www.venturevaluation.com

VENTURE VALUATION

Fit for Health 2.0

Innovative Business Solutions and Smart Financing: Focus on Valuation

Dr. Patrik Frei

October 2016 | Vienna, Fit for Health 2.0

Overview

Valuation and Negotiation in Life Sciences

Part 1:

- **Financing Sources**
- **Company Valuation**

Coffee break (10.30 – 11.00)

Part 2:

- **Product Valuation**
- **Case Study**

Venture Valuation

VENTURE VALUATION

Fit for Health 2.0

Mission

Independent assessment and valuation of technology driven companies / products in growth industries

Life Sciences Database Biotechgate.com
With Company profiles, licensing opportunites, investors and licensing deal information

- Experts Finance / Biotech-Pharma
- Not a venture capitalist
- International experience (Asia, Europe, North America)
- Track record of over 400 valued companies
- Clients such as NVF, Fraunhofer Gesellschaft, European Investment Bank; VCs; Arpida/Evolva

VENTURE VALUATION

Fit for Health 2.0

Funding gap

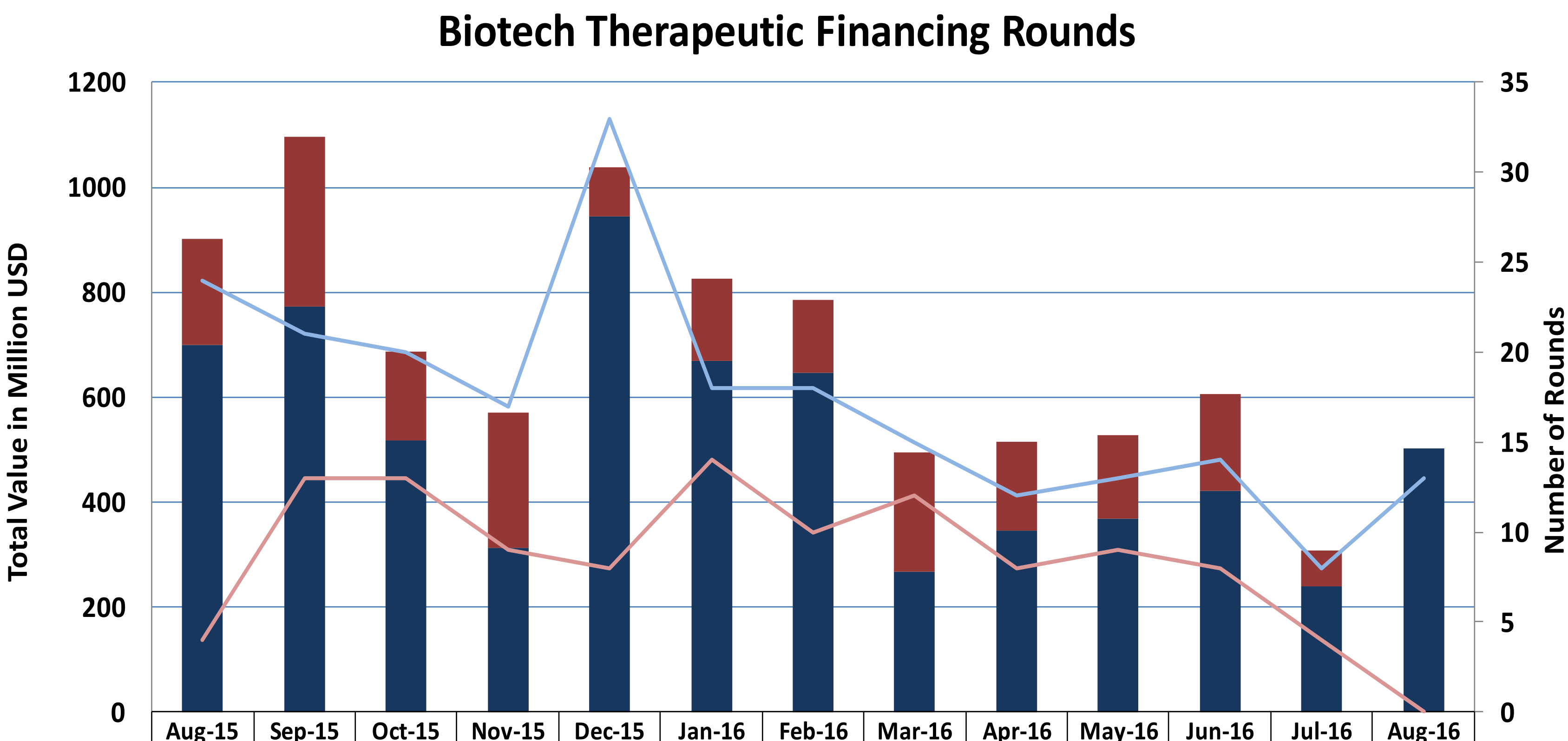
- Increasing cost of development
- Higher hurdles for registration
- Disappointment of investors
- General risk adversity of market

