an early stage startup may have little or no historical performance on which to base a value calculation, revenue, earnings and other performance measures may become useful for a later-stage financings. Once the startup matures, generates

[30] Otherwise known as the "Venture Capital" method. See Return on Investment—How Venture Capital Investors Perform "Valuation" Calculations in Early Stage Startups, page 37.
[31] See Market Forces of Supply & Demand, page 16.

revenues (and hopefully profits), the valuation methodologies we discussed in relation to established businesses will be adopted[32].

As the Company starts to generate sales revenues, valuation methods focused on earnings and revenue performance may start to become relevant. At this stage, the value is often determined by the Company's revenue. If comparable private companies in the same sector have recently been acquired for 3X their annual revenue, it would be reasonable to value of your company at 3X the annual revenue.

The financial projections of management may begin to hold some credibility, it may not be long before incoming cash exceeds the out flowing cash, so the Discounted Cash Flow method may be a viable valuation technique.

The value may also depend on the type of investor leading the round. New investors anxious to acquire a stake in the Company will tend to offer higher valuations than existing shareholders.

When it comes to a strategic round of funding, a corporate strategic investor will often agree to a higher valuation than a pure venture capital investor. Where venture investors are looking exclusively at the financial return, the corporate investor may consider other synergies and benefits to their parent company. For example, Intel has an interest in driving adoption of Intel chips, and often makes investments in startups developing technologies that will drive the growth in sales of semiconductors. By financing the startup, Intel may benefit from resulting chip sales, but the venture capital investor benefits only from the financial return. So a strategic investor like Intel may be able to justify a higher valuation than a VC.

Where the VC usually negotiates with management and sets the valuation for early stage financings, a strategic/corporate investor may lead a later round of funding, and may have more flexibility on price.

## Valuation For Mezzanine Financings

In the mezzanine stage[33], the Company now has a track record of financial results and as it may be only a matter of months away from IPO, its shares can now be

[32] See Established Businesses, page 21.
[33] Mezzanine investment financing refers to a later stage investment provided to a company that is already producing and selling a product or service, for the purpose of helping the company go public. Mezzanine investment financing

compared to those of known publicly-traded competitors. By looking at the share price and valuations of existing public companies, the revenue-multiple and earnings-multiple techniques can prove useful to set a valuation that's based on current public share prices in this particular sector.

The Company is still private, and the stock is not yet tradable and liquid, so the liquidity discount should be applied when comparing with publicly traded stock.

As there's a good deal more history to study, the valuation calculations can be much more reliable than they are in the early stage, however, the price very much depends on the current climate on Wall Street—as we have discussed, this can be volatile, driven by fear, greed and the peculiarities of human nature[34].

provides for major expansion in companies whose sales are increasing, and whose cash flow is break-even or slightly positive.

[34] See Behavioral Finance, page 30.

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# Product Lines

In Silicon Valley and the technology sector, the business climate changes at a rapid pace. Companies often switch direction, selling off product lines they are no longer interested in pursuing, and buying product lines that match their latest business plans. The buyers of these product lines are frequently large corporations with the infrastructure and channels necessary to reach the market. They acquire these assets from other large companies, from research and development labs, and from failing startups.

Startups regularly fail to assemble effective channels of distribution, as sales and marketing activities necessary to reach customers frequently prove too costly for all but the largest players. Startups frequently find themselves selling out to large corporations looking for new product lines to fuel their growth.

How are these asset sale transactions valued? Well, enterprise valuations, designed to value the whole company are not very relevant as the corporate acquirer is not buying the company—the interest is in the technology and the know-how. The acquirer is looking for the technology assets forming product lines, and the product development team. They're not really interested in the corporate shell, and they already have sales, marketing and management teams, so their real focus is on the technology, the scientists and engineers.

The acquiring corporation frequently likes to use a cost-based calculation to establish value in these situations. They look at the cost of replicating the technology and use this as a basis for valuation.

## Cost-Based Valuation of Technology Assets forming Product Lines

Before acquiring an asset, like a new technology, a buyer will usually make a build vs. buy calculation and estimate how much it would cost to build the asset using its own team and its own resources. The buyer may argue that the value of the asset is

capped by the cost the buyer would incur if it reverse-engineered and built the asset in-house.

Using the build-cost valuation method, the assets are considered to be worth no more than what it would cost the buyer to rebuild the product by hiring an in-house design and development team. As an example, if the buyer were acquiring a high-technology product design that would take 5 engineers and a project manager 24 months to reverse engineer, the buyer may estimate that the in-house build cost was, perhaps, $2m (if the cost hiring and supporting the team for the two year period was calculated to be $2m).

## Time-to-Market Multiple

Facing a buyer valuing technology assets on a build-cost calculation, a good negotiator representing the seller will point out that when this internal development project is complete, in, say, two years' time, the market will have changed considerably—and the window of opportunity will have closed. In this situation, it's not unusual to apply a time-to-market multiple to recognize the momentum generated to date and come up with a more reasonable valuation from the perspective of the seller.

As high-tech markets are fast-moving, it can be advantageous to have a product shipping today rather than wait until a product is built by reverse engineering. An argument can be made that the reverse engineering cost does not reflect the full market value of a market-ready product line and a more accurate value can be calculated by applying a time-to-market multiple to the base cost of reverse engineering. If the cost of reverse engineering a software product were estimated at $1m, and the time required to build the product were estimated at 12 months, the seller might object to having the software appraised at $1m because it does not reflect the fact that the software provides a market opportunity today, and the window of opportunity might have closed in 2 years when the reverse engineering project is completed. The time-to-market multiple might be somewhere between 1X to 5X depending on the market and the time required to reverse engineering. So, software with a $1m cost of

reverse engineering might have a 1X multiple ($1m value) value in a slow-moving market where it makes little difference whether the product is released today or in 12 months' time, but software with a $1m cost of reverse engineering might have a 5X multiple ($5m value) in a fast-moving, high-growth market where rapid time to market can make the difference between failure and success.

## Comparables-Based Valuation of Technology Assets Forming Product Lines

If similar technology assets were recently sold under similar conditions, then we can use these data points as a basis for comparables-driven valuation. However, these assets are often unique and transaction metrics are not always disclosed, so finding relevant comparables can be a challenge when appraising product lines.

**Question: How did startups like Skype, Instagram & Facebook generate huge valuations with relatively little revenues?**

Answer: Momentum. These companies generated huge market momentum, engaging millions of customers and leadership positions in their sectors.

## Income-Based Valuation of Technology Assets Forming Product Lines

The discounted cash flow[35] approach can be applied to virtually any income stream, and product lines are no exception. The revenues and profits projected from the product line can be forecast over the coming years and a discount rate selected that reflects the risk associated with these incomes materializing according to the estimate. A reliable product line, with a track record of sales results over recent years, combined with a realistic forecast of future income streams will make this form of valuation more credible than an untested product line with an overly-ambitious revenue projection. Of course, the discount rate can be increased when the forecast becomes more speculative, but some forecasts are so speculative as to render this type of valuation somewhat unbelievable.

[35] See Income Approaches—Discounted Cash Flow (DCF), page 15.

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One question a buyer might raise is whether the buyer's own sales and marketing channels should be factored in to the valuation. A buyer looking at a forecast showing huge sales of products might inquire as to how these sales are going to be achieved. If the seller explains that the forecasts are based on the assumption that the buyer's sales, marketing and distribution channels will be used to market the product might be concerned that the valuation is based on the buyer's strength, not that of the seller's product. Is it fair for the seller to ask the buyer to pay a high price due to the fact that the buyer has an effective and efficient marketing channel? This is one of the issues that will need to be negotiated in this type of transaction. There are no simple answers. The seller needs to present her valuation calculations, and the buyer will then likely negotiate from there. The buyer will argue that the buyer's marketing muscle should not be used to justify a high price, and the seller will argue that it should.

# Software Code

Where software code has ongoing license revenues, the value of the code can be valued by running a discounted cashflow analysis of the projected revenues to produce a net present value of the code today. However, most software does not have such ongoing royalty streams and the valuation of software code usually requires an analysis of the cost of replicating the code, with comparables where they're available.

## Factors Affecting the Value and Marketability of Software Code

Software code is mission-critical to most companies and organizations today, and substantial investments are often ploughed into the development of software code. However, the code that is developed is difficult to protect, difficult to sell and the value of the code often represents only a fraction of the development costs invested.

### Patents Provide Inadequate Protection from Reverse Engineering

Software is patentable in several countries today, and a software developer can file a patent to protect an invention. However, the software platforms and libraries required to develop commercial software today are highly sophisticated, comprising thousands of inventions and thousands of patents. Studies have recently estimated the number of patents in the software and related sectors. It is estimated that the number of patents that impact smartphones reaches more than 250,000[36] and roughly 40,000 software patents are issued every year.[37]

As there are so many patented software inventions, it's virtually impossible for any software developer to create a product or a piece of code that does not infringe patents held by other inventors. Checking for "freedom to operate" and finding fields of software where a software developer can operate free of any existing patents would be unreasonably difficult, even for the largest software developer. A recent study calculates "*..it would take roughly 2,000,000 patent attorneys working full-time to compare every software-producing firm's products with every software patent issued in a given year.*"[38]

[36] RPX Corporation S1 SEC filing. http://www.investorscopes.com/RPX-Corp/S-1/11340089.asp
[37] http://www.npr.org/blogs/money/2012/04/27/151357127/another-ridiculous-number-from-the-patent-wars

Software developers have little choice but to develop code without regard to patents, and software patents are often routinely infringed. The fact that a company holds a patent on a software invention is unlikely to deter competitors from practicing the invention in its own software code. Companies in the software business usually ignore patents until they are faced with a patent infringement lawsuit and are forced to deal with patents as a result of litigation. The cost of bringing a patent infringement lawsuit is prohibitive for all but the largest companies. A survey conducted by the American Intellectual Property Law Association to find median litigation costs for patent infringement suits shows that for a claim that could be worth less than a $1 million, median legal costs are $650,000. When $1 million to $25 million is considered "at risk," total litigation costs can hit $2.5 million. For a claim over $25 million, median legal costs are $5 million[39].

Patents provide inadequate protection against software reverse engineering because it is impractical for software companies to undertake freedom to operate studies, they routinely engineer software code without reference to patents, and the cost of asserting patents against infringers is prohibitive for all but the largest companies.

## Copyrights Provide Inadequate Protection Against Reverse Engineering

Copyright laws[40] in effect in many countries provide protection for software code. Just as with other works, copyright for computer programs prohibits not only literal copying, but also copying of "nonliteral elements", such as the program's structure, sequence and organization. These non-literal aspects, however, can be protected only "to the extent that they incorporate authorship in the programmer's expression of original ideas, as distinguished from the ideas themselves."[41]

When reverse engineering, software programmers can avoid violating copyright by expressing the ideas in a new and original way. Indeed, as software libraries and development platforms are constantly evolving and improving, next-generation implementations (even those reverse engineered) are often more efficient and effective than the previous generation and new approaches to implementation avoid violating copyright protection.

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[38] Scaling the Patent System, Christina Mulligan, Yale Law School, Information Society Project, Timothy B. Lee, Cato Institute, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2016968

[39] Report of the Economic Survey 2011. American Intellectual Property Law Association.

[40] In the United States, computer programs are literary works, under the definition in the Copyright Act, 17 U.S.C. § 101

[41] Computer Assocs. Int'l v. Altai, Inc., 982 F.2d 693 (2d Cir. 1992)

Copyrights provide inadequate protection against reverse engineering of software because it's not difficult for the copy to be functionally very similar while the engineering under the cover is sufficiently different from the original to avoid infringing copyright.

## Trade Secrets Provide Inadequate Protections Against Reverse Engineering—Software Trade Secrets are Difficult to Keep Secret!

A company that creates a new and valuable technique, or other piece of information, and protects it as a trade secret, has a right to restrict competitors from using it. Coca Cola, for example has a right to restrict competitors from making and selling soda drinks employing its secret recipe. Where the recipe to Coca Cola is heavily guarded, the design of software code can be very difficult to protect. Software such as website code is readily available for the website viewer to download and view in a standard web browser and the copying of Internet-based software is very difficult to restrict. Reverse engineering of modern client-server software is difficult to prevent as much of the code, the structure of the pages and forms, and the database calls are all readily available for the general public to download and analyze. Unless the trade secret is kept under lock and key, it's not enforceable. Clearly, where the software code is publicly available, trade secrets provide inadequate protection to prevent reverse engineering for software.

## Compatibility—and Incompatibility

A potential acquirer of software will usually be reluctant to buy code that is incompatible with the acquirer's own development platforms. For example, Microsoft is more interested in software developed on a Microsoft platform, Apple is more interested in software developed on an Apple platform, and the market for any particular piece of software can be restricted to potential buyers that have adopted a compatible platform. This issue of compatibility (or more accurately incompatibility) has an effect on the marketability of software code in that it reduces the number of potential buyers. There may be a large number of companies operating in a particular software market sector, but a relatively small number of them may have adopted software development platforms consistent with the software code offered for sale—the number of potential buyers is a subset of the total number of market players. Forces of supply and demand dictate that fewer buyers means suppressed prices and incompatibility

concerns make the matching of buyers and sellers problematic. Many software developers discover that finding buyers interested in acquiring their software code is a challenge.

