Must-Know Finance Concepts for Life Sciences Valuations, Part II

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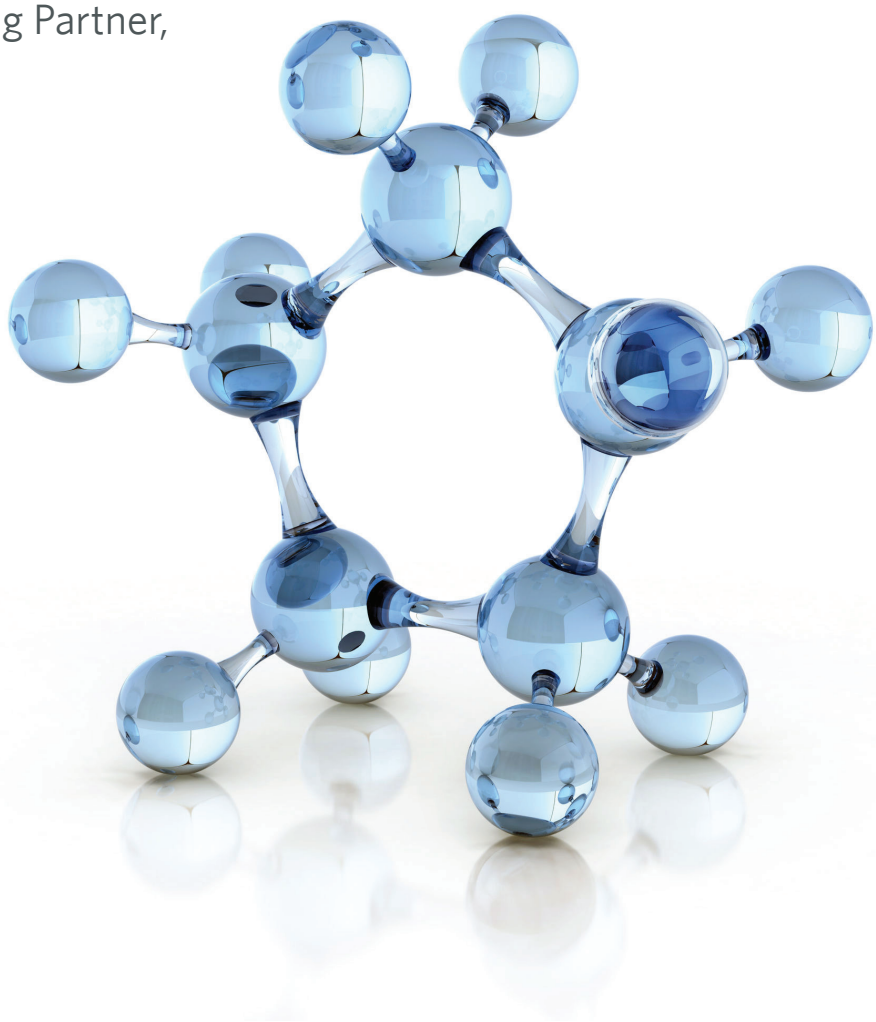

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When selling your life sciences company or licensing assets, it's critical to clearly communicate the value of your company or asset. This communication requires that both parties are using the same language and framework, so that they can have a reasonable discussion about the value of a product and the appropriate terms of the deal. To do so, it's important to understand how the other side in the negotiation is valuing the company or asset in question, and this is in part often determined by who the other party is.

A survey conducted by a university in the Netherlands asked 200+ life sciences executives—across large and small biopharma and medtech companies, venture capital firms (VCs), consulting firms, accounting firms and investment banks—how they valued assets. The results reflected multiple approaches and showed how the industry is changing over time.

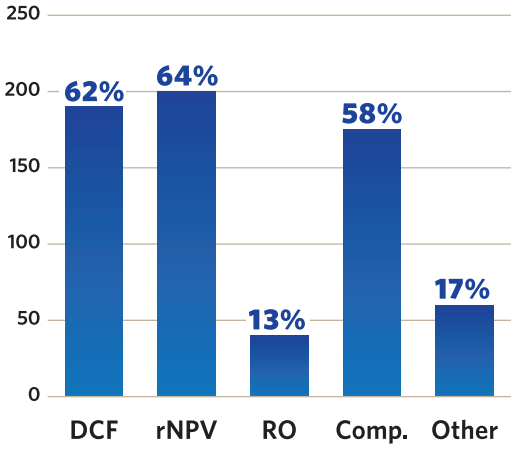
Valuation approaches included:

- **Sunk Costs**
- **Sum of Parts**
- **Comparables**
- **Discounted Cash Flow** (DCF)
- **Risk-adjusted NPV** (rNPV)

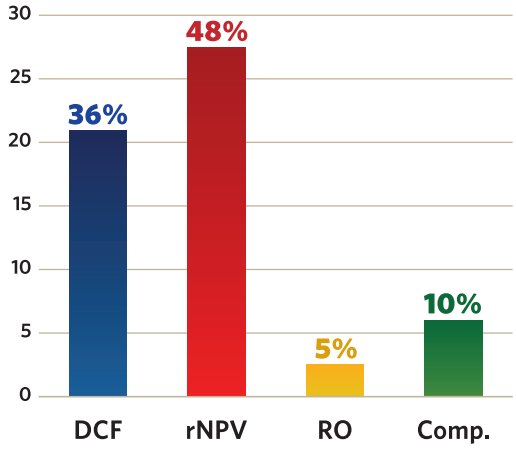
Which of These Valuation Methodologies Are Used Most Often in Life Sciences Analytics?

The most common methods used were Discounted Cash Flow (DCF) and Risk-adjusted Net Present Value (rNPV), along with Comparables. These are the methods with which most buyers and investors are comfortable, so it's important to understand what they mean and how they are used.

Primary Valuation Methods Used by Respondents Across All Areas



Primary Valuation Methods Used by Biotech/Pharma Professionals



Source: BIOSTRAT Biotech Consulting

Which Methods Do Pharmas Use Most?

Not surprisingly, pharmas typically use a full DCF or rNPV analysis. These approaches are generally epidemiologically-based analyses that target types of patients within that class for the specific device or pharmaceutical. That is, they begin with an analysis of prevalence/incidence of the indication, and build to a target of patient populations, multiplied by expected market share and pricing. The analysis includes competitors both in-market as well as in development to better understand expected market share and pricing.

Because commercial groups within a pharmaceutical company typically use this form of analysis, **it's important for potential partners to use the same type of valuation**. This will allow you to have an open discussion on value of the underlying asset, supporting appropriate deal terms customized to the asset. Conducting a full analysis of ongoing cash flows will better enable you to understand the value that the asset will be to the partner. Overlaying the deal terms on this valuation will help to estimate the internal rate of return (IRR) that the partner is likely to receive. On the partner side, this type of analysis helps the business development executives sell the commercial potential of the asset to their management team.

Know with Whom You're Speaking.

Venture Capitalists: Many VCs will do a full valuation analysis when considering an investment, though may not have the same level of resources compared to a large pharma.

While they may not perform as comprehensive an analysis as a large company would, they are likely to do an **analysis that is credible, defensible and logical** and that will help them make the best investment decision. At a minimum, the analysis will provide hard data for an advocate who is excited about your technology to present back to their partnership should they make the case for the investment.

In addition to, or instead of, an rNPV analysis, VCs may value your product by estimating the value of a likely exit based on similar companies in your industry.

They will then determine a pre-money valuation at which they would be willing to invest in order to achieve a return of seven to ten times their investment.

Even for investors who are using this approach in place of a full cash flow analysis, if a full cash flow analysis is done well, it is likely to **give investors higher confidence in the management team**, which generally results in a higher valuation or even a higher probability that they'll invest at all.

Pharmaceutical Companies. As mentioned above, pharma, have the resources to do a much more comprehensive analysis of your asset. Pharma will look at an asset not only as a stand-alone product, but also will evaluate how it will fit within their franchise in a certain therapeutic area, as well as within their overall portfolio.

In addition, they'll evaluate your asset relative to other licensing or acquisition opportunities they are considering.

Pharma use both rNPV and DCF methodologies. Both approaches calculate the anticipated cash flow generated by the product, discounting this back to the present at a rate reflecting the time and risks associated with both the business and the product type.

Pharma will also closely consider risk, knowing that as a product overcomes clinical and then regulatory hurdles, risk declines. As a result, the stage of development is a key factor in driving deal size.

Know Whether Your Partnership is a Strategic Fit.

Cash Flow is the Best Metric. Cash flow reflects the change in cash balance in a specified period of time and is more easily verifiable than other variables, such as the accounting term, "net income."

It is advisable to avoid accounting metrics because they don't necessarily relate to the amount of cash a firm loses or retains. **An analysis of pre-tax cash flow is a much more useful place to start,** and you can always overlay the accounting and tax issues after you've done the fundamental analysis on the cash flow.

At the end of the day, cash is king.

Strategic Fit Can Enhance Cash Flow. Several strategic factors can enhance cash flow. Ensure, for example, that your asset fits the partner's clinical experience and relationships. your asset fits the licensee's clinical experience and relationships.

