

Financial valuation methods for biotechnology

Financial valuation theory is all well and good, but knowing real world valuation practices is what makes a successful transaction professional. Get insight into how biotechnology valuations are practiced by executives and top-level decision makers.

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Introduction

The biotech industry is one of the growth engines in the development of a knowledge economy. The economic importance of the industry, its capital intensive character and the intangible nature of its value creating processes and assets means that the issue of how to assign fair and accurate value to biotechnology projects and firms has been the subject of much focus and theorizing.

Much is known about the theoretical pros and cons of various discount rates and valuation methods such as DCF, rNPV, Real Options and Comparables.

Less is known about the everyday practice of industry professionals charged with valuating biotechnology projects and firms. What valuation methods are actually used where and when and by whom? Which method and discount rate is considered the correct or best in what cases?

In 2009 BIOSTRAT BIOTECH CONSULTING set out to explore and map the various answers to these questions. We wanted to understand better the reality of biotechnology valuation and to share this understanding with theorists and practitioners alike looking for an overview of the different viewpoints on and approaches to biotechnology valuation.

We designed an online survey which was conducted among biotech industry professionals over a period of three months from December 2009 to February 2010. The respondents were recruited through various professional online networks and user groups. 389 people responded.

In this first biotech insight paper we report on our findings on valuation method preferences across the biotech industry in general and its key stakeholders in particular.

We conclude that the gap between theory and practice is wide and that different stakeholders prefer different valuation methods. The implications are obvious and profound and demand attention by everyone working on the business side of biotech.

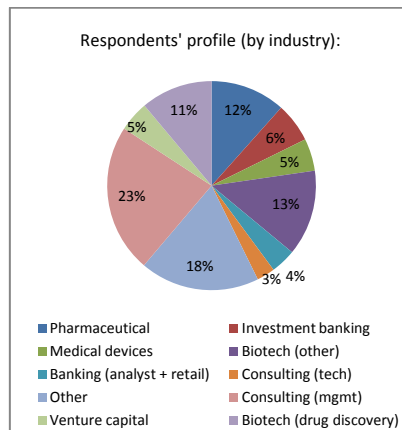
Valuation methods are also methods of communication and when parties use different language or use language differently, communication becomes difficult or even impossible and success becomes hard to achieve. First step towards resolving such issues is awareness by those involved of how language is used differently by different parties. This insight paper is a mapping of those differences across key biotech stakeholders.

In the next of our insight papers we present a similar type of mapping, this time of the different

discount rates used by different stakeholders when making valuations of biotechnology projects and firms.

Top-quality respondents

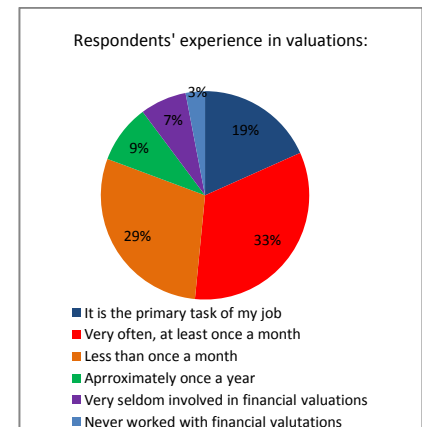
The 389 respondents who took the survey are evenly distributed across the key biotech industry stakeholder groups in biotech/pharma valuations (consultants, bankers, investors, biotech and pharma professionals):



Senior-level respondents:

| Title of respondents | # |
|-------------------------------|-----|
| CEO | 26 |
| CFO | 16 |
| Business Development Director | 13 |
| Managing Director | 13 |
| Consultant | 11 |
| Director | 11 |
| Partner | 10 |
| Principal | 10 |
| Manager | 8 |
| President | 8 |
| Investment Manager | 6 |
| VP | 6 |
| VP Business Development | 6 |
| Business Development Manager | 5 |
| Managing Partner | 5 |
| Owner | 5 |
| Analyst | 4 |
| CBO | 4 |
| CSO | 4 |
| Finance Director | 4 |
| Senior Analyst | 4 |
| Other titles + no answer | 210 |

The majority of respondents to the survey have significant to extensive frontline biotechnology valuation experience:



Financial valuation methods for biotechnology - a brief overview

When researching the literature on financial valuation of biotechnology projects and firms, four methods stand out as the most obvious candidates for use by biotech professionals:

- Discounted Cash Flow (DCF)
- Risk Adjusted Net Present Value (rNPV)
- Real Options (RO)
- Comparables (Comp.)

DCF

This classic valuation method based on free cash flow analysis is widely used across a broad range of industries. DCF is considered a strong tool because it focuses on the cash generation potential of a business. All future cash flows are estimated and discounted to give their present values.