## Valuation of Software Code Based on the Cost of Reverse Engineering

As an existing software product can be used as the blueprint for software engineers to create a copy, and patents, copyrights and trade secrets fail to protect software from reverse engineering, the value of software code can be estimated at the cost of such reverse engineering. It can be argued with some credence that software code is worth what it would cost to create a functionally equivalent copy.

To determine the cost of reverse engineering the code, we look at the cost of the software development team, the cost of the software development tools and the cost of online servers.

### Cost of Software Development Team

The Bureau of Labor Statistics, part of the United States Department of Labor reports that in May 2011, the mean annual wage for software developers in the United States was $100,420.[42]

**National estimates for this occupation: Top**

Employment estimate and mean wage estimates for this occupation:

| Employment (1) | Employment RSE (3) | Mean hourly wage | Mean annual wage (2) | Wage RSE (3) |
|---|---|---|---|---|
| 387,050 | 1.8 % | $48.28 | $100,420 | 0.5 % |

Percentile wage estimates for this occupation:

| Percentile | 10% | 25% | 50% (Median) | 75% | 90% |
|---|---|---|---|---|---|
| Hourly Wage | $30.03 | $37.36 | $46.44 | $57.93 | $70.69 |
| Annual Wage (2) | $62,470 | $77,720 | $96,600 | $120,500 | $147,030 |

[42] Occupational Employment and Wages, May 2011, 15-1133 Software Developers, Systems Software, http://www.bls.gov/oes/current/oes151133.htm.

In the software development market, there has been a trend for organizations to outsource software development to emerging markets such as India, China and Russia where the cost of labor is significantly lower than that reported in the U.S. and often reaches as low as $15/hour for qualified engineers. A salary survey in India reported by Payscale.com[43] involving 225,351 reporting individuals in 2012 shows the median salary for senior software engineers to be 580,699 rupees which converts to $10,785 per year.[44] The same Payscale report for Spain[45] involving 5,661 reporting individuals shows the median salary for senior software engineers is 30,453 euros in Spain, which converts to $39,453.

## Cost of Software Development Tools

Software development tools are required by programmers, and this is a cost that we should consider and factor in to the cost of reverse engineer code. As a sample of the costs incurred in development tools, Microsoft Visual Studio provides a comprehensive environment and the various versions available range in price from $499 to $6119[46]. These prices are similar to those programmers can expect to pay when acquiring development tools for Opensource and other platforms.

## Cost of Online Servers

Most software today is built for an Internet, client-server model where at least some of the code is hosted on Internet-based servers. The cost of operating those servers have reduced considerably over the years, and cloud-based offerings provide developers with scalable hosting capabilities at very reasonable costs. Shared hosting (where limited space is provided on a shared server) can cost as little as $5/month[47] and collocated servers (where the developer has access to an entire server) can cost as little as $99/month for a dedicated server[48]. The cost of online servers must be taken into consideration when calculating the cost of reverse-engineering client-server software, but these costs are

[43] http://www.payscale.com/research/IN/Country=India/Salary
[44] Using exchange rate of 1 Indian rupee = 0.0186 US dollars
[45] http://www.payscale.com/research/ES/Country=Spain/Salary
[46] Source http://www.microsoftstore.com/store/msstore/en_US/list/categoryID.50804700 October 22, 2012
[47] http://www.godaddy.com/hosting/web-hosting.aspx
[48] http://www.serverbeach.com/

usually insignificant when compared to the cost of operating a team of software engineers.

## Continual Renewal of Software Development Platforms Means Software is Rapidly Rendered Obsolete

The software platforms on which applications are built are continually being upgraded and enhanced. Every few years, programmers are accustomed to having to port their software to a new and upgraded development environment. Software that has been developed and operating effectively for several years is often rendered obsolete when new platforms are released. For example, much of the software developed on the Microsoft ASP platform was rendered obsolete when Microsoft moved to a new platform ASP.Net. This means that software has a limited lifespan, measured in years rather than decades, and the value of software can decline over time.

If the cost of reverse engineering is used as the basis of valuation for software, the release of a next-generation platform could affect the value of software as it could have implications on the length of the development process and the number of engineers required to facilitate the reverse engineering. As a general rule, the new generation platforms provide developers with capabilities to build more complex code more quickly, so the cost of reverse engineering could be expected to decline over time. However, there are educational costs incurred in software developers becoming acquainted with new platforms and these costs can counter-balance the efficiencies offered by the platform.

The cost of reverse engineering, hence the value of software valued by this metric, can be expected to decline steadily over time. So the value of software code today will not be expected to increase and can be expected to steadily decline over time.

## Time-to-Market Multiple

Few industries are as fast moving as the software marketplace where software products are rapidly rendered obsolete and opportunities to exploit emerging niche markets are usually fleeting. As we discussed in the section on product lines, the argument that software is valued at the cost of reverse engineering is countered with the time-to-market argument[49]. Those of us who have worked in software appreciate

[49] See Time-to-Market Multiple, page 60.

the time, energy and investment required to take a prototype to a fully-tested, stable software product.  A software product that's completed and shipping today is worth significantly more than a copy of the software that might be available in a couple of years' time.  Time is a factor to consider and the time-to-market multiple needs to be applied when valuing software using the build-cost method.

# Patents

Patents form the primary assets for many companies today, especially those in technology-oriented sectors, but the valuation of patents requires an understanding of the nature of patents and a variety of valuation methodologies. Patent valuation is necessary to assess the damages a court should award in patent litigation suits, to fix a price when a patent is sold, and to assess the value of the intellectual property sitting on a company's books.

When it comes to assessing the value of a patent in relation to an infringement lawsuit, there seems to be a great deal of debate between the patent holder and the accused infringer, each bringing experts to assess a reasonable royalty an infringer should pay for unauthorized use of the patented invention. The courts are accustomed to hearing economists and valuation experts from one side present their rationale supporting a high royalty rate, and the expert witness representing the other side present calculations supporting a royalty rate that's somewhat lower. The spread between the numbers presented by each side can be very wide, to the point that sometimes the judge loses patience. In a recent case where the patent holder's expert presented a complex math argument concluding the infringement was worth several billion dollars, the judge[50] declared: *"No jury could follow this Greek or testimony trying to explain it.. [The proposed logic represented] an impenetrable facade of mathematics."*

With news reports of these courtroom discussions, those outside the patent trade might believe the value of a patent to be highly speculative and open to a great deal of negotiation, however, when it comes to assessing a value for a patent sale transaction, there's usually comparatively little scope for discussion. The buyers know the price a patent is worth to them and they know what they're prepared to pay. Sellers can argue their patent is worth billions of dollars, but there is no judge or jury in a patent sale transaction. The buyer ultimately pays what the buyer believes the patent is worth or the patent remains unsold.

The prices buyers are prepared to pay for a patent is surprisingly predictable to those involved in the patent trading business, and they are based on quite solid valuation methodologies.

[50] See Oracle America, Inc. v. Google Inc., No. C 10-03561 WHA (N.D. Cal. July 22, 2011).

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As the patent market is very thinly traded, with relatively few buyers, it's the buyers with cash to spend who hold market power and generally dictate the prices paid. Sellers are not always happy with the prices they achieve when placing patents on the market, but over time they start to realize that buyers are not very flexible when it comes to negotiating price.

## Reasonable Royalties & Valuation Approaches Adopted by the Courts

When a court finds infringement, and in favor of the patent holder, it then applies the following rules, laid out by U.S. federal law[51]:

> *Upon finding for the claimant [patent holder] the court shall award the claimant damages adequate to compensate for the infringement, but in no event less than a reasonable royalty for the use made of the invention by the infringer, together with interest and costs as fixed by the court.*
>
> *.. the court may increase the damages up to three times the amount found or assessed.*

Patent damages are supposed to compensate patent owners for their losses, putting them back in the world they would have inhabited but-for the infringement. This involves forcing the infringer to pay the patent holder no less than a royalty that's considered reasonable. What is and is not considered reasonable has been discussed at great detail by the courts, and this is something we need to understand if we are to assess a realistic value for a patent.

### Reasonable Royalty

A reasonable royalty is the fee a patent licensee would pay a licensor (patent holder) in a hypothetical license negotiation at the time the infringement began. Essentially, the courts try to imagine the infringer had a negotiation with the patent holder before going ahead and marketing infringing products. The rate that might be agreed in this hypothetical negotiation is considered reasonable, and applied to the infringing products. Following a case involving Georgia-Pacific[52] in 1970, fifteen factors have been considered by the courts.

[51] 35 U.S.C. § 284.
[52] Georgia-Pacific Corp. v. United States Plywood Corp., 318 FSupp 1116, 6 U.S.PQ 235 (SD NY 1970).

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## Fifteen Georgia-Pacific Factors

The following check list was written by a judge in deciding a 1970 case involving Georgia Pacific[53], so may appear to be a little legalese, but you can see the courts consider many different aspects of the business and the scope of the patent when assessing a reasonable royalty:

1. The royalties received by the patent owner for the licensing of the patent-in-suit, proving or tending to prove an established royalty;
2. The rates paid by the licensee for the use of other patents comparable to the patent-in-suit;
3. The nature and scope of the license, as exclusive or non-exclusive, or as restricted or non-restricted in terms of territory or with respect to whom the manufactured product may be sold;
4. The licensor's established policy and marketing program to maintain its patent monopoly by not licensing others to use the invention or by granting licenses under special conditions designed to preserve that monopoly;
5. The commercial relationship between the licensor and the licensee, such as whether they are competitors in the same territory in the same line of business, or whether they are inventor and promoter;
6. The effect of selling the patented specialty in promoting sales of other products of the licensee; the existing value of the invention to the licensor as a generator of sales of its non-patented items; and the extent of such derivative or convoyed sales;
7. The duration of the patent and the term of the license;
8. The established profitability of the product made under the patent; its commercial success; and its current popularity;
9. The utility and advantages of the patent property over the old modes or devices, if any, that had been used for working out similar results;
10. The nature of the patented invention; the character of the commercial embodiment of it as owned and produced by the licensor; and the benefits to those who have used the invention;

[53] Georgia-Pacific Corp. v. United States Plywood Corp., 318 FSupp 1116, 6 U.S.PQ 235 (SD NY 1970).

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11. The extent to which the infringer has made use of the invention, and any evidence probative of the value of that use;
12. The portion of the profit or of the selling price that may be customary in the particular business or in comparable businesses to allow for the use of the invention or analogous inventions;
13. The portion of the realizable profit that should be credited to the invention as distinguished from non-patented elements, the manufacturing process, business risks, or significant features or improvements added by the infringer;
14. The opinion testimony of qualified experts; and
15. The amount that a licensor (such as the patent owner) and a licensee (such as the infringer) would have agreed upon (at the time the infringement began) if both had been reasonably and voluntarily trying to reach an agreement; that is, the amount that a prudent licensee – who desired, as a business proposition, to obtain a license to manufacture and sell a particular article embodying the patented invention – would have been willing to pay as a royalty and yet be able to make a reasonable profit, and which amount would have been acceptable by a prudent patent owner who was willing to grant a license.

These 15 factors have been considered by the courts since 1970, and are still used today to determine a reasonable royalty in a patent case.

Expert witnesses are often brought in and comparisons with similar license arrangements involving similar products and similar patents will be quite instrumental in finding a royalty rate to reflect the market at the time the hypothetical negotiation took place.

### 25% Rule of Thumb Now Rejected

Up until relatively recently, courts had applied a rule of thumb that around 25% of the profit margin for an infringed product should be attributed to an infringed patent. In patent-packed products like software, where thousands of patented inventions make up a single software application, the 25% rule of thumb was problematic. In a recent case involving Microsoft, the court declared:

> *"This court[54] now holds as a matter of Federal circuit law that the 25 percent rule of thumb is a fundamentally flawed tool for determining a baseline royalty rate in a hypothetical negotiation. Evidence relying on the 25 percent rule of thumb is thus inadmissible.. because it fails to tie a reasonable royalty base to the facts of the case at issue." Id. at 1315.*

I guess you don't need an Excel spreadsheet to figure out that thousands of patent holders cannot expect to sue Microsoft for patent infringement and each of them start the royalty discussions at 25% of Microsoft's profit margin. If Microsoft had only a few patented inventions incorporated in its products, this might be somewhat reasonable, but considering the hundreds of thousands packed into these complex software products, starting out at 25% of profit margin is no longer acceptable. The courts will award a reasonable royalty but will not allow a patent holder to become wealthier than Bill Gates overnight.

## Royalty Rate Surveys and Databases

It's relatively straightforward for a court to assess a reasonable royalty if identical or highly similar patents have recently been licensed in identical or highly similar situations. The court assesses at the current market rate, and uses this as a yardstick to measure the rate to be applied in the case at hand. It would be ideal if the court was able to look up royalty rates for each industry, each product and each type of patent, and to a limited extent, the courts are able do this today.