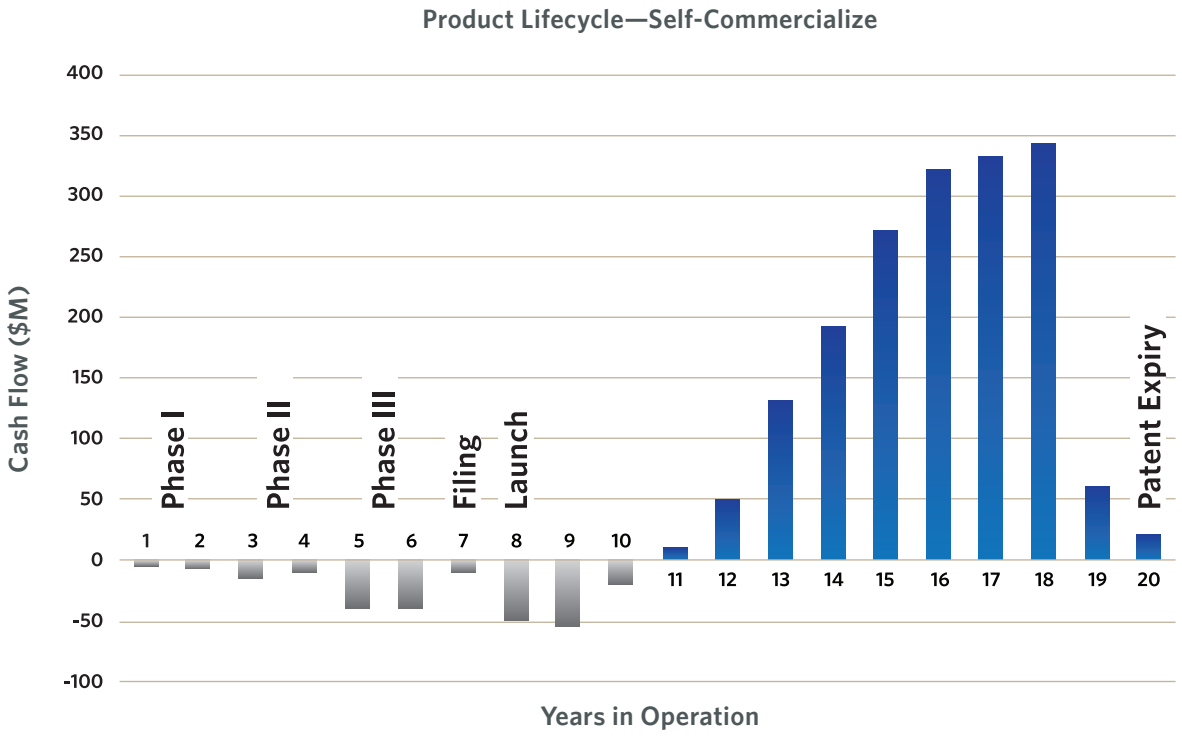
That's part of the overall process, and it should be reflected in the valuation. For instance, if a company has a better commercial sales force, they may be able to sell your product more effectively and achieve higher sales as a result, thus increasing value. If they have expertise in drug development and regulatory in the specific indication or therapeutic area on which you are focused, perhaps there might be a reason to adjust the probabilities of success for the clinical trials that they will inherit.

There are ways to adjust an analysis to account for the strengths—and in some cases weaknesses—of an individual partner, which the out-licensor can take to their board to more accurately compare deals across potential partners. **What matters is more than just the deal terms, but also what you believe a partner can accomplish as part of that deal over the years that you will be in a partnership with them.**

The pie—and therefore the deal terms—should increase with the right strategic partner.

Know Different Program Cash Flow Examples.

Example 1: Product Lifecycle

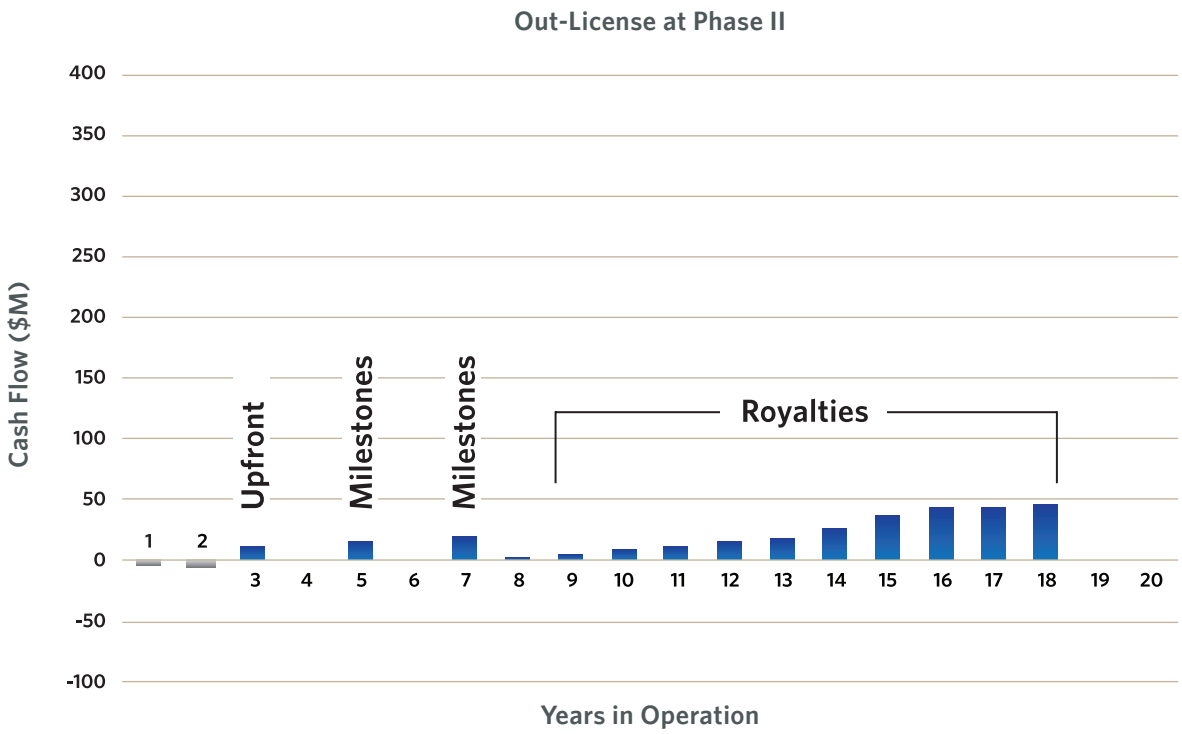


Product NPV = $310M

This graphic illustrates an **example of a typical product lifecycle should a company self-commercialize their Phase I product**. The company spends cash in the early years to get through Phase I, Phase II and Phase III. At filing, outgoing cash flow will increase for the commercial launch. They may have some revenue offsetting part of that spend, but they'll still be using significant resources, unless they're in a very small or targeted indication like an orphan indication. One benefit of the life sciences industry is that, once a product is on the market, the cash flow usually more than offsets the upfront costs, time and risks that were involved in development. But prior to that point, it is a long and risky journey.

Therefore, when you present the value of a life sciences asset to a partner, it doesn't make sense to only forecast out for a few years and then include a termination value. **In life sciences, it is better to outline the entire lifecycle of the product all the way out to patent expiry,** and to include contingencies, such as a key competitor going generic or a new product class emerging sooner than expected. This is how big pharma performs the analysis, and therefore what is best for you to do as well.

Example 2: Out-Licensed Product

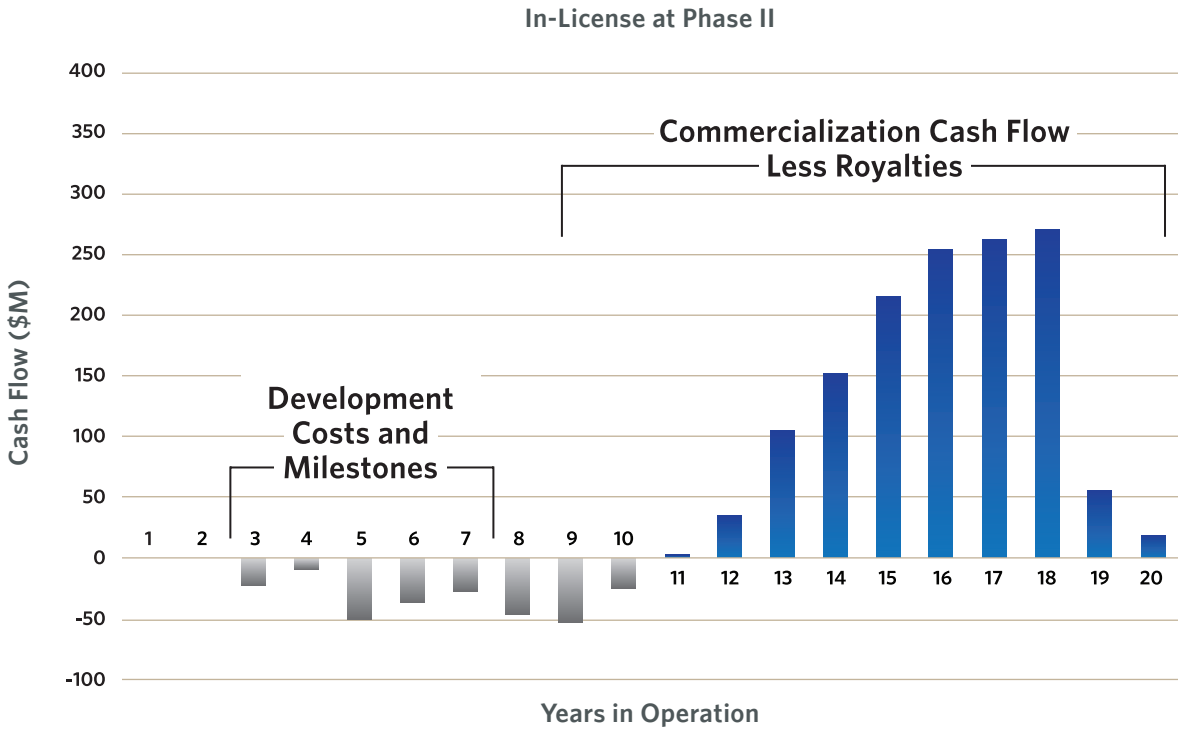


NPV to Licensor = $100M

Here's a different look at cash flow for a company with a product in Phase I that is out-licensing at Phase II. They spend cash in the first couple of years prior to Phase II, followed by some immediate upfronts and milestones from the deal terms, and then royalties. The rNPV of the previous product, or the whole pie, was $310M.