Net Present Value (NPV) is the sum of all future cash flows, both incoming and outgoing and equal to the estimated value of the company/asset. Discount rate includes both the risk of failure and the company's cost of capital and is therefore higher than just the company's WACC.

rNPV

This method is a modification of the standard DCF calculation of NPV. Each future cash flow is adjusted according to probability of occurrence, hence the name Risk adjusted Net Present Value Method (rNPV) or the eNPV method (Expected Net Present Value).

In the rNPV method the two “discount factors” – the average cost of capital and the success rate of the project – are calculated separately. The discount rate used should therefore be equal to the company’s WACC. Risk of failure is calculated separately.

It has been argued that the rNPV method is now the defacto standard in the valuation of biotechnology companies/assets. For more information on the rNPV method see for example: Stewart (2002) and Bogdan & Villiger (2008).

Real Options

It has been argued that the DCF and even the rNPV/eNPV valuation methods are not sufficiently robust when valuing high risk projects, such as biotech. Real Options addresses these objections by including valuation of the future management flexibility of the investment. The build-in assumption in the Real Options method is that management can actively modify the project after initial investment decision is taken should then need or want to. This flexibility can increase the value of the asset, and supporters of Real Options argue this flexibility is very important for long-term, multi phase investment decisions - which is the norm with most biotech investments. Consequently, Real Options is seen as superior to the DCF/rNPV methods.

For a theoretical discussion see for example: Kellogg et al (2000).

Comparables

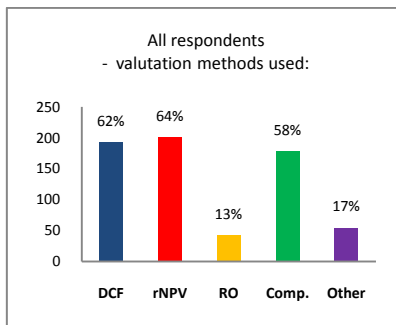
Other authors argue that all of the above mentioned financial valuation methods (DCF,rNPV, Real Options) suffer from too much theory and not enough practice. It is argued that none of the methods reflects or respects market value and that market value is *real value*.

Comparables is obviously a pragmatic, market practitioners approach to valuation: What something is worth is what (another) business is willing to pay for it. Supporters of this method therefore argue that in order to value a biotechnology investment opportunity, you have to compare it to transactions that are similar in kind.

Therefore it is argued that Comparables is the right method for estimating what an asset is currently worth and what its future value may be.

Financial valuation methods for biotechnology in practice

We asked what financial valuation methods respondents had used in the past when valuing biotech projects and/or firms and which method they considered their primary. These are the answers we got:



The majority of respondents (approximately 60 percent) have previously employed either the DCF, rNPV or Comparables method. Interestingly only 13 percent of respondents said they had ever used the Real Options for valuating biotech projects. Though the Real Options approach is seen by theorists to provide the most accurate valuation, in practice it is not the method of choice.

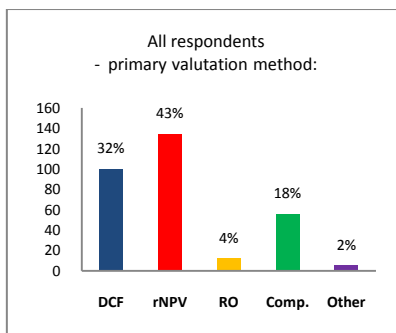
Other valuation methods used

17 percent of respondents answered that they have also been using other financial valuation methods than those suggested in the survey. The following methods were mentioned:

- Amount spend to build the company/assets
- Monte Carlo simulations
- Soft /qualitative factors (management etc.)
- Hybrid of different methods

PRIMARY VALUATION METHOD

The respondents were also asked about their primary/preferred method used when valuing biotech projects/firms. Their responses clearly showed that the rNPV method is valuation method of choice:



Financial valuation methods of choice by different stakeholder groups

We sorted answers to the survey question about primary valuation method according to stakeholder group. The motivation was of course to map and see if different stakeholder groups prefer different financial valuation methods. This is the picture we got:

Valuation experts

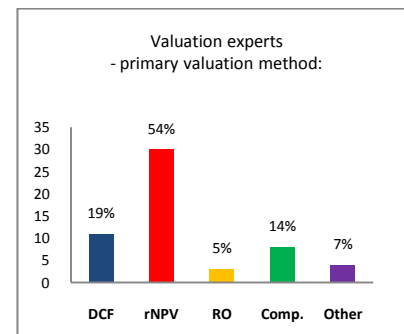
The term 'valuation experts' covers respondents who answered that making financial valuations is a primary task in their job. This grouping consist of 66 respondents from a broad range of industries:

| | |
|---------------------------|----|
| Management consultants | 18 |
| Investment banking | 8 |
| Banking – retail/analysts | 6 |
| Venture capital | 6 |
| Pharmaceutical companies | 6 |
| Biotech companies | 6 |
| Private equity | 3 |
| Asset management | 3 |
| Other industries | 10 |

One obvious and interesting question to explore and answer is if respondents in this grouping favours the more advanced Real Options approach compared to other groupings of respondents?