Patent transactions are usually shrouded in secrecy, but publicly traded companies are required to disclose material information to investors or potential investors. Information held by a company is considered "material" when there's a substantial likelihood it would affect the decision of an investor to either buy or sell shares in that company. Patent licenses are often considered of interest to investors, so they have to be disclosed and published online under rules enforced by the SEC in the U.S. and securities regulators in various countries worldwide. These license agreements are collected by research organizations, the agreed royalty rates analyzed and databases populated with the agreed terms in all these royalty rate arrangements. Databases of license agreements are made commercially available by a range of

[54] Uniloc U.S.A, Inc. v. Microsoft Corp., 632 F.3d 1292 (Fed. Cir. 2011).

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research organizations [55]and the data disclosed is often used to determine a reasonable royalty in a patent case.

Finding close comparables is usually a challenge as no two patents can ever be identical—inventions have to be unique in order to qualify for patenting. Nevertheless, these royalty rate surveys and licensing databases can be very helpful.

### Market Royalty Rates—High Tech

The Licensing Executive Society undertakes studies of licensing transactions and publishes the results for LES members. The following charts were kindly provided for publishing in this book by LES[56] and provide some interesting insights into the licensing business.

[55] See the following sample royalty rate databases and surveys: http://www.lesusacanada.org/publications/royalty-rates-deal-terms-surveys
http://www.royaltyconnection.com/
http://www.royaltysource.com
http://www.ktmine.com/royalty-rate-finder-new-2/
http://www.itinet.org/royaltystat/
http://www.intangiblebusiness.us/Brand-Services/Marketing-Services/Royalty-Rates~1090.html (brands)
[56] Licensing Executive Society (U.S.A & Canada), 2011 High Technology Sector deal Term & Royalty Rate Survey Report.

In the most recent LES survey (2011), 228 deals were reported and not surprisingly, the average royalties[57] for deals involving patents plus other forms of IP were higher than license deals involving patents alone.

*The report states: "The vast majority of deals reported were out-license deals made by larger companies as licensors and smaller companies as licensees..*

*The survey also probed the types of IP licensed, and found that three-quarters included patents.*

**Table 5.3 Average Royalty Rate by the Type of IP Licensed**

| 1. By Number of IP Types Licensed | | |
|---|---|---|
| | Count | Average Royalty Rate |
| One Type of IP Only | 69 | 5.20% |
| *-- Patents Only* | 58 | 3.88% |
| Multiple Types of IP | 50 | 7.04% |
| *-- Patents plus any other IP* | 35 | 6.02% |
| *-- Patents plus knowhow* | 28 | 4.53% |
| *-- Patents plus software* | 8 | 4.25% |
| *-- Patent plus drawings* | 7 | 5.86% |
| *-- Patent plus industrial designs* | 8 | 8.88% |
| *-- Knowhow plus drawings or designs* | 17 | 13.44% |
| **2. By Type of IP Licensed, Standalone or in Combination** | | |
| Patents | 93 | 4.69% |
| Knowhow and Trade Secrets | 45 | 7.90% |
| Trademark | 13 | 7.23% |
| Copyrights | 10 | 8.30% |
| Software | 13 | 6.62% |
| Drawings | 20 | 7.55% |
| Industrial Designs | 20 | 8.70% |

*Unlike some of the other LES sectors, high tech deals include a significant level of know-how and trade secret components (31%), which probably reflects somewhat the nature of the technology areas represented..*

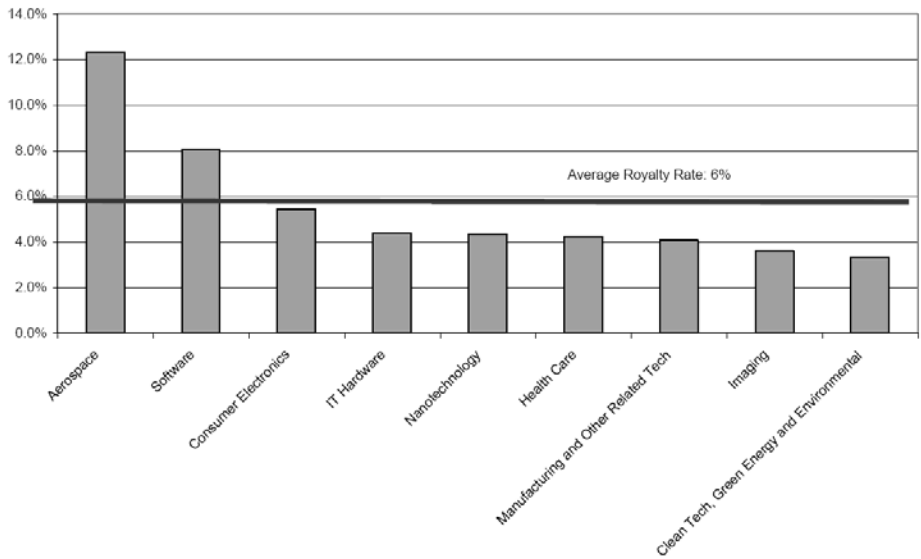
*The split between exclusive and non-exclusive deals was almost 50/50..*

*The survey addressed major fields within the High Tech Sector; these included Aerospace, Software, Clean Technology, Communications, Medical Devices, Semiconductors, Consumer Products & Electronics and Computers.*

*..there was considerable variation seen in royalty rates among different High Tech Sector segments. The overall rate of 6% is not surprising; however, the wide variation between academic licensor rates (4.8%) and aerospace licensor rates (11.2%) was not expected."*

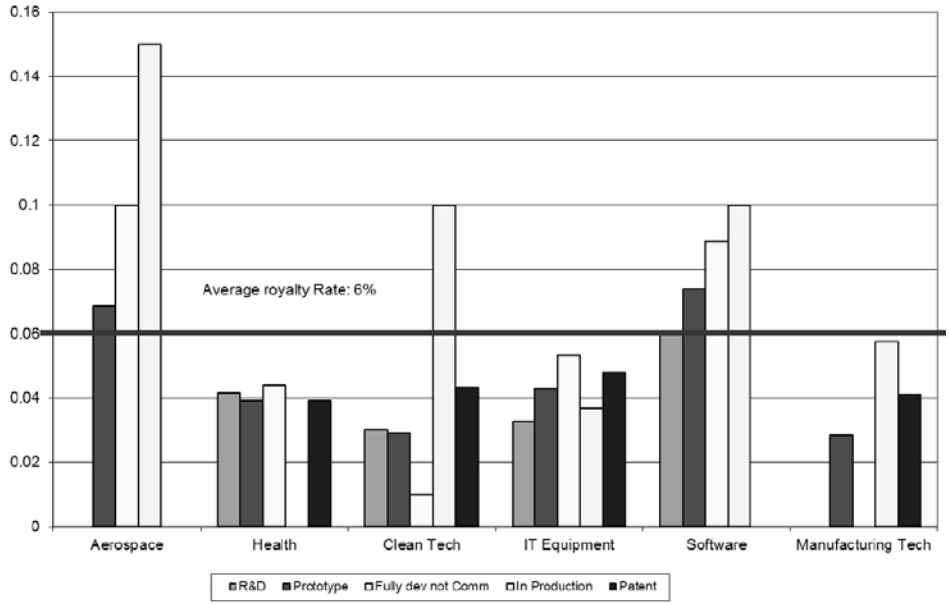
[57] Royalty rates are generally calculated based on the wholesale price, not the retail price. In industries where intermediaries are involved in the distribution chain, the royalty percentages are calculated from the price received by the manufacturer, not from the price paid by the customer.

**Figure 5.1 Average Royalty Rate by Major Technology Types**



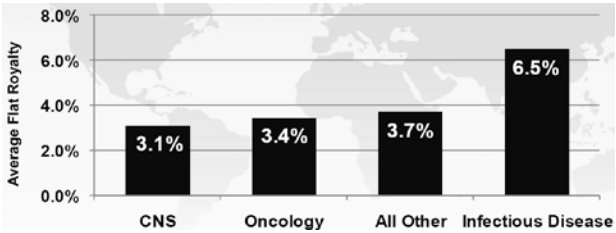

*"The survey found that around one-third of the licensed technologies covered products already fully in production, as opposed to still in development. Roughly one-half of the reported deals allowed the licensee to improve on the original licensor's technology and allowed both parties to utilize improvements made by either party. Conversely, around half of the reported deals did not allow improvements. Finally, close to one-half of the reported deals involved licensees entering the agreement to either support a new (to them) product and/or to access new markets. This result seems consistent with pre-survey expectations for why entities take on a license."*

Figure 5.2 Average Royalty Rates by Technology Readiness Level (TRL) for Major Technology Types




## Market Royalty Rates—BioPharmaceuticals

Another sector addressed by the Licensing Executive Society surveys is medical and the royalty rates for various biopharmaceutical licenses are reported[58]. The sample sizes involved 184 completed surveys, but the royalty rates reported were somewhat similar to those reported in the high-tech sector.




[58] Licensing Executive Society International. Global BioPharmaceutical Royalty Rates & Deal Terms Survey, 2010.

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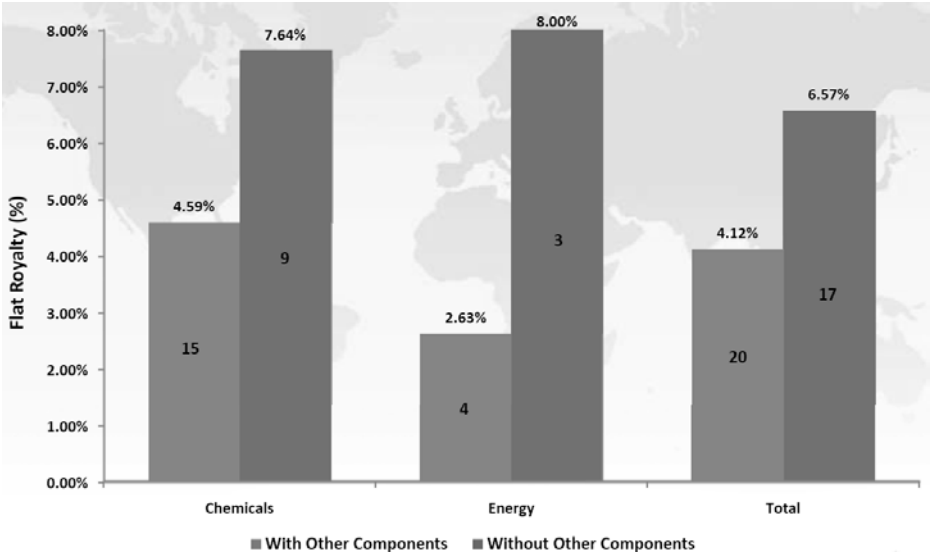
## Market Royalty Rates—Chemicals, Energy, Environmental and Materials Sector (CEEM)

Interestingly, the Licensing Executives Society survey[59] of royalty rates for the Chemicals, Energy, Environmental and Materials Sector (CEEM) also shows average flat royalty rates somewhat consistent with those found in the high-tech and pharma sectors.




Generally, these LES surveys require some detailed study in order to gather specific rates that might be applied to a particular patent in a particular industry, but the numbers disclosed seem to reflect situations where patents are licensed in single-patent product (or few-patent-product) scenarios, rather than patent packed products. Where a software product consists of hundreds of thousands of patents, it's unreasonable to think any single patent might be worthy of a royalty in the 2-7% range.

## Notice, Willful Infringement & Triple Damages

An infringer knowingly, willfully infringing a patent is treated somewhat harsher by the courts than a company unwittingly practicing a patented invention without a license. In fact, the punishment for willfully infringing is a judgment of triple

[59] Licensing Executive Society (USA & Canada) CEEM Royalty Rates and Deal Terms Survey 2010.

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damages. If a reasonable royalty payable to a patent holder were $10 per product, the court can award the patent holder three times this amount, $30 per product, on finding the Company was on notice of the patent, therefore willfully, knowingly infringed it. For this reason, many companies adopt policies to blinker their staff, preventing them looking at patents, and organizations tightly control any emails or other communication involving patents in case it might be used later in court as evidence of notice. As I discuss further in my book on patents[60], the fear of creating evidence of notice drives some of the bizarre cloak and dagger activities of patent buyers.

## Lost Profits

Under U.S. patent law, the court shall award *"no less than a reasonable royalty"*. A reasonably royalty is merely the floor, and the court can award more than this to fully compensate the patent holder. The court is able to award lost profits as a form of compensation. Let's say the patent holder is able to show the patent infringement resulted in a loss of sales of 1 million products, with an expected profit of $10 on each product, the total lost profits could be calculated at $10m and this amount could be awarded by the court. Lost profits can sometimes be claimed alongside reasonable royalties, if this is necessary to fully compensate the patent holder.