=> Less capital available for earlier stage companies

VENTURE VALUATION

Fit for Health 2.0

Biotech Financing



	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16
Financing Value EU	204	322	170	257	93	159	139	228	168	159	185	69	0
Financing Value US	698	773	518	313	945	668	647	267	346	368	421	239	502
Number of Rounds EU	4	13	13	9	8	14	10	12	8	9	8	4	0
Number of Rounds US	24	21	20	17	33	18	18	15	12	13	14	8	13

Source: Biotechgate.com

Financing Trends

How do companies cope with lack of VC money?

- Corporate Investors becoming more important
- Licensing as key source of funding
- Fee for Service as a way of financing innovation
- Product / Project financing by VCs
- Public money is very important

Financing Sources

1. **Own development => resources needed**
   - Own financing (Services)
   - Public: Grants / Government Funding
     a) Regional
     b) National
     c) European / international
   - Raise capital
     a) Equity (VC, Corporate, Family Office, BA)
     b) Venture Debt / Convertibles
     c) Product Financing
2. **Out-licensing**
   - Value retention; lead vs. follow-on products

Equity Finance

	Venture Capital	Corporate Investors	Family Offices	Business Angels
Size	> USD 5 m	Open	Open	< USD 2m
Company type	High risk / potential	Strategic fit, innovative	Service component, opportunistic	Seed / early stage
Total capital requirement	High	High	Medium	Low
Exit	Set 5-10 years	M&A	Long-term partner	Medium term

Non-Equity Finance

	Public Grants / Government	Private Grants	Convertibles	Revenue, Royalty Product Financing
Size	< USD 2 m	< USD 5 m	open	> USD 10 m
Company type	Innovative, R&D, early stage	Innovative, R&D, niche markets,	High growth, later stage	Mature, later stage
Total capital requirement	All	All	All	High
Exit	None	None	Repay / convert	none

Don’ts in VC preparation

- Don’t use highly technical descriptions of products
- Don’t make vague or unsubstantiated statements
- Don't ignore or underplay your competition
- Don't ignore key risks
- Don’t take the funding process lightly
- Don’t try to raise between significant milestones
- Don't be afraid to ask for adequate funding

Dos for VC preparation

- You need a Business plan
- Be specific. Substantiate statements with market data
- Summarize and properly structure financial information;
- Show how much money you need; how do you spend it
- Network like crazy
- Do reference checks on the VC (previous investments)

Overview

VENTURE VALUATION

Fit for Health 2.0

Valuation and Negotiation in Life Sciences

Part 1:

- Financing Sources
- Company Valuation

Coffee break (10.30 – 11.00)

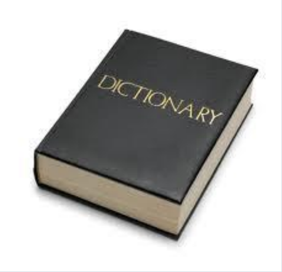
Part 2:

- Product Valuation
- Case Study

VENTURE VALUATION

Fit for Health 2.0

Why Valuation?



- **Value:** implies the inherent worth of a specific thing
- **Price:** depending on the market (supply / demand); whatever somebody is prepared to pay