Given the product was out-licensed at Phase II, **it's not surprising that less than half of the product value (at a 12% discount rate) is going to the out-licensor**. The measurement of this value is influenced in part by the use of a higher discount rate. When using a typical discount rate, which tends to be around 10% or 12% for a life sciences partnering deal, it's not unusual for an out-licensor at Phase II to be getting about one-third of the overall pie.

Example 3: In-Licensed Product



NPV to Licensee = $210M

Conversely, the in-licensor is going to be paying both for development costs to move the product from Phase II onward as well as the deal terms to the out-licensor. Their rNPV ends up at two-thirds because they are responsible for the vast majority of the cash flow and commercialization, which offsets their upfront expenses.

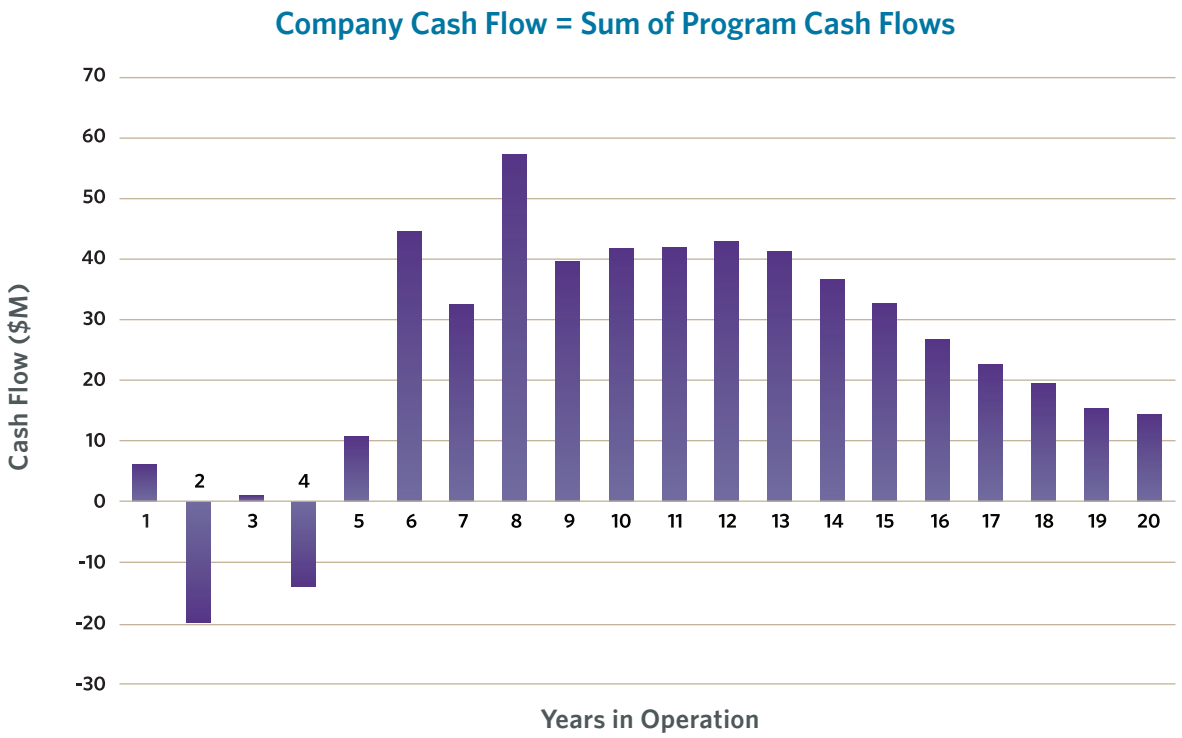
Know How a Company's Value is Determined.

It's Often Determined by Expected Cash Flow.

A life sciences company's value is determined in large part by expected cash flows and by the degree of strategic combination and integration of its current and future programs. This is different from companies whose value is based on machinery or real estate, for example. A life sciences company's asset value derives primarily from its intellectual property, but it is intellectual property that is valued in a very different and specific way.

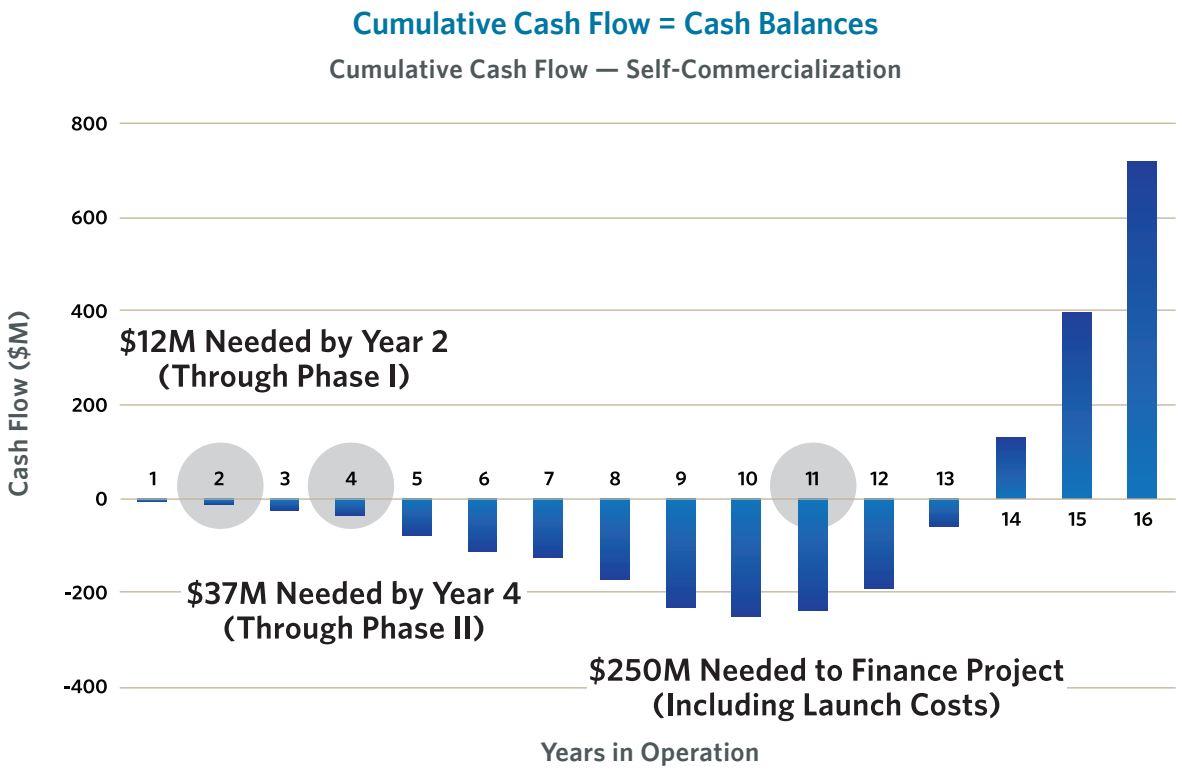
In life sciences, it is **difficult to separate intellectual property from the underlying value of the asset.** Licensors want to know the value of a specific asset while taking into account the patent expiry date, but without necessarily separating the underlying technology. Instead, they may value the ability of the same technology to, for example, create additional candidates.

Determined by Company Cash Flow.



The company cash flow equals the sum of cash flows from its portfolio of programs. If a company has multiple products in development, whether they are devices, diagnostics or pharmaceuticals, they must consolidate the cash flows in order to better understand how much money they must raise in the future. If they perform that analysis on a risk-adjusted basis, they can incorporate attrition from some of those programs to better understand their future cash needs.

Determined by Cumulative Cash Flow.