Note that the lost profits method applies to the profits lost by the patent holder, not the profits made by the infringer. The reasonable royalty would be applied to sales by the infringer, not profits made as a result of those sales. In the Apple-Samsung[61] case in San Francisco 2012, the jury awarded Apple more than $1bn in damages, but the judge was forced to reduce the damages by more than 40% and order a new trial because Judge Koh said that the jury failed to follow her instructions in calculating damages. In her opinion, Judge Koh writes[62]: *"In this case, it is apparent that the jury awarded 40% of Apple's expert Terry Musika's calculation of Samsung's profits.."* and goes on to say *"When a Court detects an error in the jury's damages verdict, the Court has two choices: the Court may order a new trial on damages, or the Court may reduce the award to a supportable amount."*

[60] Patents, Cloaks & Daggers. www.daggers.co.
[61] Apple Inc. v. Samsung Electronics Co. Ltd. et al. See: http://cand.uscourts.gov/lhk/applevsamsung.
[62] See Judge Koh's order of damages, 03/01/13.

The Apple-Samsung case dealt with utility patents where profits made by the infringer cannot be used to calculate damages there is an exception to this rule for design patents. Where the case involves design patents, the infringer can be disgorged of profits, forced by the court to pay the holder of the design patent all the profits made as a result of the infringement.

## Discounted Cash Flow and Income-Based Approaches Applied to Patent Valuation

Discounted cash flow models are used to determine the value of patents when the incomes can be estimated with at least a minimal degree of accuracy. The income streams derived from patents are the result of licensing where product manufacturers (and/or distributors) pay a royalty based on product sales. Product manufacturers, distributors and retailers don't particularly enjoy paying license royalties, and will generally not volunteer to agree to write checks to inventors unless they are forced to. So when forecasting income streams from patents, we look at the potential revenues from licensing and deduct the costs involved in collecting the royalties. When calculating the cost of collecting royalties, we have to assume the licensee refuses to pay a license fee until it is forced to pay by a court. We then have to calculate the costs of bringing the case to court and the timescales involved.

To estimate the income we might collect on a patent, we look at the number of infringed products sold to date, and the number forecast to sell on the market in the coming years. We then apply a royalty rate to determine what licensing revenue we should expect to collect. If, for example, one million products have been sold featuring the infringed patented invention, and the wholesale price of each product was $100, we then have a total revenue to the infringer of $100m. If we estimate that a reasonable royalty would be 2%, we can determine that we should be able to collect $2m in royalties. The income side of the calculation, in this example, would have $2m, but we need to calculate that this would not be collectable until the lawsuit was settled, which could take 3-4 years.

The cost of bringing a patent infringement suit is $2.5m on average[63], when more than $1m is at risk, and we need to insert this figure into the cost column in the spreadsheet.

When we have the income column, and the expense column, we need to look at the timescales involved and apply a discount rate reflecting the risk factors involved in bringing a patent suit. Almost half (46 percent[64]) of patents asserted in court have been found to be held invalid when litigated to a final decision (including appeal, trial, or summary judgment). Some risk can be mitigated by asserting multiple patents at the same time[65], but patent litigation is a risky business and patent buyers select discount rates to reflect the strong chance of losing the case. The discount rates applied by patent buyers to these licensing programs are upwards of 30%.

When we look at the $2m revenues we expect to collect in year 4 (following successful appeal), and discount this back to today's value using a 30% discount rate, the $2m becomes $910,000 in today's money.

Example 1—$100m Infringement:

- Total sales of infringed products—$100m.
- Reasonable royalty—2%.
- Royalty payable to patent holder—$2m (2% of $100m).
- Time required for court case to proceed to final judgment—3 years.
- Discount rate applied—30%.
- Net present value (today) of ($2m) royalties collected (in year 3)—$910,000.

With legal fees of $2.5m to offset against net revenues of $910,000, you don't need to be a math major to calculate this is not a profitable venture. Even if the case is won, large sums of money are lost in this example.

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[63] AIPLA, 2011 Report of the Economic Survey. See http://www.aipla.org/advocacy/executive/Documents/AIPLA%20Comments%20to%20IPEC%20on%20Joint%20Strategic%20Plan%20on%20IP%20Enforcement%20-%208.10.12.pdf

[64] Allison, John R. and Lemley, Mark A., Empirical Evidence on the Validity of Litigated Patents (July 1, 1998). American Intellectual Property Law Association (AIPLA) Quarterly Journal, Vol. 26, p. 185, 1998. Available at SSRN: http://ssrn.com/abstract=118149 or http://dx.doi.org/10.2139/ssrn.118149

[65] See Patents, Cloaks & Daggers. www.daggers.co.

When you run the numbers, you will find it's difficult to justify taking on a case unless there are at least $50m in royalties that can be won in damages. If this represents a reasonable royalty of 2%, you need to be able to prove the infringer has sold products to the tune of $2.5bn. With $2.5bn of infringed product on the market, and $50m potential royalties to be collected, the licensing program can be justified if the patents are strong and all the obvious risks have been eliminated.

Example 2—$2.5bn Infringement:

- Total sales of infringed products—$2.5bn.
- Reasonable royalty—2%.
- Royalty payable to patent holder—$50m (2% of $2.5bn).
- Time required for court case to proceed to final judgment—3 years.
- Discount rate applied—30%.
- Net present value (today) of ($50m) royalties collected (in year 3)—$22.7m.

When discounted, applying a 30% discount rate each year, the $50m award in year 3 is still worth more than $20m in today's value. Compare the $22.7m projected revenues with the typical legal costs of $2.5-$7.5m[66] and you can see that profits can be made. Potential royalties of the order of $50m can justify an investment in a patent licensing program, and many professionals in the intellectual property business are looking for opportunities of this scale. This partly explains why inventors operating in smaller markets struggle to generate any interest in their patents, as many buyers need at least $50m in potential damages to justify making a patent purchase.

When running these discounted cash flow valuations, please bear in mind that a patent buyer is looking to make a profit from licensing the patents, and is not merely looking to break even. If the net present value of the patents is calculated to be $10m today, the buyer can be expected to buy these patents at a price of, say $5m, in order to make a profit.

The income based approaches to patent valuation are useful, but only when the royalties to be collected can be assessed and the numbers are available to run the calculations.

[66] See Patents Cloaks & Daggers (www.daggers.co) for further explanation and citations.

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## Valuation Scenario: Patent with Ongoing Royalty Streams

As a patent can be licensed, it can generate royalty streams over a period of time and these streams of revenue are perfect for valuation using the discounted cash flow (DCF) method. The problem is that patent sellers usually don't sell the revenue streams with the patents. Patents are frequently sold subject to licenses, and the licensees frequently pay the royalties in one lump-sum—usually following a threat of litigation or a court judgment.

It would be unusual to find a patent that has been licensed to 100% of the potential licensees, with all the potential license revenue thereby captured. More commonly, additional licensees might be identified, and further revenue potential out there in the market. Capturing this additional revenue requires a licensing program, an army of lawyers and war chest of legal fees. Unfortunately, this rather complicates the discounted cash flow spreadsheet.

So although this scenario might be considered rather simple to value, finding a patent with 100% licensee revenue captured and a clear forecast of future revenue streams is highly unusual.

In the following example, let's assume our patents generate $500,000 per year in licensing royalties, and the patents have 10 years left before they expire, and the revenues dry up. Let's also assume the cost of collecting the license fees is $50,000 per year. This includes the accounting fees, invoicing, bank fees, etc.

As we are assuming license arrangement has been agreed, and the licensee is committed to paying $500,000 per year, we can set the discount rate to be relatively low. There is a chance that the licensee might go out of business so the discount rate is not, say 5%, but let's set it at 15% to reflect a moderate level of risk that the income could not be collected:

| **Net Present Value of Licensed Patents** | | | |
|---|---|---|---|
| Discount Rate | | 15.00% | Discount rate applied. |
| Cost of Licensing | $ | 50,000 | Annual cost of monitoring sales of licensed products, issuing invoices, collecting licensing revenues, etc. |

| Year | $ 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| License Revenue | $ 500,000 | $500,000 | $500,000 | $500,000 | $500,000 | $500,000 | $500,000 | $500,000 | $500,000 | $500,000 |
| Cost of Licensing | $ 50,000 | $ 50,000 | $ 50,000 | $ 50,000 | $ 50,000 | $ 50,000 | $ 50,000 | $ 50,000 | $ 50,000 | $ 50,000 |
| Annual Net Collections | $ 450,000 | $450,000 | $450,000 | $450,000 | $450,000 | $450,000 | $450,000 | $450,000 | $450,000 | $450,000 |
| Discounted Value Today | $ 391,304 | $340,265 | $295,882 | $257,289 | $223,730 | $194,547 | $169,172 | $147,106 | $127,918 | $111,233 |

As you can see, over ten years, the license fees to be collected total $5m (10 years at $500k per year), but when we apply the 15% discount rate and deduct the $50,000 cost of licensing, the new present value of these income streams is calculated at $2,719,975. However, a potential buyer might not be prepared to pay this figure, as the buyer is going to be looking for a profit. A fair price might be half this figure, $1,359,987.

| | | |
|---|---|---|
| Net Present Value (US$M) | $2,719,975 | Value of licensing revenues less cost of licensing discounted to today's value. |
| **Purchase Price of Patents** | **$1,359,987** | present value of licensing revenues, after licensing costs and after profit for buyer has been taken into consideration. |
| Profit to Buyer | $1,359,987 | The discounted net revenue to the buyer after acquisition cost of patents has been taken into consideration. |

In this example, you can see how a set of patents with license revenues of $5m over the next 5 years could have a market value of around $1.4m today.

## Valuation Scenario: Patent with Identified Potential Licensees

Where the licensing revenues for a particular patent can be estimated with some justification, we can use the discounted cash flow income based method of valuation. When calculating these net present values, it is important to factor in the cost of running a licensing program, and the fact that a buyer will be looking for a return on investment.

The cost of asserting the patents through a legal process must be assessed as part of this valuation, as potential licensees are often reluctant to pay license fees unless they face a credible threat of legal assertion of the patents if they do not agree to license.

The discount rate is applied to the reasonable royalties that might be awarded in court, is quite high, to reflect the high risk of loss of the suit and the high risk that

patents can be invalidated in the litigation process, via the discovery of prior art or other issues.

As an example, let's imagine we gather strong evidence that our patents are being infringed, and we estimate the number of infringed units sold on the market to date is 10 million. Let's assume the price per unit is $100. We therefore have $1bn of infringed products to target in our licensing program.

| **Patent Value Based on License Potential** | | |
|---|---|---|
| Discount Rate | 30.00% | Discount rate applied. |
| Reasonable Royalty | 2.00% | Royalty paid for patent in this industry and sector. |
| Product Price | $ 100.00 | Average Selling Price (Wholesale) For each Unit Sold. |
| | | |
| Infringed Units to Date | 10,000,000 | The number of infringed units to date. |
| Infringed Units Projected | - | The number of infringed units projected until patents expire. |
| Total Infringed Units | 10,000,000 | The number of infringed units in the lawsuit. |
| | | |
| Litigation Costs | $ 2,000,000 | Cost of bringing litigation. |
| Appeal Costs | $ 500,000 | Cost of taking the case through appeals process, and winning. |
| Total Legal Costs | $ 2,500,000 | Costs of bringing litigation, through trial and appeal. |

In our example, let's assume we calculate that a reasonable royalty for these patents would be 2%. We then have a potential recovery from our licensing program of $20m. This might take 3 years to come to trial, and another year for appeal. So, if all goes well (and we win the case), we might collect $20m from the infringer.

| | | | Trial in Yr 3 | Appeal Year 4 | | |
|---|---|---|---|---|---|---|
| Year | 1 | 2 | 3 | 4 | | |
| Infringed Revenue | | | | $ 1,000,000,000 | | |
| Reasonable Royalty Payable | | | | $ 20,000,000 | $ 20,000,000 | Amount Awarded by Court and Collected. |
| Legal Costs | $ 625,000 | $ 625,000 | $625,000 | $ 625,000 | $ 2,500,000 | Legal Costs through trial and appeal. |
| Profit Projected | | | | | $ 17,500,000 | Revenue collected from court awarded judgment, less the legal costs incurred. |

Against these $20m projected revenues, we have to deduct the legal fees, and we estimate these to be $2.5m, spread across the 4 year period of the case.

Now patent lawsuits are highly unpredictable, and roughly half of the patents litigated are invalidated by the court[67], so the discount rate we apply has to be significant in order to cater for this high level of risk. Let's apply a rate of 30%.

[67] See page 30, Patents, Cloaks and Daggers, available at www.daggers.co.

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The net present value of the $20m license royalty is $6,127,236 after the $2.5m legal fees have been deducted and a 30% discount rate applied over a period of 4 years.

| | | |
|---|---|---|
| Net Present Value (US$M) | $ 6,127,236 | This is what the patent buyer can expect to gain from the patent acquisition and assertion (without considering cost of acquiring patents). |
| Buyers Profit Margin | 50% | Profit margin the buyer requires on the assertion program. |
| **Purchase Price of Patents** | **$ 3,063,618** | Patent (portfolio) value to the buyer. |
| Buyers Profit | $ 3,063,618 | Net present value of profit to buyer after legal fees and cost of acquiring portfolio have been deducted. |

Again, a patent buyer is going to want to make a profit, so a licensing opportunity with a net present value of $6m might command a price of $3m from a patent buyer today. This example shows how patents representing $1bn of infringed products can be valued at around $3m.