The answer is no.

Instead the rNPV method again turned out as method of choice. 54 percent of the respondents stated that this was their primary/preferred valuation method. Only 5 percent of the valuation experts answered that Real Options was their primary valuation method.



Biotech/Pharma Professionals

This grouping is made up of respondents who answered that they work inside a biotech or pharmaceutical company and for whom financial valuation is a primary/regular task in their job.

This grouping consists of 69 respondents:

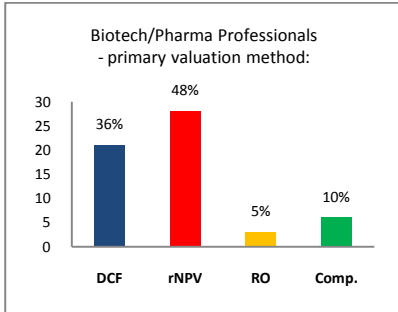
| | |
|---------------------------|----|
| Pharmaceutical companies | 25 |
| Biotech - drug discovery | 20 |
| Biotech - other companies | 19 |
| Medtech companies | 5 |

In terms of profession the majority of the respondents work in:

| | |
|----------------------|----|
| Business development | 31 |
| General management | 15 |
| Finance | 10 |
| Strategic Planning | 6 |
| Other | 7 |

Again the question we wanted to explore and answer was that of preferred/primary financial valuation method. Again the answers was rNPV.

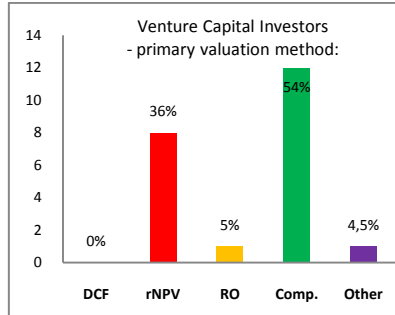
Almost 50 percent of respondents in this grouping said that the rNPV method was their preferred/primary. The sorting also revealed that the classical DCF method is used more often by biotech and pharma professionals than by valuation experts in general.



Venture Capital Investors

25 of the survey respondents answered that they are professionals working in venture capital firms and indicated that they have significant financial valuation experience (complete at least one evaluation per month).

This important stakeholder group stand out from the other groups in terms of preferred/primary method when valuing biotechnology projects and firms. More than 50 percent said that Comparables was their primary method. None of the respondents use the classical DCF method as primary.



CONCLUSIONS

rNPV is the primary/preferred valuation method for most industry professionals involved in biotech valuations

Real Options is only used by approximately 10 percent of the respondents, and when asked about their primary valuation method only 4 percent mentioned Real Options.

Even among financial valuations experts very few (5 percent) use Real Options as primary valuation method.

Among all but one of the stakeholder groupings the classic DCF analysis is still a widely used method when performing biotech valuations - except venture capital companies. Not one respondent from this grouping answered that DCF was their primary method.

Venture capital companies clearly have a preference for the Comparables method. More than 50 percent of respondents answered that this method was their primary valuation method. This compared to biotech/pharma where only approx. 10 percent of those experienced in making financial valuation answered that Comparables was their primary valuation method.

Next: Discount rates

In our next biotech insight paper we report on the use of different discount rates by different stakeholders when making valuations of biotechnology projects and firms. We found that there are significant differences and the implications are obviously profound when taking account of the long-term nature of most biotechnology projects and investments.

Sources:

- D. Kellogg, JM. Charnes, *Real-options valuation for a biotechnology company*, *Financial Analysts Journal*, 2000.
- B. Bogdan, R. Villiger, *Valuation in Life Sciences: A Practical Guide*, Springer, 2008.
- JJ. Stewart, *Biotechnology Valuations for the 21st century*, Milken Institue, 2002.

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BIOSTRAT provides strategic decision making services to pharmaceutical, life sciences, and biotech companies. Operating in a highly competitive and one of the most capital and research intensive industries significantly increases the importance for these companies to make the right strategic choices. BIOSTRAT specialises in assisting companies in making strategic decisions with regards to corporate strategy, partnering, licensing, fundraising and M&A. Read more at www.biostrat.dk.

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