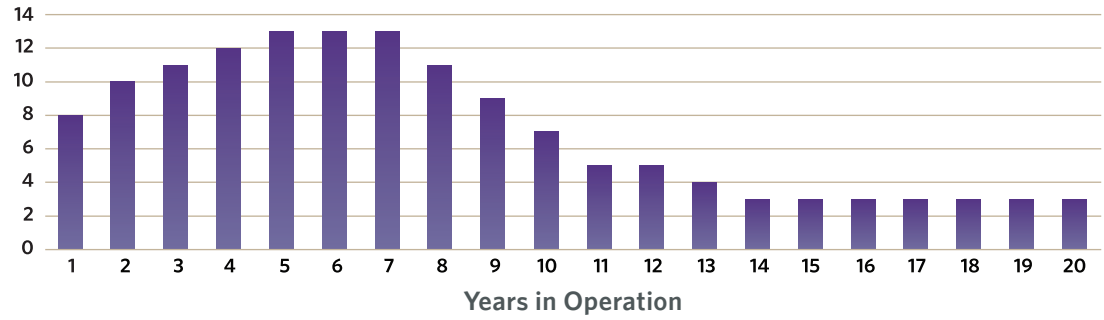


By examining a portfolio in this way, we can estimate the total cash outflows needed to run this portfolio. In this case, they require US$250M, but they should probably raise more in order to allow for contingencies, such as clinical trial costs that are higher than expected or unforeseen timeline extensions.

Determined by Product Portfolio.

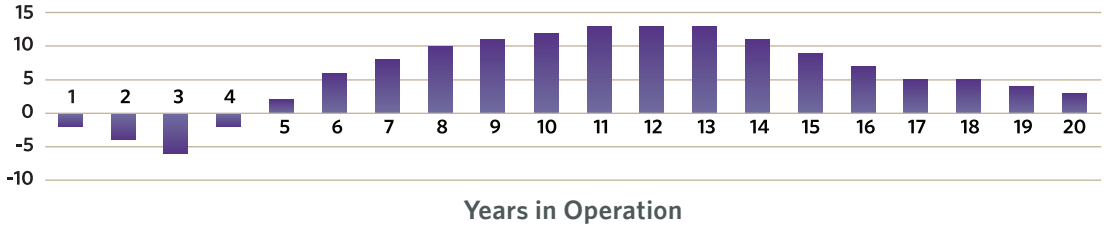
1. Commerical Stage

Cash Flow ($M)



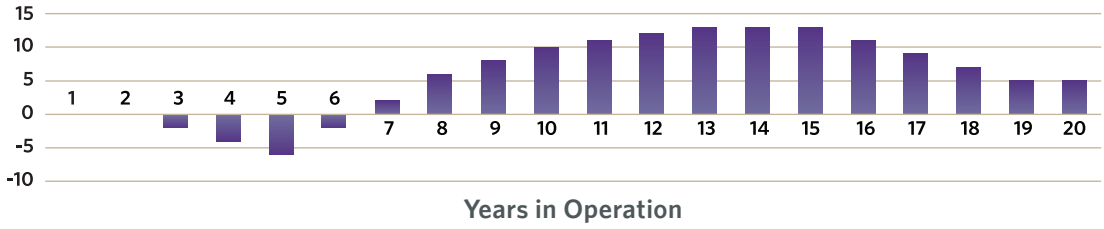
2. New Product Year 1

Cash Flow ($M)



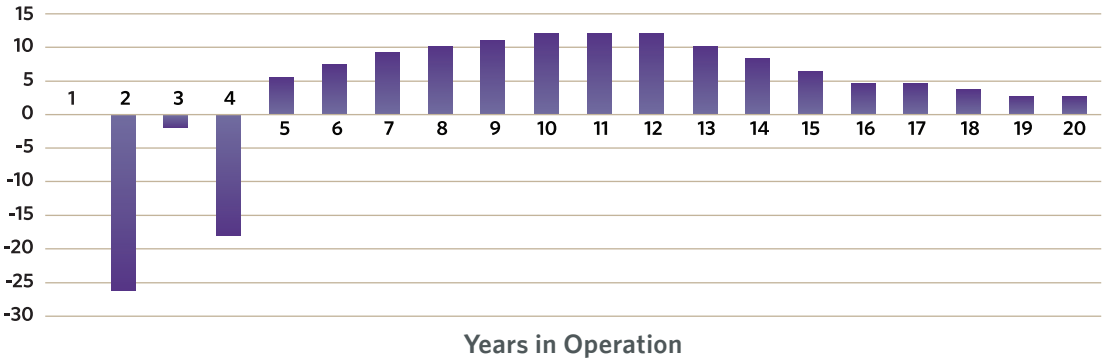
3. New Product Year 3

Cash Flow ($M)



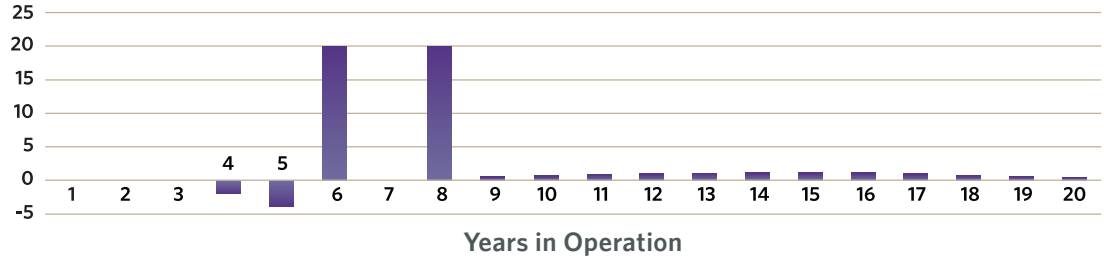
4. In-License Year 2

Cash Flow ($M)



5. Out-License Begin Year 4

Cash Flow ($M)



In this example, the company has multiple products at various stages and using different licensing approaches, all of which needs to be included to value its asset portfolio. Product 1 is in market (at the top) and has slowly declining revenues over time. Product 2 is in development, while Product 3 is another new product that's not quite as far along. Product 4 is an in-licensed product that had a series of upfront payments that were fairly expensive. And finally, Product 5 is expected to be out-licensed beginning in Year 4.

Summary: Solid Valuation Enhances Decision Making, Raising Capital and Licensing.

It is critical to use good valuation methods that are credible, defensible and logical, as they will enhance both internal management decision-making and will more accurately keep the board informed. Solid, credible valuation can also improve and expedite the following:

- **Decisions concerning future products and licensing**
- **Assessments of whether deal terms are appropriate**
- **Capital raising efforts**
- **The sale of the asset to potential investors**

Clarity = Value

As important as a good valuation is, it is equally important to achieve an alignment of expectations, both internally and externally. You want to avoid a scenario in which a board member unrealistically believes that a certain asset is worth multiples of its market value. It is not enough to merely state that it won't be possible—you will be more effective in convincing them otherwise if you present a straightforward analysis. **Ensure that you understand all of the inputs to the analysis and document them so you can respond more effectively.** For example, you might say, "This asset will not generate a billion dollars for the following reasons… The only way it would look like a billion-dollar deal is if x, y or z happened, and here's why we think these events are likely or unlikely." **A credible asset valuation will enable you to more effectively communicate with members of the management team internally,** members of the board and external parties. And if your company is publicly traded, it can serve as a credible basis by which you communicate your expectations for the asset with the public.

The Three Fundamental Concepts Of Valuation Methodology.

Expected Value **Cost of Capital** **Present Value**

These are three distinct concepts, each of which are generally measured or determined independent of the other two. However, the methodical application of all three concepts in combination is required to communicate the value of the program to potential partners, such that you are comparing "apples to apples" in your discussions.

Asset value

1. Expected Value. **The expected value is the weighted average of all possible values of an asset, depending on the probability of each value.**

It is independent of both time and the cost of capital (the discount rate). **The probability of each possible outcome will determine the expected value of the asset.** An event that has a higher probability of occurring will have a larger effect on the expected value, since its value will have been assigned a higher weight in the analysis.

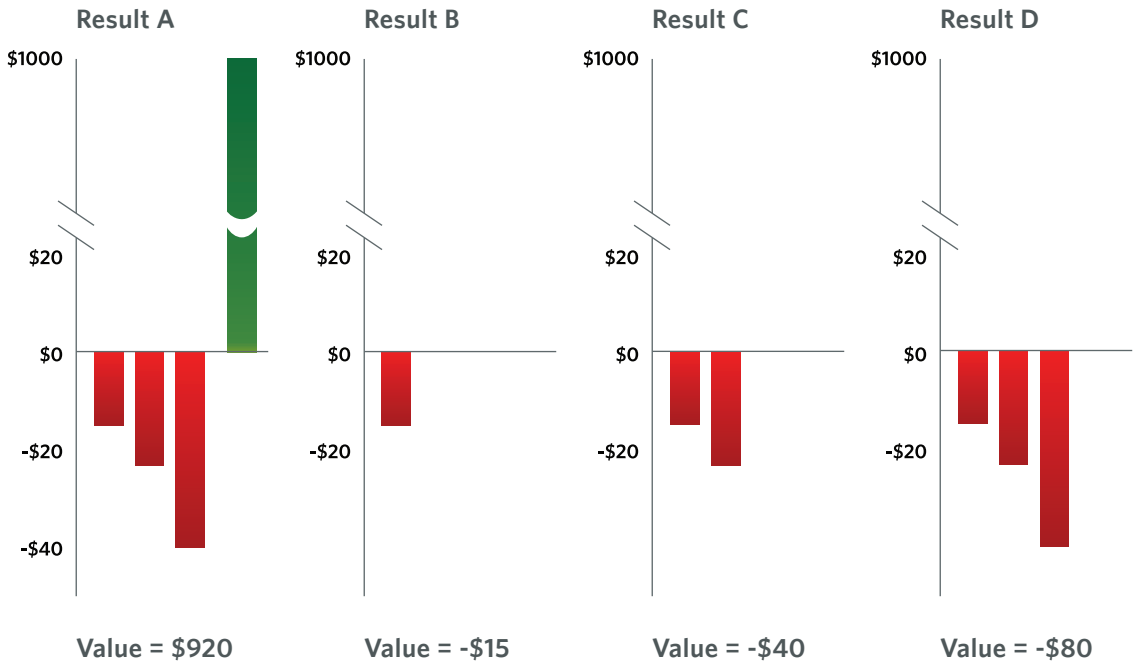
$$E[X] = x_1p_1 + x_2p_2 + x_3p_3 + \ldots + x_np_n$$