## Valuing Patents Using a Comparables Approach

When it comes to comparing assets such as patents, the comparables approach has an inherent flaw based on the fact that each patent has to be unique—no two patents can be identical. Nevertheless, two patents can be very similar, and the comparables approach can be very useful in assessing the value of patents and other intangible assets.

As the patent trading market grows, and we gather more data on patent sale transactions, it's becoming increasingly possible to assess the value of a patent by making comparisons with similar patents recently sold. Comparables can provide us with a reasonable estimate of the price a ready, able and willing buyer might be prepared to pay to buy the patent today.

### Data Points from Patent Sale Transactions

In order to gather realistic valuation estimates based on comparing the valued patent with others that have recently sold, we must gather data points for the average prices paid for patents in the marketplace. This is not a simple task. As patents often form the basis of costly litigation, information on the prices paid in patent acquisition transactions is usually kept secret. It is customary for the patent purchase agreement to contain a confidentiality provision restricting disclosure of the price or any details

of the transaction. So finding information on the prices paid for patents in a transaction is something of the exception rather than the rule. However, some buyers and sellers are required to disclose information for shareholders, especially SEC reporting companies and companies in Chapter 7 liquidation.

| Year | Seller | Buyer | Field | Total Price | # of Patents | Type | Average Price Per Patent[68] |
|---|---|---|---|---|---|---|---|
| 2013 | IBM | Twitter | Internet & Media | $36,000,000[i] | 900 | All | $40,000 |
| 2013 | Alvarion | WiLAN | 4G/LTE | $19,000,000[ii] | 150 | All | $126,666 |
| 2012 | Kodak | IV, RPX, et al. | Digital Imaging | $525,000,000[iii] | 1,100 | All | $477,272 |
| 2012 | MIPS Technologies | AST | Semiconductor Cores | $350,000,000[iv] | 498 | All | $702,811 |
| 2012 | Digg | LinkedIn | Social Media | $4,000,000[v] | 15 | All | $266,667 |
| 2012 | Fujifilm | Universal Display Corporation | OLED | $105,000,000[vi] | 1,200 | All | $87,500 |
| 2012 | Precision Optics | Intuitive Surgical Operations, Inc | Medical | $2,500,000[vii] | 17 | All | $147,059 |
| 2012 | Elpida | Apple | DRAM | $51,000,000[viii] | 259 | All | $196,911 |
| 2012 | Interdigital | Intel | Mobile Telephony | $375,000,000[ix] | 1,700 | All | $220,588 |
| 2012 | Motorola Mobility | Google | Mobile Telephony | $5,500,000,000[x] | 17,500 | All | $323,529 |
| 2012 | Microsoft | Facebook | Internet | $550,000,000[xi] | 650 | All | $846,154 |
| 2013 | AOL | Microsoft | Internet | $1,100,000,000[xii] | 925 | All | $1,189,189 |
| 2012 | IBM | Ultratech | Semiconductor Packaging | $8,000,000[xiii] | 70 | U.S. | $114,286 |
| 2012 | Adaptix | Acacia | Mobile Telephony | $160,000,000[xiv] | 230 | All | $695,652 |
| 2012 | Real Networks | Intel | Video | $120,000,000[xv] | 190 | U.S. | $631,579 |
| 2012 | Unity Semicon. | Rambus | Flash Memory | $35,000,000[xvi] | 299 | U.S. | $117,056 |
| 2011 | ADC Telecomms | HTC | Mobile Telephony | $75,000,000[xvii] | 82 | U.S. | $914,634 |
| 2011 | Glenayre Electronics | Wi-LAN | Mobile Telephony | $8,000,000[xviii] | 60 | U.S. | $133,333 |
| 2011 | Undisclosed | Wi-LAN | Digital Video | $8,000,000[xix] | 1400 | All | $5,714 |
| 2011 | Nortel | Apple/Rockstar | Mobile Telephony | $4,500,000,000[xx] | 6,000 | All | $750,000 |
| 2010 | Novell | Microsoft/CPTN | Networking | $450,000,000[xxi] | 882 | All | $510,204 |
| 2010 | ICAP Auction Results | | | $84,316,395[xxii] | 704 | U.S. | $119,768 |
| 2009 | Avistar Comms. | Intellectual Ventures | Comms. | $11,000,000[xxiii] | 42 | U.S. | $261,905 |

[68] See end notes at the end of the book for citations where details of these transactions can be found.

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### Rockstar—Nortel, Apple et al

A consortium of buyers led by Apple outbid their rivals, including Google, to acquire a patent portfolio from the bankrupt Nortel in 2011. The portfolio comprised approximately 6,000 patent assets and the price paid by the consortium (subsequently named "Rockstar") was $4.5bn. This transaction was highly newsworthy, not only because of its sheer size, but for the price paid per patent. The price of $742,647 per patent[69] was much higher than expected, reflected the bidding war that had been taking place between Google and Apple and the patent wars that were raging in the smartphone sector.

This transaction came about under circumstances where Apple's CEO Steve Jobs declared "*I Will Spend My Last Dying Breath to Destroy Android*"[70] and Apple was rapidly becoming the most profitable and cash-rich corporation in the World, therefore had the financial resources available to outbid other challengers. So this Apple/Nortel transaction and the price-per-patent cannot be taken as being in any way representative of the average market value of patents in the smartphone sector, or any other industries. Most believe this transaction and price will be remembered as a high-water mark in the patent trading marketplace as the circumstances were so unique.

### Google/Motorola Mobility

Immediately after losing the bid to acquire the Nortel patents, Google responded by acquiring a large portfolio from Motorola Mobility. Google acquired 17,000 patents when it bought the Motorola Mobility company for $12.5bn in 2011. In a regulatory filing July 2012 when the acquisition transaction was completed, Google released calculations that $5.5 billion of the $12.4 billion price tag was attributable to "patents and developed technology". $2.9 billion of the purchase price for Motorola was attributable to cash acquired, $2.6 billion was related to goodwill, $730 million for customer relationships and $670 million for "other net assets acquired." This places a price-per-patent of $323,529 for each patent purchased.

The Google/Motorola and Apple/Nortel transactions represent some of the highest prices that can be expected for patent sales, as they involve some of the largest, most wealthy and litigious corporations competing to control the huge and growing

[69] http://www.thestreet.com/story/11222039/1/google-apple-inflate-patent-bubble.html
[70] Book: Steve Jobs by Walter Isaacson, published by Simon & Schuster, ISBN-13: 978-1451648539

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smartphone market. These price levels are restricted to huge portfolios involving thousands of patents and highly competitive sectors.

### Intellectual Ventures

Intellectual Ventures is one of the most active patent buyers in the sector, and the prices paid by Intellectual Ventures reflect the price levels that high-tech patents usually bring on the open market. Forbes reported that Intellectual Ventures "*raised $2.9 billion in two separate funds to invest in patents and inventions.. buying 35,000 intellectual property assets*"[71] If all these funds raised were spent to acquire the patents, this would provide us with an average price per patent of $82,857. However, we have to assume that some of the funds have been spent on operations and somewhat less than the full $2.9bn was invested in patents and Intellectual Ventures and the $82,857 average price is actually the upper maximum based on this information. If you estimate that half the $2.9bn total fund was used to buy the 35,000 patents, based on these figures you then calculate the average price paid by Intellectual Ventures is around $41,428 per patent.

[71] http://www.forbes.com/sites/nathanvardi/2012/06/19/nathan-myhrvolds-patent-investing-returns-are-still-lousy/

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## ICAP Patent Auctions

ICAP is a securities broker operating a series of live patent auctions where pre-qualified buyers attend the auction in person, or via telephone and bid on patents consigned to the auction. Reflecting the fact that very few of the patents in the marketplace are of litigation quality, therefore attract interested buyers, a relatively small percentage of the lots consigned to the auction actually sell. The chart below shows that the average price per patent sold at the ICAP auctions varies between $51,000 and $195,000 each and the percentage of lots sold varies from a high of 62% to a low of only 7%.

| ICAP Ocean Tomo Auction Summary, 2010 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | # of Lots | # of Lots sold | # of Patents sold | % of Lots sold | Total $ Value | Average $ per Patent |
| 1 | Apr-06 | San Fran | 40 | 16 | 25 | 40% | $ 2,659,000 | $ 106,360 |
| 2 | Oct-06 | New York | 54 | 19 | 35 | 35% | $ 4,890,000 | $ 139,714 |
| 3 | Apr-07 | Chicago | 70 | 33 | 84 | 47% | $ 7,775,000 | $ 92,560 |
| 4 | Jun-07 | London | 48 | 14 | 39 | 29% | $ 7,319,535 | $ 187,680 |
| 5 | Oct-07 | Chicago | 77 | 37 | 62 | 48% | $ 10,045,000 | $ 162,016 |
| 6 | Apr-08 | San Fran | 85 | 53 | 155 | 62% | $ 17,845,000 | $ 115,129 |
| 7 | Jun-08 | Amsterdam | 64 | 29 | 59 | 45% | $ 11,521,860 | $ 195,286 |
| 8 | Oct-08 | Chicago | 116 | 48 | 78 | 41% | $ 11,675,000 | $ 149,679 |
| 9 | Mar-09 | San Fran | 85 | 6 | 23 | 7% | $ 2,785,000 | $ 121,087 |
| 10 | Mar-10 | San Fran | 46 | 19 | 111 | 41% | $ 13,000,000 | $ 117,117 |
| 11 | Nov-10 | Napa | 141 | 16 | 95 | 11% | $ 4,845,000 | $ 51,000 |

*Source: IAM Magazine*[72].

Taking all the patents sold in these events the average price-per-patent for the above ICAP auctions is just under $120,000.

## RPX Corporation

RPX is a defensive patent aggregator that often acquires patents as a method of settling infringement lawsuits involving RPX members. On its website RPX states: *"As of June 30, 2012, RPX has reviewed approximately 4,000 portfolios, and we review approximately 90 portfolios – both open market and in assertion/litigation – per month for potential acquisition, independently evaluating them for quality, assertion history, seller reputation, and whether the portfolio may be relevant to any or all RPX members.*

*Through June 30, 2012, RPX has completed 105 patent-related acquisitions. In 35 of those acquisitions, we acquired rights to patents being actively litigated. As a*

[72] http://www.iam-magazine.com/blog/articles/ICAP_Ocean_Tomo_Summary.pdf

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*result, approximately 90 of our clients have been dismissed from over 250 litigations in the course of their RPX membership, for some, multiple times.*

*As of June 30, 2012, we have deployed more than $490 million to acquire and/or sublicense rights to approximately 2,900 patent assets, providing broad protection against patent assertions in technology sectors including consumer electronics and personal computing; e-commerce and software; media content and distribution; mobile communications and handsets; networking; and semiconductors."*[73]

According to these disclosures, the average price paid by RPX is $168,965 per patent. However, it is important to consider that the assets acquired by RPX are often patents in litigation at the time of acquisition, so RPX is buying high-quality assets to settle expensive disputes and we can expect them to pay higher-than-average prices.

## Cost-Based Approaches to Patent Valuation

Patents are all unique, and by definition have to be substantially different from each other, so the notions of identical replication or replacement do not make much sense when applied to patents. A patent can never be replicated or replaced with an identical copy. Similar patents can be compared, in order to assess a relative value, so in this sense the replacement cost approach to patent valuation is very similar to the comparables approach.

The cost of building the patent can be used as a basis for valuation, but when we investigate this methodology for patents, we need to investigate which types of costs can realistically be used.

## The Cost of Building a Patent

If we apply the cost-based approach to the value of a patent, we look at the cost of creating the patent, including the fees payable to the patent office and the legal fees involved in drafting and preparing the patent application.

Would we consider the cost of building the patented invention? As a patent is an exclusive right, the cost of building the invention is not something that has a bearing on the cost of the patent. As an example, let's consider a patented invention for a simple, wooden mouse trap. The patent might cost the inventor, say $20,000 in

[73] http://www.rpxcorp.com/index.cfm?pageid=21

legal fees and administration fees, but the mouse trap might cost a mere $1.00 to build. Do we assess the value of the patent at $20,000 or $1, or perhaps $20,001? I would argue that the cost-based method of valuing a patent would set the value at $20,000 and the cost of building the mouse trap is irrelevant under the cost-based approach to valuation.

As another example, consider a patented invention for a power plant. The patent might again cost $20,000 in legal and prosecution fees, but the power plant might cost $1,000,000,000 to build. There's certainly a higher cost associated with the power plant than there is for a mouse trap but how would we value the patent for the power plant design under the cost-based approach? The valuation under the cost method would be set at $20,000, the same as the mouse trap patent. The huge dollar digits associated with the power plant would factor in, and justify a much higher value under the income-based approach as a reasonable royalty collected on billion dollar power plants might be substantially higher than those that could be collected on the sale of mouse traps (assuming the country was not suddenly infested with billions of rodents). Under the income approach, as the income associated with a power plant is so large, the value of the power plant patent could be much higher than that of a mouse-trap patent. However, under the cost approach, the value of the mouse trap and power plant patents would be relatively similar.