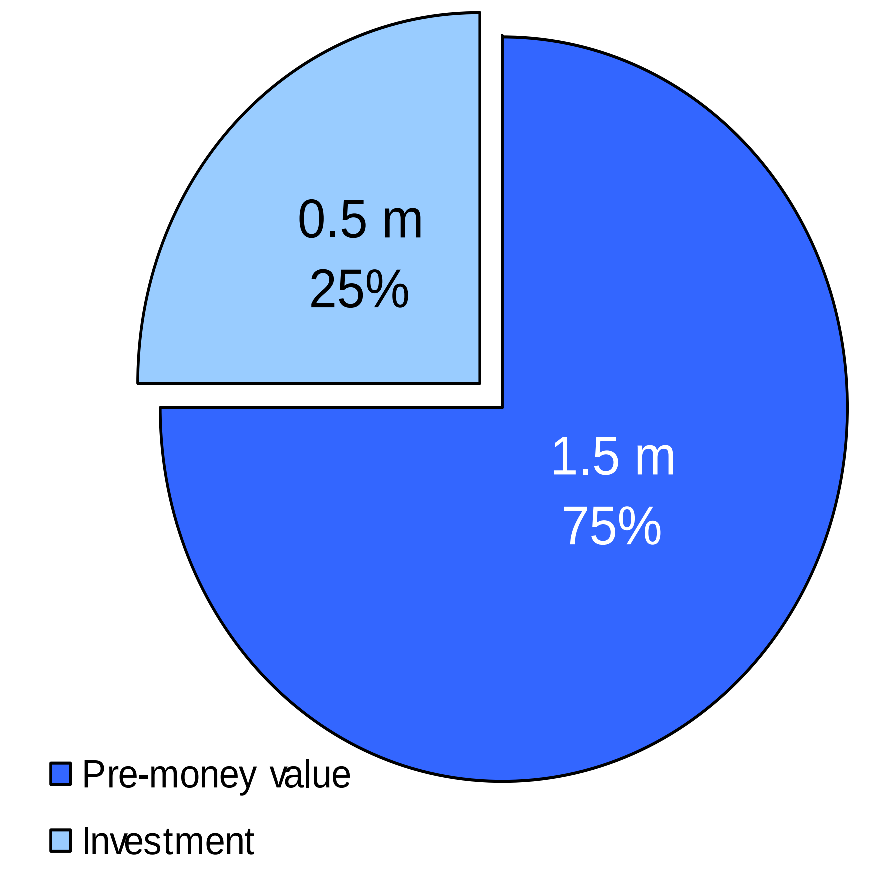
“Price is what you pay. Value is what you get.“

By Warren Buffett

=> Provide basis for negotiation, investment decision, fair share price

Why Valuation

- Value before investment (pre - money value): EUR 1,5 m
- Investment: EUR 0,5 m
- Value after investment (post-money value): EUR 2,0 m
- Share Investor: 0,5 m / 2 m = 25%



Why Valuation

- Out-licensing of a phase II product
- Deal terms:

	up-front	CHF 1 m
	milestones	CHF 20 m
	royalties	7%

- rNPV of product ?
- rNPV of deal ?

⇒ rNPV of product: CHF 30 m

⇒ rNPV of deal: CHF 10 m

⇒ Split Biotech / Pharma: 33% / 66%

rNPV: risk adjusted net present value

Biotech Valuation

- Valuation is key issue in development
- Industry lacks transparency (private)
- Very difficult (high uncertainties)
- High potential for investors
- Long investment cycle
- Traditional valuation methods unsuited
- Complex technology and IP situations

Mind-set of Investors

- Take high risk, but expect high returns
- Pressure from investors
- Compete in capital market

	Probability of failure	Return
Government Bond	0%	3%
Bonds	5%	5%
Blue Chip Company	10%	9%
Internet company (Nasdaq)	50%	20%
Biotechnology Company	80%	50%