$$\text{Where } p_1 + p_2 + p_3 + \ldots + p_n = 1$$

In the formula above, X is simply an event and its value, while P is the probability that the event occurs. In this process you describe all of the events that could occur, for example, in an upcoming Phase III trial. I**t could be as simple as two events—success or failure.** However, there could be many events in between those two scenarios. In this case, there are just two events, the sum of the probabilities of which must be 100%, since you are listing every possible outcome.

Example: Events 1, 2 and 3 (perhaps Phase I, II and III) must be performed in that order. The cost to perform Phase I is $15M, the cost to perform Phase II is $25M and the cost to perform Phase III is $40M. Each phase has a 50% chance of success. If a phase results in failure, then you cannot proceed to the next phase and you stop development of that product. If you succeed through all three phases, then there is a payout of $1,000M. Therefore, if all of these events occur successfully, you will realize a final net value of $920M (payout less cost of the phases).

Four possible results, all under the exact same assumptions.



There are four possible outcomes:

1. Result A is that all three phases are successful, which results in a **positive outcome**.
2. Result B is that there is **failure after the first phase and there is a loss of $15M**.
3. Result C is that there is **failure after the second phase and the loss is $40M**.
4. Result D is that there is **failure after the third phase and the loss is $80M**.

If we average the results of each event, the value would be $196.25. But a straight out average doesn't really help us estimate a realistic expected value because each of the four events have different probabilities of occurring. Therefore, we must calculate the probabilities so that we can weight the average of each of these outcomes, which will then enable us to attain a weighted average.

So, if we use the same formula:

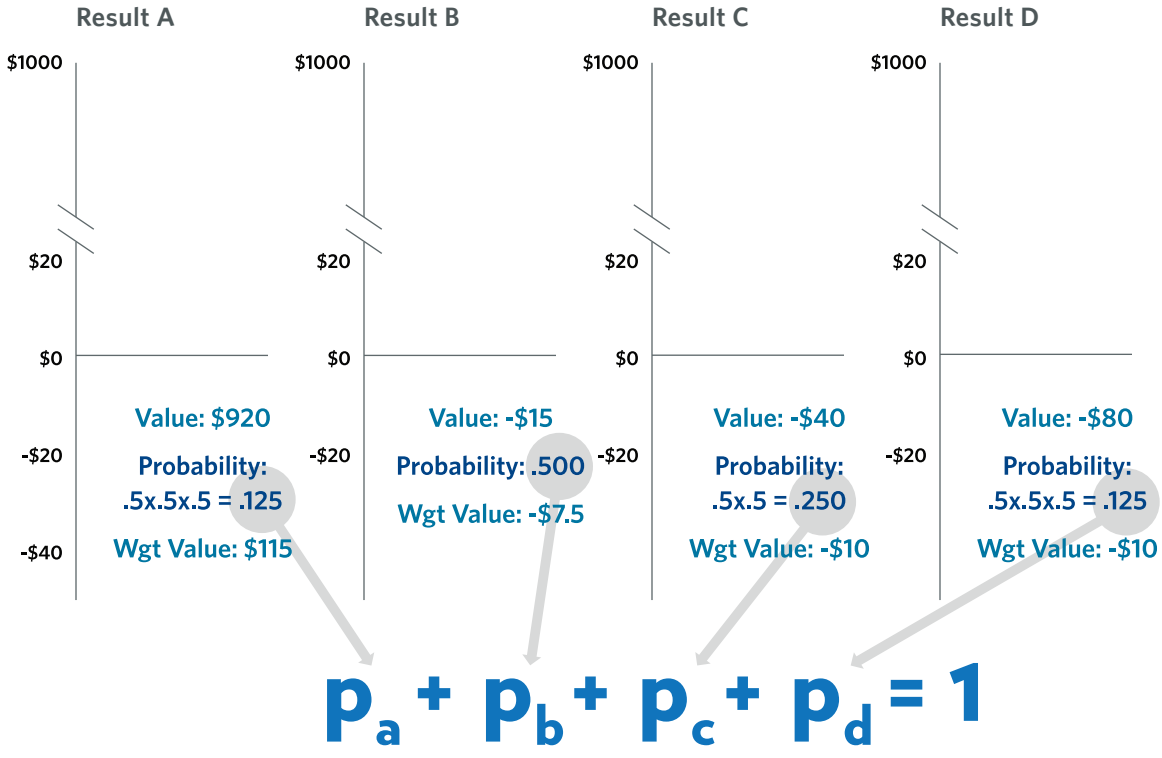
$$\text{Value} = A \cdot p_a + B \cdot p_b + C \cdot p_c + D \cdot p_d$$

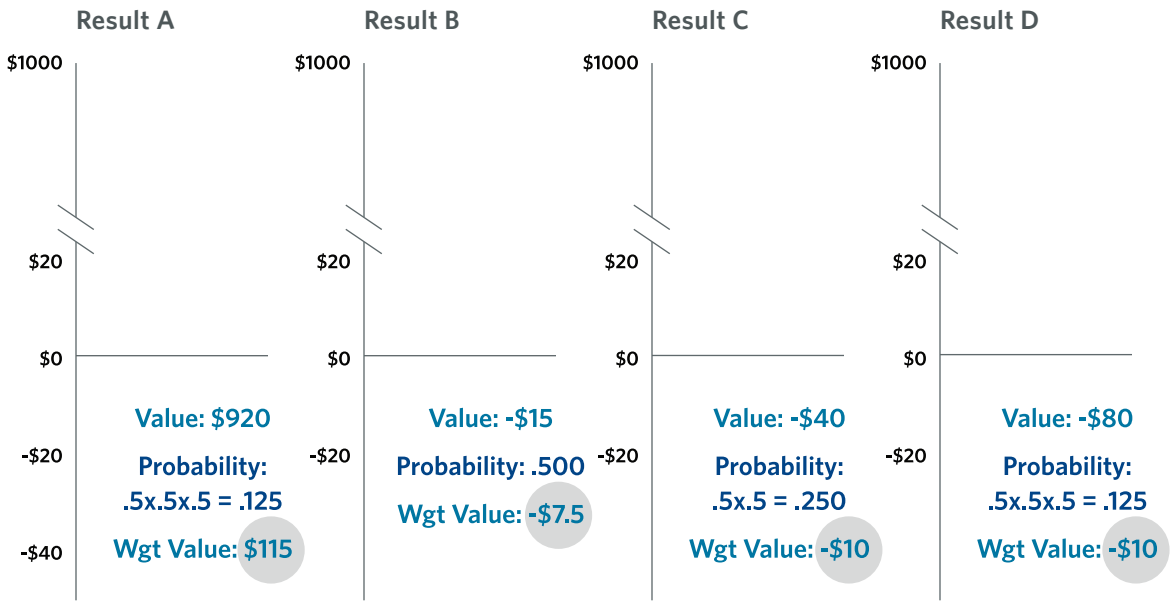
(Which is the formula for Expected Value)

$$E[X] = x_1p_1 + x_2p_2 + x_3p_3 + \ldots + x_np_n$$

$$\text{Where } p_1 + p_2 + p_3 + \ldots + p_n = 1$$

Let's calculate the probability of each of the four outcomes, knowing that there is a 50% chance of success at each phase.