If the cost of building the invention were a driver of the value of the patent, we would have some strange phenomena to deal with. If a patent for the mouse trap were valued at $1 (the cost of building a mouse trap), and a continuation (child patent) were filed that covered essentially the same invention but requiring the wooden components of the mouse trap be replaced with solid gold, the value of the golden mouse trap patent would be significantly higher than the value of the wooden mouse trap patent. It's difficult to see how this would make sense. Under the income approach, the size of the market would be considered, and the market for cheap wooden mouse traps would be much larger than the market for expensive mouse traps made out of gold, so the wooden trap patent would be of higher value than its gold counterpart. The patent provides a right to extract royalties from infringers, and block them from practicing the invention in future. A patent is not a right to build or manufacture a product, and has little or no association with the cost of building the patented invention, so the product build costs are not relevant to the value of the patent.

It can, however, be argued that the time spent inventing and perfecting the invention should be factored in to the cost-based approach. Experimenting to produce a workable invention could be considered a cost directly attributable to the patent, so could be factored into the value of a patent under a cost-based approach.

### Valuation Scenario: Patent with Unknown Licensing Potential

Where the potential licensees have not been identified, and the licensing potential is unknown, the potential revenue streams from licensing cannot be used to form the basis of valuation but we can compare the patent to similar patents that have sold on the marketplace in order to estimate a market price. As every patent has to be unique in order to be granted, there are no two identical patents, and finding a perfectly comparable patent is never possible, but it is often possible to find patents in similar fields with similar priority dates, that have recently sold on the marketplace and estimate value using a comparables approach.

## Black-Scholes Options-Approach to Patent Valuation

A patent is an option to bring a lawsuit against an infringer. As an option, a valuation technique developed by mathematicians Fischer Black and Myron Scholes[74] now known as the "Black–Scholes model", can theoretically be applied to patents. The Black–Scholes model is often used to value options to buy publicly traded shares, but the patent market is so thinly traded, so different from the stock market, and so peculiar that applying Black-Scholes makes little sense.

When dealing with share options, the value of the option under the Black–Scholes model is driven by the price and speculation as to the future value of the underlying shares. The share option can be exercised at a profit when the share price reaches a certain price. When dealing with relatively new patents, however, there's speculation as to whether the patent will ever be infringed, then further speculation as to whether infringement will reach a sufficient level to justify a licensing effort, then speculation as to whether the licensing effort will be fruitful[75]. The calculations are further rendered futile by the facts that such a small minority of patents are

[74] Fischer Black's and Myron Scholes' 1973 paper: "The Pricing of Options and Corporate Liabilities", published in the Journal of Political Economy.
[75] See Discounted Cash Flow and Income-Based Approaches Applied to Patent Valuation, page 45.

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infringed, around only 1% of patents are litigated[76], and a similarly small percentage of patents are sellable at any price.

It may be possible to use Black–Scholes to shed some insight into the potential value of a patent licensing program where the infringers are identified, the volume sales of infringing products are known and the royalty rates can be estimated with some accuracy. Otherwise, it's too speculative to use Black–Scholes to estimate the value of a patent with a degree of credibility.

## Valuation of Patents Covering High-Tech and Other Densely Patent-Populated Products

Where complex modern products contain thousands of patented inventions, and patents are accumulated by buyers in large portfolios, a vibrant patent trading marketplace often develops, especially when driven by patent wars and high-levels of litigation. Where a patented invention must be combined with thousands of other patented inventions, in order to produce a complete product, it's sometimes difficult to determine what income can be attributed to a single patent. As one patent could be significantly more important and broader in scope than another, it's not reasonable to divide the total revenue of a product by the total number of patents incorporated in the product in order to assess the value contributed by any one of the patents. The concept of an "average" value has severe limitations. It would not be out of the question for one patent, out of a thousand patents making up the product, to be so significant to the product design to be worth more than all the others combined. As a result, income-based approaches to the valuation of patents covering densely patent-populated products are problematic. It might be possible to value a large portfolio using an income-based technique, but valuing a specific patent would require an assessment of the scope and significance of that patent, when related to the others in the portfolio.

Comparable approaches to patent valuation can be most compelling in the high-tech sector and other sectors involving complex, multi-patent products. Where a large

[76] See Patents, Cloaks & Daggers for explanation, and citations (www.daggers.co).

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number of similar patents have been traded and the traded prices are gathered, a valuation for a specific patent can be estimated with some accuracy by comparing it with the other patents that have recently been sold.

## Valuation of Patents Covering Medical and Other Sparsely Patent-Populated Products

Where income-based valuations are inappropriate for patents covering densely patent-populated products, the opposite is true in certain medical sectors and other areas where products are comprised of one, or a relatively small number of patented inventions. On the other hand, comparable techniques do not make much sense in this type of product, as patents are not usually traded in high volumes, and it is more difficult to find large numbers of recently-sold patents to compare with. So the valuation of patents covering certain medical and other sparsely patent-populated products often involves an analysis of the incomes that might be generated by products practicing the patented inventions. A direct relationship between the value of the patent, and the sales of the shipping product can be more readily determined when the product contains a small number of patented inventions and the net present value of projected income streams can produce a fair market valuation.

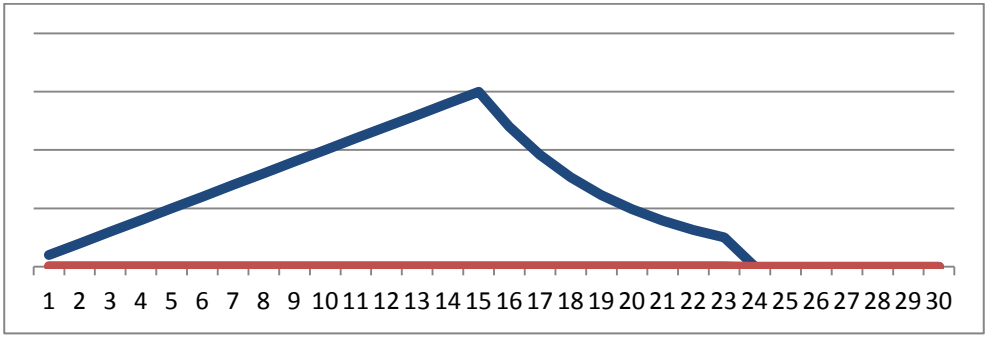
## Patents Grow More—and Less—Valuable With Age

As the value of a patent is driven by the extent of infringement of the claims in the marketplace, when patents grow older, and more infringing products are sold over time, the value of the patent increases. The ideal scenario for the inventor is as follows:

1. The inventor imagines the invention and files the patent application before anyone else.
2. The patent examiners find no prior art that would prevent the patent office allowing the patent, and the patent is granted.
3. Large product manufacturers adopt the invention, and start building it into their products shortly after the patent application was filed.

4. Billions of dollars of infringing products are sold in the marketplace, and continue to be sold for many years.
5. The value of the patent increases as each additional infringing product is sold, on the basis that the patent represents a right to earn a royalty on each sale.

In this ideal scenario, the value of the patent increases as it ages. Then, however, when the patent expires, 20 years from filing date, the invention becomes public domain, anyone is free to implement the invention royalty-free and the patent's value drops to zero. With growth in adoption of the invention, the value of the patent increases over time, then it drops to nothing upon expiration. In reality, the value of the patent doesn't always drop off so quickly. As it comes up to the 20 year expiration date, the patent's value starts to fall as the window of opportunity to assert the patent in court starts to close.




In this chart, the top (blue) line shows, over a period of 30 years, how the value of the patent increases, then declines in the ideal scenario above.

Unfortunately, for most inventors, the ideal scenario fails to transpire and the story plays out as follows:

1. The inventor imagines the invention and files the patent application before anyone else.
2. The patent examiners find no prior art that would prevent the patent office allowing the patent, and the patent is granted.
3. No-one sees the invention as commercially viable, it is never productized, and no infringement ever develops.

4. The patent never warrants any real value whatsoever (see red line in the chart above).

You may be wondering why the blue line above, showing the value of an infringed patent, remains above zero after the patent expires on its 20th anniversary. Well, it's possible for a patent holder to bring an action for past infringement with an expired patent, so long as the infringement took place while the patent was still in force. Expired patents can be used to extract royalties for past infringement, but patent holder can't wait too long as the courts will often dismiss a case on the grounds of laches. The case will be dismissed when the patent holder slept on its rights and failed to bring the case within a reasonable length of time.

Anyway, as the chart shows, patents never practiced (inventions never adopted in products) fail to achieve any value, and patents that are practiced and infringed grow more valuable, then less valuable with age.

## Driving Demand & Increasing the Price When Selling Patents

If a patent seller is able to engage multiple competing buyers, the price of the patent can increase considerably. I recently covered a case where the asking price for a small family of patents was $1m, the opening bid from one buyer was $300,000, but as multiple bidders wanted the patent, the winning bid was more than $3m. This goes to show how the price can be driven upwards significantly by running an effective sales process and engaging multiple buyers. A patent broker can certainly earn his/her commission when it comes to patents, and is often able to increase the price to cover much more than the brokering commissions.

Unlike the sale of companies, company shares or other securities, the sale of patents is not regulated in the U.S., or any other country, so we don't have the same regulatory concerns as we discussed in relation to selling companies or raising venture capital. There are some other concerns though that a patent seller should consider. The sales materials that are most interesting to patent buyers are claims charts showing evidence that the patent is being infringed, ideally by large corporations with deep pockets. The problem is that these claims charts can form

the basis of a lawsuit, and the accused infringer has a right to bring a lawsuit asking the court for a declaratory judgment that the company is not infringing[77]. Not only do they have a right to bring a lawsuit against the patent holder, but these large corporations have a motive to do so. The company filing the suit is able to select the state and jurisdiction where the case will be heard, and this can be very important in a patent case. The patent holder is not able to ignore the suit, and is forced to respond with a claim of patent infringement, or otherwise lose the right forever.

Clearly, the distribution of claims charts and sales materials regarding the patent can trigger an expensive lawsuit, and needs to be done very carefully. Patents are weapons of litigation, and marketing patents involves navigating through a legal minefield. Patents cannot be promoted like other assets. As a patent broker, I have to prepare claims charts, distribute claims charts, solicit multiple bids and help my clients maximize the price they achieve without stepping on any landmines.

## Patents Bundled with Startups, Product Lines, Software Code & Other Assets

Value of Assets Bundled with Patents
=
Value of Assets
+
Value of Patents

The value of an established business trading on the public stock markets, as set by the share price, takes into consideration the value of the patents and all other assets. We learned earlier[78] that the market price reflects all the publicly available information regarding that company, and patents are disclosed to the public by the USPTO, and other state patent offices. In reality, Wall Street investors are just waking up to patents and their potential impact on enterprise value and they are not always accurate in their assessment of the value of a company's patent portfolio. However, we can assume that the valuations of established businesses, especially the large businesses with shares traded on the public markets, includes the value of the company's patents.

[77] For more information on declaratory judgments, see my book Patents, Cloaks & Daggers. www.daggers.co.
[78] This is true under the weak version of the Efficient Capital Market Hypothesis as well as the strong versions. See Efficient Capital Market Hypothesis, page 30.

Patents are often sold bundled with startups, product lines, software code and other assets and when we are dealing with these scenarios, we have to look carefully at the patent portfolio to assess value. In some cases, the patents are worth much more than all the other assets combined. When you understand the true nature of patents, you will find that valuing these bundled assets is quite straightforward. The patents and the other assets are valued separately, and then added together. The logic for this approach derives from the fact that the value of the patents is estimated by looking outside the Company, whereas the value of the business and its product lines are estimated by looking inside the Company (or at least inside the Company's financials).

Patent rights are similar in most countries and the rights created by the U.S. Constitution are representative of the nature of patents. *"Congress shall have power...To promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries; "*[79] It's the word "exclusive" that defines the legal right associated with a patent as it enables a patent holder to bring an action in court to exclude infringers from practicing the patented invention without a license. Looking at the value of a patent, we therefore look outside the Company, at potential infringers—the people we are going to "exclude". The value of the patent is disconnected from the value of the business that owns the patent, or from the software code or technology assets, as the patent merely provides a right to restrict or license competitors.

When a product line being sold [80] is subject to patented inventions, the buyer is unable to reverse engineer the products without infringing the patents. This means the buyer is liable to pay a license royalty to the patent holder, and the patent holder may be able to force the buyer to cease making and selling the products through a court injunction. The "build cost" valuation applied to a product line sale can arguably be invalidated as a result of patent protection. If the buyer is excluded by (patent) law from building the technology in-house, the seller can argue that build-cost is not relevant to valuation and other valuation techniques should be adopted.

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[79] Article One, Section 8(8) of the U.S. Constitution

[80] We are assuming that patent sales are structured with a license back to the patent-selling company that allows for the patent-selling company to continue selling products practicing the inventions without incurring any royalties or license fees. This is how the vast majority of patent sale transactions are structured—as companies will avoid selling patents in an arrangement where the buyer can turn around and sue the seller for infringement of the patents sold.

When you view a patent as a right to extract royalties from competitors (a right to exclude), you can see that this right can be separated from the Company's ability to sell its own products. As startup companies, product lines, software code and patents are somewhat distinct, and each can be valued individually, the aggregate value can be determined by estimating the value of each one, then adding them together.