Risk as a major factor

1. How can we capture risk?
   => Assessment of the company

2. How can risk be quantified?
   => rating of factors

Assessment

1. Understand the fundamentals
2. Assumptions drive the valuation

⇒ Assessment/assumptions are key

Assessment	Company	Product
1. Management		
2. Market		
3. Technology		

VENTURE VALUATION

Fit for Health 2.0

Valuation Approaches

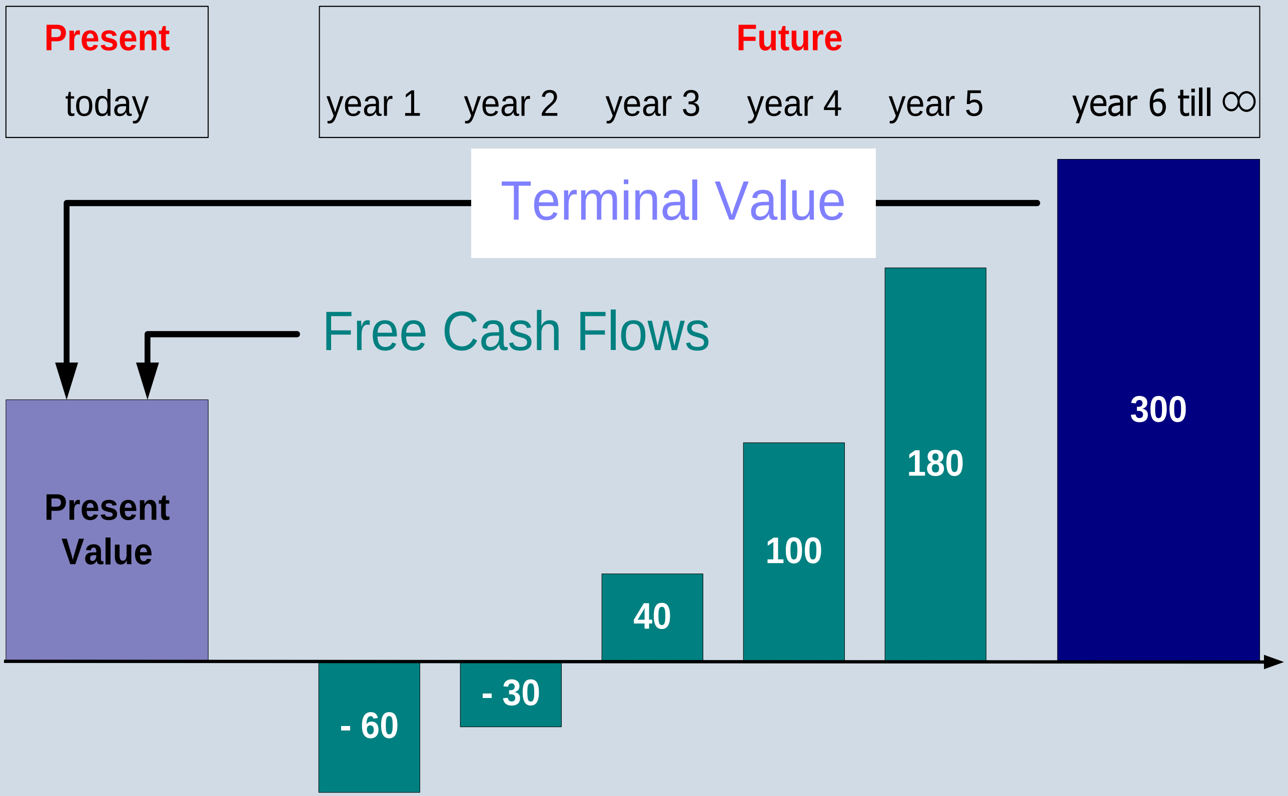
- Operations-based methods:
  ⇨ *business plan, fundamentals*
- Market-based methods:
  ⇨ *price, trends, comparison difficulties*

– Discounted Cash Flows (DCF)	}	Operations methods
– rNPV		
– Real Options		
– Venture Capital method	⇨	Mixed method
– Market Comparables	}	Market methods
– Comparable Transactions		

=> there is no “the right method”

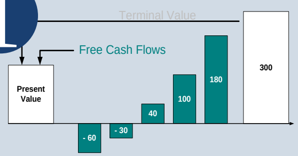
=> combination of different methods

Basic DCF


Present
today
Future
year 1
year 2
year 3
year 4
year 5
year 6 till ∞
Terminal Value
Free Cash Flows
Present Value
- 60
- 30
40
100
180
300