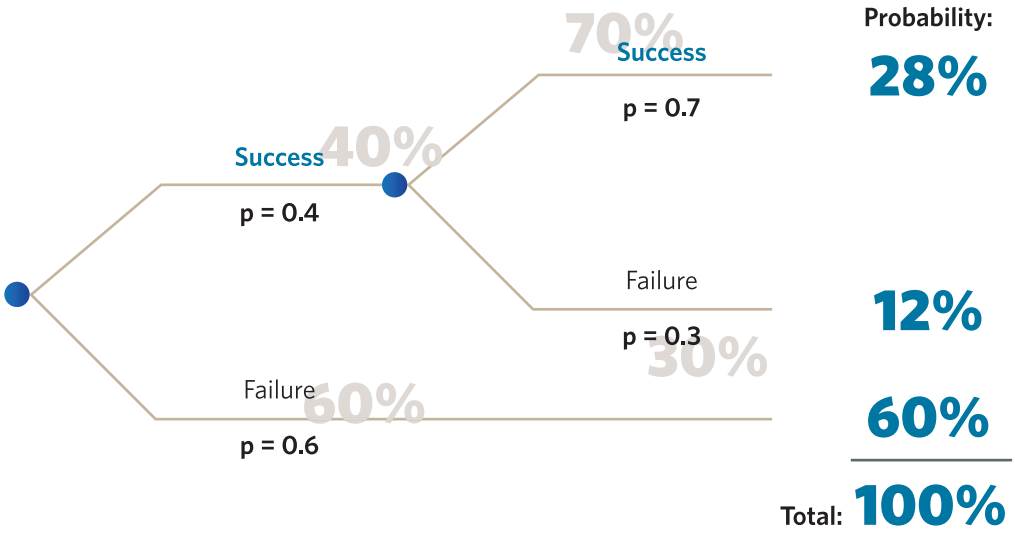


Expected Value $115 – $7.5 – $10 – $10 = $87.5

In Result B, or a Phase I, there is a 50% chance of success and a 50% chance of failure. If you fail in Phase I, you've lost $15M, so the weighted value is negative $7.5M. Result C assumes that you've successfully completed Phase I, so you need to multiply the probability of succeeding in Phase I, which is 50%, by the probability of failing in Phase II, which is 50%, meaning you only have a 25% chance of ending up in Result C. The weighted value is negative $10M (25% x -$40M in trial costs). For Result D, the probability of success is 25%x25%x50% = 12.5%, and the weighted value is negative $10M. In Result A (success through Phase III and receipt of the payout), you have a 50% chance of success in each of Phase I, II and III resulting in a probability of ending up in Result D of 12.5% and a weighted value of $115M. **What this shows is that the biggest single probability is to fail in Phase I,** the next best likelihood is to fail in Phase II. Between Phase I and Phase II there is a 75% chance of failure.

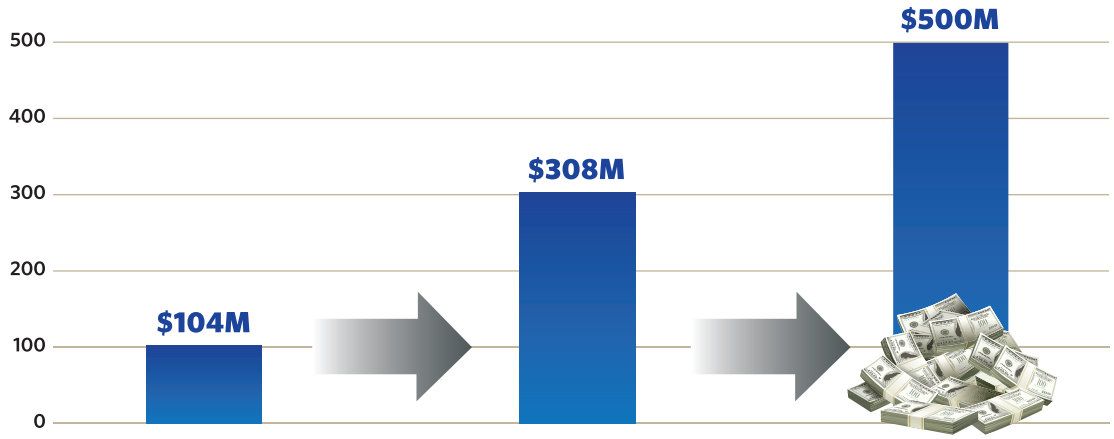
If we incorporate these probabilities into the overall analysis, we now have a weighted average of $87.5M, which significantly less than the $196.25M, the unweighted average of outcome values. The smaller estimated value stems from the fact that the probability of failing increases as you go through each phase of development.

Additional example of Expected Value: Decision Tree



This graphic shows a **simple decision tree of a Phase III trial**. In this case, the success branch is 70% and the failure branch is 30%. This is an easy visual way of understanding probabilities.

Step-Up in Value Concept: After you've done the initial analysis of the current value of your asset, you can **start modeling out what may happen as you move forward and the risk decreases** as you're closer to market. **As you move closer to market, the product value increases substantially,** which can be helpful when thinking about licensing or selling strategies.



	Today	End of Phase II	End of Phase III
Probability to Launch	38%	63%	90%
Remaining Dev Cost	$65M	$45M	$5M

It will help you decide whether to move forward and run a trial yourself versus out-licensing now. There may well be a substantial trade-off between the hit you incur by raising more capital to get to the next level, on the one hand, and the step-up in value, on the other.

Keep in mind that product value increases as you:

- **Resolve risk**
- **Have less remaining development cost**

Also, be sure to factor in key concepts associated with the time value of money.

- **Key concept:** $1 received today is worth more than $1 received in 5 years.
- **Why?** Because you can invest that $1 received today and get a return.
- **This concept is applied in valuation as a cost of capital** (discount rate).

Investment interest

2. Cost of Capital. **The cost of capital is the cost for a company to raise additional money, whether it's through debt or equity. As you can imagine, it's much cheaper for a larger company than a smaller company to raise capital because the larger company probably has a positive cash flow.**

Larger companies have assets or cash flow that enable them to borrow money at a much lower rate. Smaller companies don't have those financial attributes, which makes their cost of capital more expensive.

Discount rate defined.

The **discount rate comes from the idea of the cost of capital,** which is used to gauge investment interest. Sometimes companies use a "hurdle rate," which may not be the actual cost of the company's capital, but reflects an "opportunity cost," or the cost of debt and equity necessary to compensate creditors and shareholders. This rate will change over time depending on how investors view the market, the industry and the company.

Generally, when evaluating a deal, a large company will not use the discount rate at which they can borrow. They will likely use a higher discount rate as a hurdle rate, which drives down the value of your asset.

How is a discount rate determined?

A sole proprietor may not want to waste time and money on any project that doesn't promise at least a 10% return. They might use a discount rate of at least 10%, so that when they look at the value of the project and the cost of putting money into the project, the resulting net present value of cash flow accounts for this return hurdle.

Venture capitalists will require a discount rate that is even higher. They're promising their limited partners a very high return, because limited partners are investing their money into higher risk projects (i.e., start-up companies). As a result, a venture capital firm has even higher hurdle rates (possibly 25% or greater) in order to evaluate riskier projects and ensure that they only make investments that are worth the risk.

Capital markets have their own way of determining discount rates. Sometimes this method is driven by the rate at which they can borrow, such as the T-note rate. Potentially, the markets will be trying to determine other investments that are less risky than the investment in your company, which will determine the return they require and therefore the discount rate.

If a discount rate has a major inverse effect on valuation, what rate should be used?

You can have the exact cash flow stream, but **the actual value of that cash flow stream will be greatly affected by the discount rate**.

To give an example, for a given cash flow stream, a really low discount rate such as 3% will result in a net present value of $930M.
However, if the discount rate used to value the stream is 10%, you've just cut the net present value of that cash flow stream by two-thirds.
If you increase it to 24.5%, you've cut it to zero.

Incidentally, **the discount rate associated with a zero NPV is also called an Internal Rate of Return (IRR).** The IRR is the discount rate that produces a break-even NPV. **If the NPV is positive, the program is financially favorable (i.e. the cash flow stream more than offsets the cost of capital or opportunity costs to do the deal).** If the NPV is negative, the program is unfavorable. This is often how investors will measure the return on their investment. Sometimes a company will spend all of its time looking at revenue and market share and pricing, but it is critical to realize that for your valuation terms, the discount rate that the other side is using and the discount rate that is appropriate for your company will have as large or possibly an even larger impact on the discussion.

Cash flows

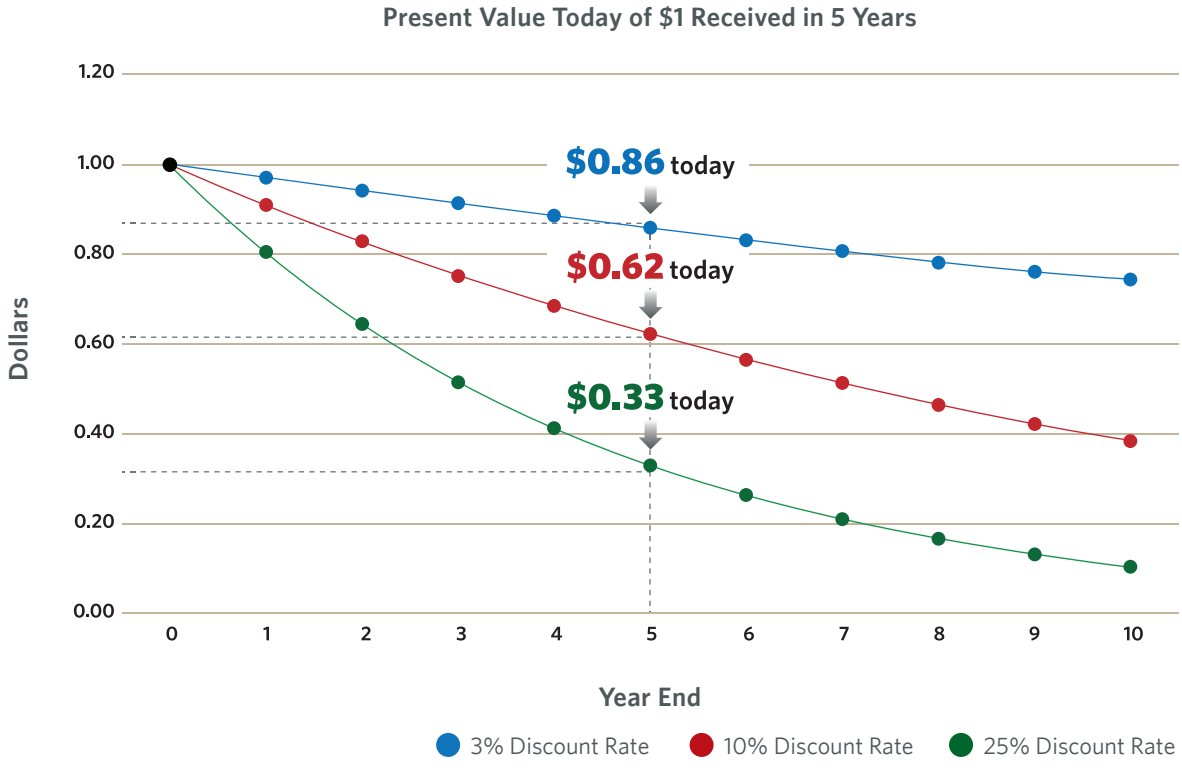
3. Present Value. **Present value is the value at a given time of a single payment (or receipt) or a series of payments (or receipts) at later times.**