# Trademarks

A trademark[81] is essentially a brand name and some brands can be worth billions of dollars. A trademark or service mark includes any word, name, symbol, device, or any combination, used or intended to be used to identify and distinguish the goods/services of one seller or provider from those of others, and to indicate the source of the goods/services. The scope of the trademark is generally restricted to the classes in which the trademark was filed. Internet domain names are now associated with trademarks as the holder of the trademark has rights[82] to confusingly similar domain names.

The highest valued global brand in 2012 was determined by Interbrand to be Coca-Cola[83]. Interbrand analyzes the many ways a brand touches and benefits an organization, from driving bottom-line business results to delivering on customer expectations, and determines a value. The methodology examines the financial performance of the branded product or service, the role the brand plays in influencing consumer choice, and the strength the brand has to command a premium price, or secure earnings for the Company.

[81] The term "trademark" is intended to include both trademarks and service marks. The main federal statute is the Lanham Act, which was enacted in 1946 and most recently amended in 1996. 15 U.S.C. 1051, et seq. Unlike patents which were assigned to federal law by the U.S. Constitution, trademarks can also be litigated in state courts.
[82] See UDRP (Uniform Domain Name Dispute Resolution Policy) and the ACPA (Anti-cybersquatting Consumer Protection Act).
[83] http://www.interbrand.com/Libraries/Press_Release/BGB_Press_Release_FINAL.sflb.ashx

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**Interbrand's 2012 Best Global Brands**

| 2012 RANK | 2011 RANK | BRAND | SECTOR | 2012 BRAND VALUE $m | % CHANGE (Brand Value) |
|---|---|---|---|---|---|
| 1 | 1 | Coca-Cola | Beverages | 77,839 | 8% |
| 2 | 8 | Apple | Technology | 76,568 | 129% |
| 3 | 2 | IBM | Business Services | 75,532 | 8% |
| 4 | 4 | Google | Technology | 69,726 | 26% |
| 5 | 3 | Microsoft | Technology | 57,853 | -2% |
| 6 | 5 | GE | Diversified | 43,682 | 2% |
| 7 | 6 | McDonald's | Restaurants | 40,062 | 13% |
| 8 | 7 | Intel | Technology | 39,385 | 12% |
| 9 | 17 | Samsung | Technology | 32,893 | 40% |
| 10 | 11 | Toyota | Automotive | 30,280 | 9% |
| 11 | 12 | Mercedes-Benz | Automotive | 30,097 | 10% |
| 12 | 15 | BMW | Automotive | 29,052 | 18% |
| 13 | 9 | Disney | Media | 27,438 | -5% |
| 14 | 13 | Cisco | Business Services | 27,197 | 7% |
| 15 | 10 | HP | Technology | 26,087 | -8% |
| 16 | 16 | Gillette | FMCG | 24,898 | 4% |
| 17 | 18 | Louis Vuitton | Luxury | 23,577 | 2% |
| 18 | 20 | Oracle | Business Services | 22,126 | 28% |
| 19 | 14 | Nokia | Electronics | 21,009 | -16% |
| 20 | 26 | Amazon | Internet Services | 18,625 | 46% |

*Source: Interbrand press release October 2, 2012.*

The value of these trademarks is driven by the value of goods and services sold under the trademark, and the impact the brand has on the purchase decisions of the buyer. As a generic cola drink will not sell in such high volume, and such high margins as the same drink branded "Coca Cola", and Coca Cola sales are measured in hundreds of billions of dollars, the Coca Cola brand is highly valuable. As I was once responsible for the Apple brand, working in Apple's European head office, I can attest that the Apple brand is carefully managed, highly influential and has something of a cult following, especially in Europe. Before Apple, IBM was the dominant player in the computer industry for many years and there's a well-known saying in the computer industry that "no-one was ever fired for buying IBM", and a complex, mission-critical computer systems carrying the IBM brand is much more sellable than an identical computer with a lesser known brand.

Trademark valuation involves calculating the proportion of the sales revenues sold under a particular mark that can be attributed to that brand. Trademarks like "Coca Cola" can be so significant to the value of a company, that a proportion of the value of the whole company can be attributed to the brand.

## Registered and Common Law Trademarks

Rights to a trademark can be established by being the first to register the mark with the U.S. Patent and Trademark Office ("USPTO") or by being the first to use the mark in commerce. Unlike patents, trademarks can be established without being registered. After the brand has been associated with a product (or service) in the mind of a customer, a trademark has been established. The mark can be registered at the USPTO, and there are some compelling reasons for filing the mark with the state, but registration is not necessary.

## Court Awarded Damages & Remedies in Trademark Cases

When a court finds that a trademark has been infringed (by finding consumers would likely be confused as to the source of goods being marketed under the trademark) the court has a range of potential remedies at its disposal. The court can issue an injunction[84] preventing further infringement in future, and can compensate the trademark holder for damages[85] suffered as a result of the infringement. The profits made by the infringer can be disgorged from the infringer and the court can order them to be paid to the trademark holder. On a finding of bad faith, the damages can be trebled—as is the case with patent law.

Infringement is not necessary to bring a case involving trademarks, as dilution of famous marks through blurring or tarnishing of the mark can form the basis for a lawsuit. Confusion among consumers is not necessary to bring a case for dilution but damages are only available where the dilution and trading on the goodwill of the mark was willful. The usual remedy for a dilution case is an injunction barring future use of the mark[86].

[84] 15 U.S.C. 1116(a).
[85] 15 U.S.C. 1117(a).
[86] 15 U.S.C. 1125(c).

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## Valuing Trademarks Using a Comparables Approach

Under the comparables approach, a value for a trademark can be assessed by comparing the mark with other marks of similar uniqueness, generating sales of similar products, and similar popularity in similar markets. Famous brands, representing products selling in high volumes, are highly marketable and public companies often disclose details of trademark sale and licensing transactions. For example, in 2010 Philips licensed its "Philips" brand for use in association with the sale of TV's to TPV Technology JV in China for 2.2-3% of (sales) turnover[87]. In 2007, Virgin licensed the rights to the Virgin Mobile brand associated with mobile phones for use in the USA market for 0.25% of gross revenues with a $4m cap[88]. In 2003, Coca Cola licensed the brand to Panamerican for the Mexican marketplace at a royalty rate calculated at 2% of the net selling price[89].

"Philips", "Virgin" and "Coca Cola" are clearly famous brands driving billions of dollars in sales, but for little known or unknown trademarks, finding buyers and relevant comparables is something of a challenge. Trademarks can be listed on eBay[90] or specialist exchanges such as U.S. Trademark Exchange[91], or IPAuctions[92]. Browsing these exchanges, you will see little known and unknown marks offered at a range of prices ranging from hundreds to millions of dollars. It's important to recognize that the actual selling price is the relevant price when it comes to comparables valuation and the asking price is irrelevant. Trademark holders can post their marks for sale at totally unrealistic prices, and often do. The number of marks that actually sell on these venues is very small. On eBay and several of the other sites, you're often able to see the number of bids on listings, the prices offered and the prices paid when a listing is sold. Monitoring these listings, it's apparent that there are no offers at all on the vast majority of trademarks offered for sale. When offers are made, the offers are usually in the range of several hundred dollars, and it is rare to ever find a trademark that has been sold. The market for unknown trademarks is very thin, and similar to that of Internet domain names.

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[87] http://www.tpvholdings.com/attachment/20110418183201001190643_en.pdf
[88] Virgin Mobile SEC filing. USA DEF 14A 2009.
[89] http://www.sec.gov/Archives/edgar/data/911360/000095015703000339/ex10-4.txt
[90] http://www.ebay.com/sch/i.html?_sacat=0&_nkw=Trademark+For+Sale&_frs=1
[91] http://www.ustrademarkexchange.com/
[92] http://www.ipauctions.com/

## Replacement Cost-Based Trademark Valuation

The costs associated with establishing the trademark can be used as a basis for the mark's value by investigating the cost of replicating or replacing the mark. The replacement cost comprises the cost of obtaining rights to the trademark plus the cost of establishing awareness and recognition of the mark. In the U.S., the filing fee for a single trademark in a single class may be $325 or $375 (*See trademark filing fees published by the United States Patent & Trademark Office*[93]). Hiring a lawyer to run a search before filing a trademark will cost between $500-$2,000[94]. The legal fees associated with Trademark filing application are between $1,000 to $2,000[95] and the cost of prosecuting the mark, interacting with the USPTO examiners, is estimated to be $1,000-$3,000[96]. Hence, assuming there are no significant problems such as disputes with others claiming the same mark, hiring a lawyer to file a trademark will cost in the region of $2,500-$7,000.

There's no reason why the cost of registering the mark cannot be used for common law trademarks as well as registered marks. A trademark can be established either by use in the marketplace ("common law") or by registration, and a common law mark can be equally valid and valuable as a registered mark, so the cost of registration can be used to assess the replacement cost for a common law trademark.

Compared to the registration costs, establishing a brand, known and respected in the marketplace can be a much more costly exercise involving hundreds of millions of dollars in advertising, years of quality customer service and large volumes of product sales. Loyal customers are costly to generate, and they are hugely important in building a valuable brand. Brands are very important in large industries, and in sectors involving complex products where customers are exposed to danger or cost if the product fails. Investment in advertising and promotion can be factored in to the value of the resulting trademark.

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[93] http://www.uspto.gov/web/offices/ac/qs/ope/fee100512.htm

[94] See http://www.danielsonlegal.com/blog/2010/05/28/how-much-does-a-trademark-cost/. "A thorough search.. is likely.. to cost between $1,000 and $2,000".

[95] See http://www.danielsonlegal.com/blog/2010/05/28/how-much-does-a-trademark-cost/. "you should expect to pay somewhere between $1,000 and $2,000, inclusive of the official government fee and the requisite time of an attorney to prepare an file the application."

[96] http://www.danielsonlegal.com/blog/2010/05/28/how-much-does-a-trademark-cost/

If we estimate the cost of obtaining the mark to be, say $5,000, and the cost of establishing awareness of the mark was $100,000, we can determine that the cost of replacing the mark would be $105,000.

## Cost Savings-Based Trademark Valuation

By owning a trademark outright, a company is saving costs associated with paying license fees for a mark and these cost-savings can be used as the basis of a mark's valuation. Trademarks are often licensed, or "rented", for association with products or services and the cost savings we might enjoy when owning the mark, as opposed to licensing it from another trademark owner, can be estimated to determine a dollar value for the mark.

Again, this process involves looking for comparables. If we see a similar mark with a similar brand awareness available for licensing at a royalty of, say, 5% of the sale price of the product, we can use this 5% figure as the basis of the valuation of our mark. If we own a similar mark outright, we are avoiding the necessity of paying the 5% royalty fee for licensing an alternative. If our sales of trademarked products are $10m each year, applying the 5% royalty, we can say that we are saving $500,000 per year and this cost saving can be discounted back to net present value today in order to determine a value for the mark.

It's useful to note that licensed marks are usually very well known (like "Virgin" or "Philips") and finding comparable marks for lesser-known brands can be something of a challenge.

## Valuing Trademarks Using an Income-Based Approach

Once a trademark has become known and respected, it is possible to license the trademark in exchange for a royalty on sales generated from the sale of goods carrying the trademark. The royalty rates can range from a small fraction of a percentage to 5% or higher[97] and depend on many factors including the nature of the industry and the awareness and popularity of the trademark. Valuation of a trademark licensed in this way can be achieved by estimating the future royalties that will be generated from the trademark, and then applying a discount rate to discount the revenue stream back to the net present value today.

[97] For example, the "Everlast" logo was licensed to USA Classic, Inc. at a royalty rate of 6% of sales.

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Brands help sell many products, and a percentage of the sale price of the product can be attributed to the brand. When Philips sold its TV business to JVC, the "Philips" brand was well known and respected in the area of consumer electronics and attracted many customers to the TV products carrying the Philips mark. The value of the mark was deemed to be 2.2% of the revenue generated from the TV sales, rising to 3% on certain performance criteria[98]. By projecting the sales forecast for Philips' TV sales, it is possible to estimate the cash flows generated by the "Philips" TV brand, and we could then discount these cash flows back to the net present value today.

[98] http://www.tpvholdings.com/attachment/20110418183201001190643_en.pdf

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# Internet Domain Names

An Internet domain has become an important part of the intellectual property portfolio of companies in many sectors, not only high-tech startup ventures. Internet domain names are separate legal rights from trademarks, but are somewhat connected in that a holder of a trademark has certain rights to eject cybersquatters from registering a domain that is identical or confusingly similar to the trademark, without any rights or legitimate interests in the trademark, when the domain registration was done in bad faith[99].

The U.S. .COM domain is the most popular, and valuable, but other domains such as .TV, .ME and .CO have grown in popularity in recent years. As more extensions become available in future, the focus on .COM domains might decline, but .COM still reigns supreme when it comes to Internet domains.