Discounted Cash Flow

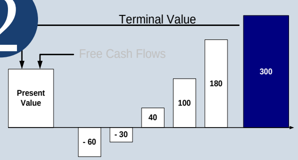
1



FCF

Determine Free Cash Flows to year 5 or y3 / y10

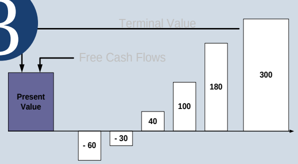
2



Terminal Value

Calculate Terminal Value

3



Discount to PV

Discount with Discount Rate

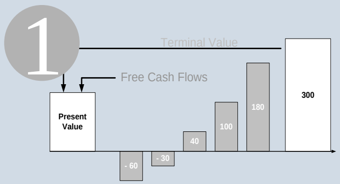
4

$$$$

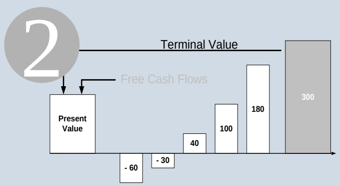
Add FCF

Sum of Discounted Free Cash Flows

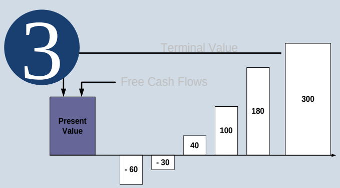
Discount rate



FCF



Terminal Value



Discount to PV

4
$$$$

Add FCF

Assumptions: interest rate i=10%

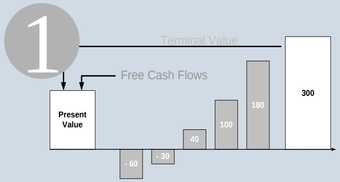
today (K_0)	**future (K_1) (n=5 years)**	
1.00 EUR	1.61 EUR	$K_0(1+i)^n$
0.62 EUR	1.00 EUR	$K_1/(1+i)^n$

Content of the discount-rate:

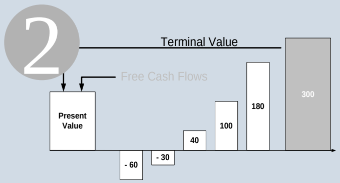
- Depreciation of currency and
- Risk => Qualitative analyzes

=> = 1.6 X

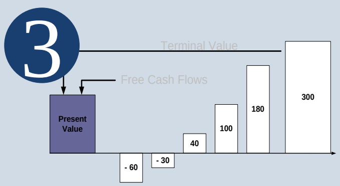
Discount rate



FCF



Terminal Value



Discount to PV

4

$$$$

Add FCF

a) Company stage

1 Seed Stage	leads	70%	to	90%	(20x)*
2 Start-up Stage	pre-clinical	50%	to	70%	(10x)*
3 First Stage	phase I	40%	to	60%	(8x)*
4 Second Stage	phase II	35%	to	50%	(6x)*
5 Later Stage	phase III	30%	to	40%	(5x)*

*X-times the investment in 5 years necessary => (1+80%)^5 = 19x

b) Rating based

⇒ **Determine area within range**

Comparable Methods

For most Biotechs you cannot use:
P/E, EV/EBITDA, EV/EBIT, EV/Sales

Ratio

Company Value:
USD 50 m

50 employees

- R&D expenditure
- Employees
- Money raised
- Product in development (p I, p II, p III)

10 employees

⇒ Company Value:

USD 10 m*

* (50/50) x 10 m = 10 m

VENTURE VALUATION

Fit for Health 2.0

Venture Capital Method

Stage	Discount rate	(Multiple)
Lead	70% to 90%	(20x)*
Pre-clinical	50% to 70%	(10x)*
Phase I	40% to 60%	(8x)*
Phase II	35% to 50%	(6x)*
Phase III	30% to 40%	(5x)*

* i.e.: in 5 years

Present Value

Exit Value

Present

today

Future

year 1 → Exit year

Example Glycart

- Glycart acquired by Roche
- For USD 180 m
- Swiss company; founded in 2000 spin-off from ETH in Zurich
- Technology platform to enhance the activity of therapeutic antibodies (cancer / autoimmune diseases)
- Pre-clinical products
- Existing collaboration with Roche (1 year)
- 30 employees

Example Glycart

VENTURE VALUATION

Fit for Health 2.0

GLYCART biotechnology

- Raise USD 31 m in the past
- Planned to raise another USD 35 m => valuation too low
- Acquisition offer by mid-sized Pharma