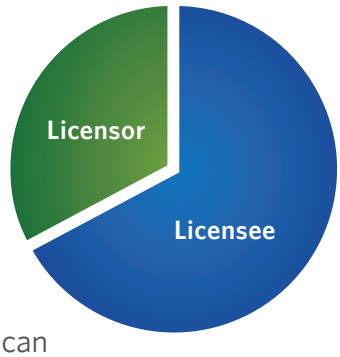
It is found by discounting a stream of cash flows back to today. It's dependent on time, of course, because the further out the cash flow occurs the less that cash is worth today, especially when using larger discount rates.

Key Concepts

- **As the discount rates increase, the value today of money received in the future decreases.**
- **Higher discount rates translate into lower asset value and less favorable deal terms.**

This graph shows how much a dollar that is received today will be worth in five years at a 3%, 10% and 25% discount rate.

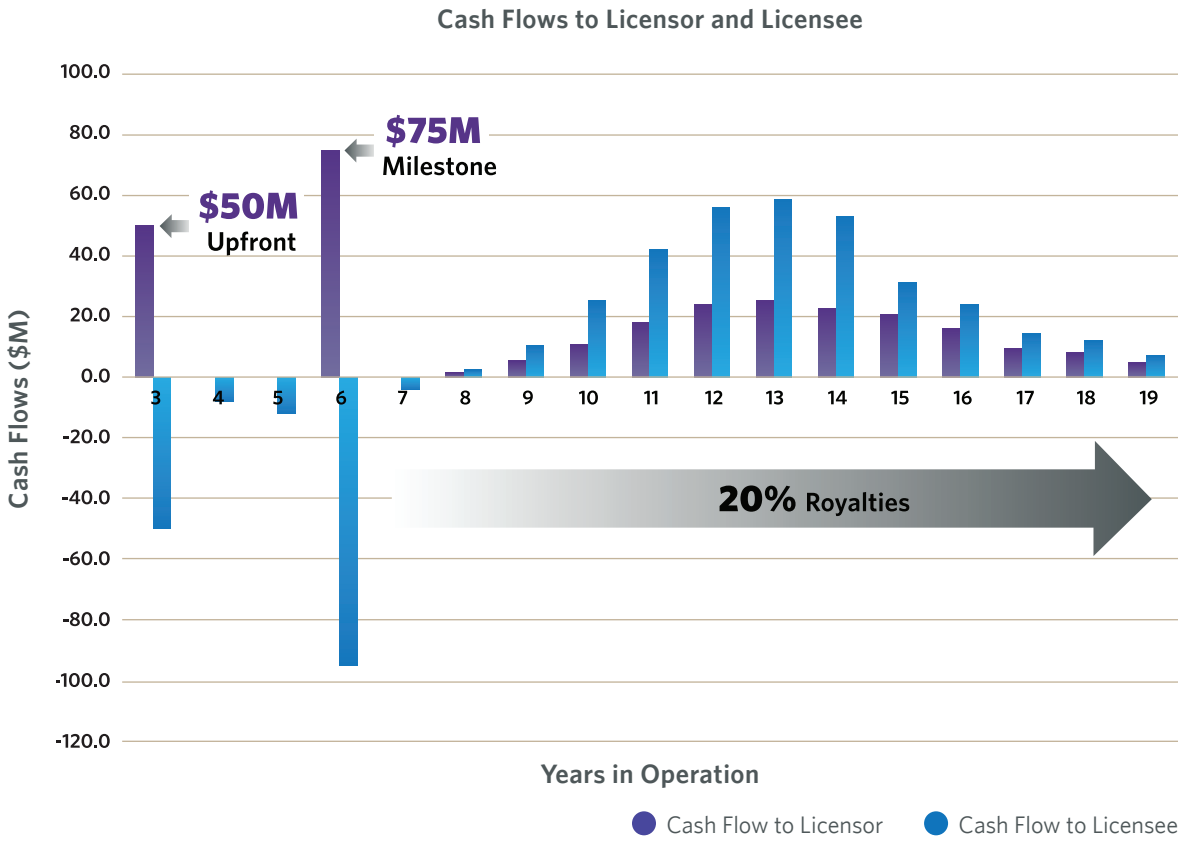




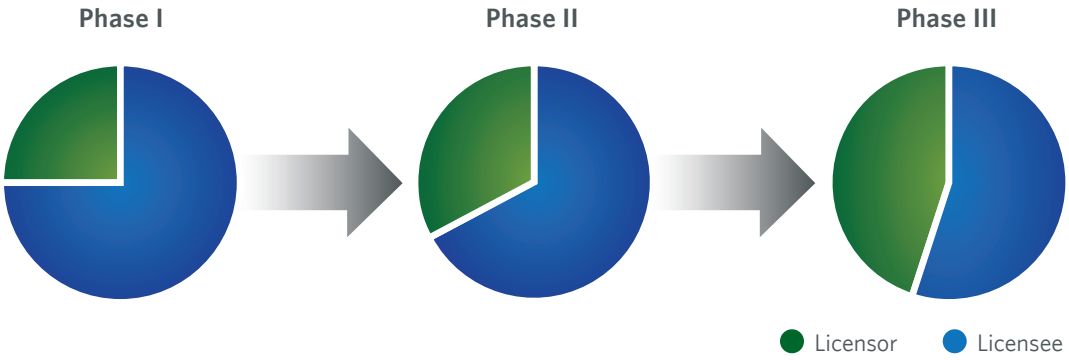
How does this tie into licensing?

Think of total product value (based on risk-adjusted net present value of cash flows) as a pie. Depending on deal terms, a portion of that pie goes to the licensor and a portion goes to the licensee.

The cash flows reflect the licensing terms, which set out who receive what payments at what time. Now you can measure the relative net present value for the licensor and the licensee.



As a product moves forward in development, the share to the licensor increases.



Why should the licensor get a larger slice of the pie over time? One reason is **scarcity**: Phase III assets are not as readily available in the market, which makes them more valuable. A second reason is because people and companies tend to be risk adverse and will pay more for less risky investments even after accounting for risk.

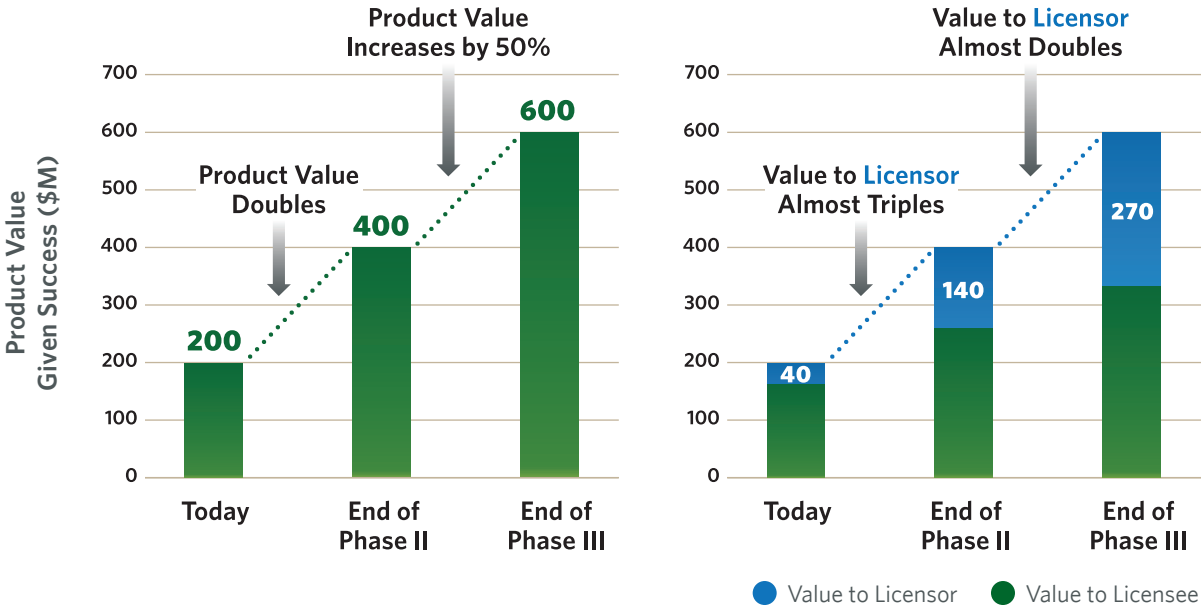
There's a range on this pie split, which is related to the concept of "Strength of Negotiating Position."