## Valuing Internet Domain Names Using a Cost-Based Approach

If a domain has never been registered before, or has been abandoned, it can be registered via a number of domain registrars. The cost of filing and operating a new .com domain is in the region of $10-$20 per year[100]. This registration cost can be used to estimate the value of many Internet domains. Unless the domain represents a known trademark, has very few characters, it comprises of a memorable word, it has significant ongoing website visitor traffic, or it generates advertising revenues, the domain is most likely not of interest to potential buyers and has very little or no value. Public online domain name auctions, such as the one operated by domain registrar Godaddy[101] show that the vast majority of domains are valued at less than $20 and prove to be unsellable. A random sample of 500 domains for sale at the Godaddy auction[102] showed that all 500 had a "Buy Now" price less than $20, that all 500 domain auctions were closing within 24 hours without any bids whatsoever.

[99] See the Uniform Domain-Name Dispute-Resolution Policy (UDRP); and the Anticybersquatting Consumer Protection Act (ACPA).
[100] For example, see one of the largest US domain name companies http://www.godaddy.com/.
[101] https://auctions.godaddy.com/
[102] https://auctions.godaddy.com/ on October 20th 2012.

## Valuing Internet Domain Names Using a Comparables Approach

The vast majority of domain names are worth no more than a few dollars, but some do sell for relatively high prices. This is a list[103] of the most valuable domain names ever sold:

1. Insure.com $16 million in 2009.
2. Sex.com for $14 million in October 2010.
3. Fund.com 2008 £9.99 million.
4. Porn.com 2007 $9.5 million.
5. Fb.com by Facebook for $8.5 million in November 2010.
6. Business.com for $7.5 million in December 1999.
7. Diamond.com 2006 $7.5 million.
8. Beer.com 2004 $7 million.
9. Israel.com 2008 $5.88 million.
10. Casino.com 2003 $5.5 million.
11. Slots.com 2010 for $5.5 million
12. Toys.com: Toys 'R' Us by auction for $5.1 million in 2009.
13. Asseenontv.com 2000 for $5.1 million.
14. iCloud.com by Apple for $4.5 million in April 2011.
15. GiftCard.com by CardLab for $4 million in October 2012.
16. AltaVista.com for $3.3 million in August 1998.
17. Candy.com for $3.0 million in June 2009.
18. Loans.com by Bank of America for $3.0 million in February 2000.
19. Gambling.com for $2.5 million in 2011.
20. Tom.com for $2.5 million in 1999.

[103] http://en.wikipedia.org/wiki/List_of_most_expensive_domain_names

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Domain name holders might get giddy looking at these numbers but in reality, the vast majority of domain names placed on the market receive no bids and they have no value beyond the cost of maintaining the domain: $10-$20 each. The Sedo Domain Market Study [104] reports that when domain names are actually sold, "*The average sales price is about $2,000, but the median price is around $600*". [105]

It is reasonable to use a comparables approach when valuing domain names, as the relevance of the word, combined with the number of characters can be compared with others that have recently sold, and market data is available from organizations like Sedo.

Median in $

| | Q1 2010 | Q2 2010 | Q3 2010 | Q4 2010 | Q1 2011 |
|---|---|---|---|---|---|
| .com | 510 | 510 | 522 | 650 | 595 |
| .net | 521 | 581 | 588 | 686 | 589 |
| .org | 550 | 530 | 589 | 697 | 537 |
| .biz | 537 | 380 | 500 | 317 | 405 |
| .info | 418 | 402 | 431 | 420 | 442 |

© Sedo 2011

Top 10 Public Sales

| Domain | Sale Price |
|---|---|
| gamesforgirls.com | $500,000 |
| action.com | $270,000 |
| ts.com | $186,000 |
| shield.com | $190,000 |
| mariage.com | €92,000* |
| xxxbook.com | $100,000 |
| 06.com | $91,888 |
| podnova.com | $90,000 |
| doorhardware.com | $85,000 |
| tz.com | $80,000 |

*french spelling of "marriage".

© Sedo 2011

Many of the domain auction sites disclose the most successful auctions completed over their platform in recent months. As an example, the Go Daddy site shows a market report[106] with top 10 selling domains each month. You can see from this report that during May 2013, the top selling domain was "boxed.com" and the price paid was $35,000. The tenth highest price was "cpj.com" which sold for $13,000. These data points prove very useful for creating comparables-based valuations of domain names.

[104] http://sedo.com/fileadmin/documents/pressdownload/Q1_2011Market_Study.pdf
[105] http://domainnamewire.com/2007/03/28/median-domain-selling-price-600-750/
[106] https://auctions.godaddy.com/trpmarketanalysis.aspx?ci=55877

Go Daddy Auctions® Domain Market Report

Select a report to v

**Top Domain Sales**

Includes all auction listing types.

| LAST | 5/1 - 5/31 | PRIOR | 4/1 - 4/30 |
|---|---|---|---|
| boxed.com | $35,000 | seeq.com | $33,000 |
| globaloffice.com | $32,500 | ipark.com | $23,000 |
| 30seconds.com | $19,400 | madeinswitzerland.com | $18,500 |
| rockdome.com | $18,500 | thetoystore.com | $18,000 |
| afirm.com | $17,000 | staycation.com | $16,667 |
| htb.org | $16,000 | chicagoblues.com | $14,750 |
| gunsafety.com | $15,088 | type2diabetes.net | $14,499 |
| servicemasterrestore.com | $15,000 | globalpetro.com | $14,000 |
| ttgi.com | $14,500 | nses.com | $12,500 |
| cpj.com | $13,000 | safrat.com | $11,800 |

## Valuing Internet Domain Names Using an Income-Based Approach

Where a domain has been licensed and generates an ongoing income stream, as with any income stream, the value can be determined by calculating the net present value of the future license royalties. This is not such an unlikely scenario as you might suspect. In Silicon Valley, online startup ventures need short, memorable domain names but don't have the funds to spend millions of dollars to acquire a domain name outright. Instead they often license the domain with an option to buy later on. The revenue streams flowing to the owner from the domain name as a result of this license/option arrangement can be estimated over the coming years, and these can form the basis of the domain's valuation. Of course, the discount rate applied should reflect the level of risk that the license revenues will fail to materialize.

## Driving Demand & Increasing the Price When Selling Internet Domain Names

Internet domains are not weapons of litigation like patents, and the sale of domains is not highly regulated like company shares. So the marketing of Internet domains is not such a legal minefield, and domains represent assets that can be promoted to buyers without have to worry about upsetting federal regulators or triggering lawsuits.

Unlike the Tynax.com exchange where patents are traded and buyers are shielded from sellers in order to protect them from patent infringement concerns, online auctions of domain names are operated in public by a number of exchanges including Sedo.com, Pool.com and Godaddy.com[107]. This is good news if you want to auction your domain and you're lucky enough to attract multiple bidders, but not such good news if your domain attracts few or no bidders. Convincing a buyer that your domain is highly valuable is something of a challenge when the domain has failed to attract buyers in an online auction open to the public.

An effective sales and marketing process can reach more buyers, engage more bidders in the process and help drive up or support the highest price. Professional domain brokers (yes they do exist), can earn their commissions by attracting buyers and negotiating the best prices for their selling clients. The law of demand applied to domain names, so effective sales and marketing efforts can attract bidders and push up the price.

[107] Larger list of domain auction sites is available here: http://www.domaining.com/directory/domain-marketplaces/

# Final Thoughts

Patents, startups, software code and intellectual property assets are all peculiar in their own ways. As a weapon of litigation, the value of a patent is driven by infringement of the claims, the potential for collecting licensing royalties and the cost of asserting the patent against an infringer in court. Startup investments structured as preferred stock create such disparate rights between the common stock holding founders and investors that there's little reasoning that venture capital investments can be used as a basis for valuation of the startup enterprise. Software code is difficult to perfect but easy to copy in the Internet age. Software developers struggle to protect their software with patents or copyrights, so software value can evaporate in the blink of an eye.

These peculiarities do not, however, render valuation methodologies that have been developed for more tangible assets totally unusable for intangible assets. Tried and trusted valuation methods such as the cost of replacement, comparisons with similar assets that have recently sold on the open market, and the net present value of future revenue streams can be used to determine the value of intangible as well as tangible assets.

Once we understand the nature of the asset, traditional valuation methods can be selected for the situation at hand and a fair value can usually be determined. The traditional notion of demand theory has an impact on the selling price of intangibles as well as other goods. A seller is able to maximize the value by engaging multiple competing bidders, so an effective promotional process can push up the price. However, marketing and promoting certain assets such as company shares and patents is something of a legal minefield requiring expert navigation if the seller wishes to avoid triggering patent lawsuits, criminal charges or sanctions from federal agencies. The value can be enhanced by the seller, but for some intangible assets, the marketing and promotions have to be done very carefully.

If you wish to understand more about patents and startups, you might want to check out my books on these topics[108]. As I give them away for free, I can get away with blatantly recommending my own publications! For videos and complete courses on

[108] Zero-to-IPO (www.zero-to-ipo.com) and Patents, Cloaks & Daggers (www.daggers.co).

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valuation, you might want to check out Silicon Valley Business School[109] which offers free guest access to a wide range of courses, some of which cover valuation. Don't be surprised to find the materials from this book assigned as readings in the courses.

It's sometimes surprising how things turn out. When I look at my experiences over the last three decades: brokering transactions, marketing for Apple, studying at law school and business school, raising finance for my startups, forming and running a global patent exchange brokering many I.P. transactions, I guess it shouldn't have been a surprise when I started to receive requests to provide appraisals for a wide range of technology-oriented clients. I didn't really set out to become an appraiser and I was a little surprised when the requests started to come in from professional advisors as well as clients themselves. In the last several years, I have enjoyed valuing a range of intangible assets from patents to trademarks, software code and startup ventures. I've also been developing a set of software tools that enable us to value large numbers of patents relatively quickly—which is useful for large patent holders and patent buyers. I hope the calls continue and I look forward to applying the techniques laid out in this book for many years to come.

Thank you for reading. I hope you get to maximize the value of your assets, minimize your tax liabilities and navigate through the marketing processes without setting off any legal landmines. If I can be of any help, please let me know.

[109] www.svbs.co

# End Notes

## Sources of Patent Sale Transaction Data Points:

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[i] http://www.sec.gov/Archives/edgar/data/1418091/000095012314003031/twtr-10k_20131231.htm
[ii] http://www.wilan.com/news/news-releases/news-release-details/2012/WiLAN-Acquires-Patent-Portfolio-from-Alvarion1131229/default.aspx
[iii] http://www.nytimes.com/2012/12/20/business/kodak-to-sell-patents-for-525-million.html
iv http://www.nasdaq.com/article/mips-technologies-agrees-to-sale-of-patent-properties-to-ast-and-acquisition-by-imagination-technologies-20121106-00030
v http://techcrunch.com/2012/07/12/digg-sold-to-linkedin-and-the-washington-post-and-betaworks/betaworks%2F&ei=SPmfUJvsMcPiiwKupYGICg&usg=AFQjCNGF-md5rjL8yNjAkOYCtZRaPUETZQ&sig2=AyYYDK4_k68LLcvWDHVoLg
vi http://www.fujifilm.com/news/n120724.html
vii http://www.prnewswire.com/news-releases/precision-optics-corporation-announces-agreement-with-intuitive-surgical-and-receipt-of-25-million-126761798.html
viii http://www.lexisnexis.com/community/mealeys/blogs/mealeys/iptech/2012/09/28/elpida-wants-to-sell-259-patents-to-apple-inc-to-honor-51m-agreement.aspx
ix http://www.reuters.com/article/2012/06/18/us-interdigital-intel-idUSBRE85H17S20120618
[x] http://blogs.wsj.com/digits/2012/07/24/google-says-patents-tech-were-less-than-half-motorolas-price/
xi http://online.wsj.com/article/SB10001424052702303592404577361923087607762.html
xii http://online.wsj.com/article/SB10001424052702303592404577361923087607762.html
xiii http://sec.gov/Archives/edgar/data/909791/000119312512287927/d374286dex101.htm
xiv http://online.wsj.com/article/SB10001424052970204409004577157470455118362.html
xv http://www.realnetworks.com/press/releases/2012/intel-to-buy-patents-and-next-generation-video-codec-software-from-realnetworks.aspx
xvi http://www.rambus.com/us/news/press_releases/2012/120206.html & http://assignments.uspto.gov/assignments/q?db=pat&asne=UNITY%20SEMICONDUCTOR&page=1
xvii http://www.cellular-news.com/story/48579.php
xviii http://www.wi-lan.com/news/news-releases/news-release-details/2011/wilan-acquires-of-mobile-communication--pioneer-patents/default.aspx
xix http://www.wi-lan.com/Theme/WiLan2012/files/111209%20WiLAN%20Acquires%20Portfolio%20of%20DTV%20Patents_Final_v001_h65p86.pdf
xx http://sec.gov/Archives/edgar/data/320193/000119312511192493/d10q.htm
xxi http://www.sec.gov/Archives/edgar/data/758004/000119312510265964/d8k.htm
xxii http://www.iam-magazine.com/blog/articles/ICAP_Ocean_Tomo_Summary.pdf
xxiii http://www.businesswire.com/news/home/20100126005733/en/Avistar-Communications-Monetizes-Patent-Portfolio-Closes-Transaction