Factors that affect your ability to negotiate include:

- **Competition and interest level (number of bidders)**
- **Atypical relative contributions of licensee vs. licensor**
- **Relative knowledge of market conditions**
- **Relative strength of negotiating skills of the two sides**
- **Financial strength/distress of either party**

Key Implication: Product value increases substantially from successful trials.

And because deals for later-stage products with less risk also give a larger portion of the pie to the out-licensor/seller, the out-licensor or seller **actually "double dips"** when they wait to out-license or sell because not only is the underlying pie growing, but their share of that larger pie is also growing.



These charts demonstrate that **while the product value doubles by the end of Phase II, the value of the deal terms to an out-licensor are expected to triple.** This is an important concept to understand internally when you're thinking about timing, dilution, raising money vs. licensing, and so forth. By understanding this value, you can more effectively evaluate the various trade-offs. This is also important for in-licensors and acquirers, who know they will pay more for less risky products and therefore help them answer the question,

"License now or wait?"

Conclusions

By understanding and using these valuation methods, you can make better decisions, and better decisions over time will generally result in better outcomes. Biopharma dealmaking works best when both sides come away from a deal believing that they've done well. When you can achieve a "win-win" deal, it generally means that downstream both parties will work well together. If both sides use and understand these valuation methodologies, they are more likely to have a win-win mentality and to achieve a win-win agreement.

Questions & Answers with John Selig

Q: I agree that rNPV and NPV are great valuation methods, but what happens when you have a really early-stage product, perhaps in discovery, and it might have a 1% chance or less of succeeding?

A: I don't want to pretend that this methodology is appropriate for all seasons and all situations. If you've got a really early-stage molecule and you're seeking to do a deal, it helps to have a group of molecules or a platform with a lead candidate and then some back-up candidates. This is where a Monte Carlo analysis can be helpful because you can model simulations where one, two, three, or however many assets move forward to a certain point where they can get into clinical trials, and you can account for the costs of those early attritions and develop multiple targets on goal. This enables you to anticipate what the winner looks like as your drug or product moves forward into clinical trials.

You can also look at comparables and other deals with platform technologies at that stage. Unfortunately only 10% or less of the deals that are publicly available even show deal terms and to the extent that they show deal terms, they are heavily redacted. You don't know when milestones hit, you don't know the full scope of the deal, and you don't know the nature of the data that was underlying those molecules. So, there is no one perfect answer to this question, but I would say your best bet is a triangulation of both using comps and potentially a Monte Carlo analysis to a group of molecules at an early stage.

Q: How good are we at predicting the probability of success or failure of a Phase 2 or Phase 3 trial? The chain is only as strong as its weakest link. What factors should be considered in estimating those probabilities?

A: It is absolutely true that the prediction is only as accurate as the least accurate component of the analysis. I would therefore recommend that you look at a variety of the available databases and firms that have gathered statistical data over the years on hundreds of molecules that have gone forward in development or failed.

A few of these are:

- The Tufts Center for the Study of Drug Development
- BioTracking
- Nature.com

You can then adjust depending on whether it's a proven mechanism of action or whether there have been any safety issues. I would start with those benchmarks and not pretend that someone could guess one way or the other. Sometimes, however, you will run up against a larger pharma or medtech company that simply has a set of internal policies that says that they don't care what indication it is or what the therapeutic area is. They may state that Phase II has a 35% chance of success regardless of your research. That's just the way it is, and that's how they're going to value it.

Q: How does the IRR and the discount rate change depending on who you're talking to?

A: Generally, angel investors and VCs have extremely high discount rates, which is expected given how early they're getting into the process. There is a fundamental difference between angels and VCs versus big pharma. Big pharma is borrowing money at an extremely low rate. Given how low the rates are right now, pharma can borrow money at 6%, and in Japan it's even lower. So their actual cost of capital is incredibly low.

That being said, they're never going to give you a 6% discount rate when they're buying your product. But they'll probably give you a 10% to 12% discount rate, which is probably about midway between their actual cost of capital and your cost of capital rate, probably at 20% or higher. The other difference between angels and VCs versus pharma is that pharma is taking your product to run with it, so they will be commercializing the product and realizing the full amount and benefits of that product at its relatively lower discount rate. Conversely, a VC or Angel is just earning the difference between the amount of money they're giving you now at the valuation they're getting. It's really a three-step process: First, it is a pie split in terms of the money they're putting in. Then there's a step where you're actually executing on that money. And third, there's a delta in terms of what they realize as a share of what your company has realized.

Q: How do you predict success rates for repurposed, pre-approved drugs?

A: Repurposed, pre-approved drugs have a very small probability of failure, particularly if the drug has been approved and has been in the market for a chronic indication and has great safety data.

Q: Is there a preferred methodology for analyzing a profit sharing co-commercialization deal rather than a standard licensing deal?

A: Yes. In a co-commercialization deal, you're talking about risk-sharing by both parties. In a standard out-licensing deal, only one party (the out-licensor) is risk-sharing because they're not getting the majority of their payments until they start earning royalties.

In a co-commercialization deal, you can think of the asset as a joint venture. One company is contributing cash, or cash and some skills, and the other company is contributing its IP as well as some additional cash. You should be able to measure the value of the product today in terms of what one company is contributing and then add the value that the co-commercialization deal brings. The other side should be matching it appropriately. To the extent that they're not equal, you should adjust the percentage of the profit sharing.

Q: During a negotiation process, if one partner requests an increase in the upfront, how do you adjust other parameters, one-by-one or simultaneously?

A: This is an example of how it is important to have built a model with a Monte Carlo analysis, since it allows you to do exactly that. You actually just hit the nail on the head regarding the topic of this entire paper. A dollar upfront is worth a lot more than a dollar from royalties down the road. What does $5 million upfront equate to as a percentage of royalties? The great thing about these models is they allow you to explicitly make the trade-offs between a dollar today in an upfront versus a dollar as a milestone at Phase II, versus a dollar as part of a milestone in Phase III, versus a dollar of a milestone of getting to market, versus a dollar of a milestone of getting to $100 million in sales, versus an extra percent of royalty.

It depends on the nature of the asset. There is no one answer, but you should absolutely make all these adjustments together as you try to balance the IRR to you and your share of the pie and the IRR to the other party and their share of the pie. That being said, even after accounting for risk, when you're accounting for what the value of that royalty is versus the value of that extra million dollars in upfront, people value the million dollars upfront now more due to their risk aversi- no. So, as a matter of practice, I would do the adjustment to make it risk neutral. For example: At this discount rate, this million dollars is worth half a percent of royalty, but because you value the million dollars more now than later, you might ask for a full percentage point of royalty in lieu of the million dollar upfront.

About John Selig

Co-Founder and Managing Partner, Mavericks Capital

John advises life sciences companies on M&A, licensing and financial strategy. John speaks frequently on topics in valuation, deal term benchmarking, and strategy. He teaches the Valuation and Finance module at BIO's Executive Management Training course for BD professionals each year, and he will be teaching the Valuation module at Stanford Medical School's Entrepreneurship Program.

Prior to joining Mavericks, John was a Managing Director at Woodside Capital Partners, a boutique investment bank. Previously, he was a Partner at Keelin Reeds Partners, a life sciences management consulting firm, where he advised dozens of VC-backed and small to mid-cap biopharmaceutical, medical device, and diagnostics companies on M&A, licensing strategies, portfolio management, valuation and strategic direction. While at Keelin Reeds, John led a partnership and M&A deal term benchmarking effort and has extensive experience in applying that data to yield market-value deal terms for dozens of assets, using the results to inform product strategy and to provide ongoing support during deal negotiations. John also combined his expertise in valuation, deal term benchmarking and decision analysis with his background in law to help companies make optimal decisions in litigation and settlement.

Previously, John was a senior consultant with Strategic Decisions Group, a global management consulting firm, where he advised many of the top 20 pharmaceutical and medical device companies, as well as Fortune 500 companies in other industries on valuation, business strategy and M&A. Prior to consulting, John was an attorney with Weil, Gotshal and Manges, LLP where he focused on M&A and corporate finance. John holds a JD from Stanford Law School, where he was an Associate Editor of the Law Review, and a BA, magna cum laude, from Brown University, where he was a member of Phi Beta Kappa. (FINRA 24, 63, 79)

About Mavericks Capital

Mavericks Capital and its licensed broker dealer, Mavericks Capital Securities, specialize in M&A, capital raises and strategic partnerships across the health-care sector. They help construct and facilitate innovative and lucrative solutions for their clients. Their practices include therapeutics, devices, diagnostics, and digital health.

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