⇒ auction process / parallel fund raising

Example Glycart

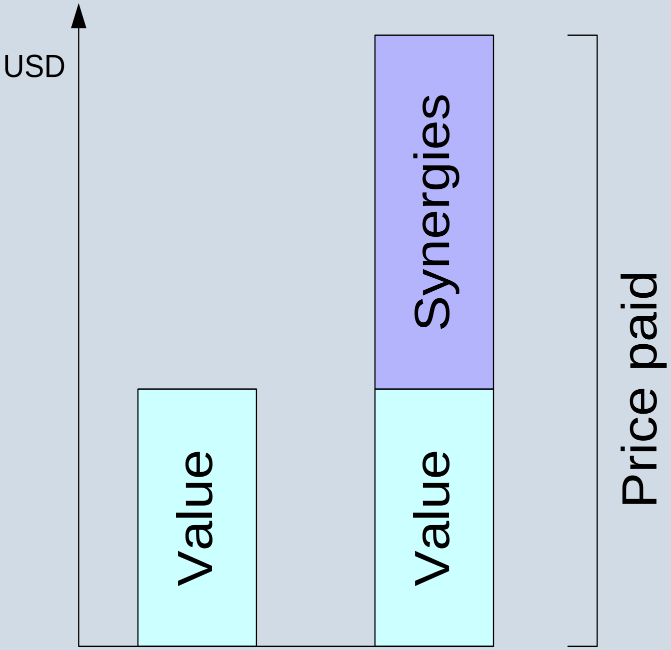
Valuation:

⇒ Pre-clinical compounds USD 180 m?

⇒ Technology Platform?

⇒ Keeping control?

⇒ Value enhancement for own products?



VENTURE VALUATION

Fit for Health 2.0

Conclusion

- Think outside the box / be creative
- Use grants and non-dilutive

  … but keep focus
- Valuation is all about the assumptions
- Price vs. Value
- Network, network, network….

VENTURE VALUATION

Overview

VENTURE VALUATION

Fit for Health 2.0

Valuation and Negotiation in Life Sciences

Part 1:

- Financing Sources
- Company Valuation

Coffee break (10.30 – 11.00)

Part 2:

- Product Valuation
- Case Study

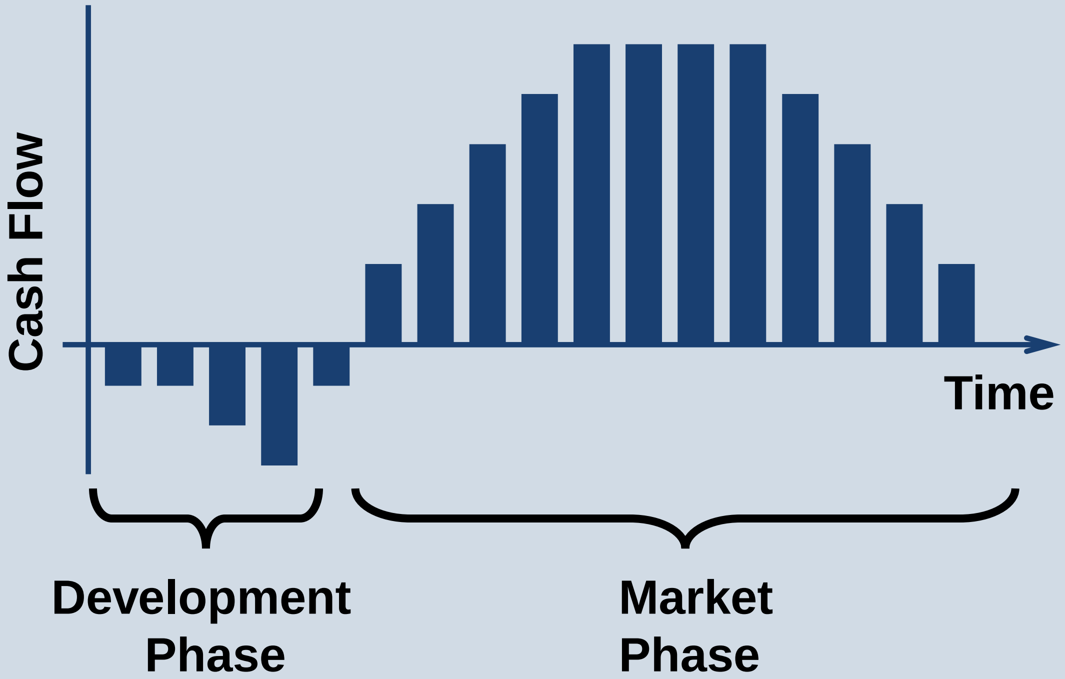
1. Overview of product valuation
2. rNPV product valuation
3. Company valuation
4. Deal structure
5. Case study

Product Valuation

Valuation of a product

- Licensing deal
- Strategic development decision
- Expenses included are only those relevant to the product
- Management risks not taken into account

Valuation components



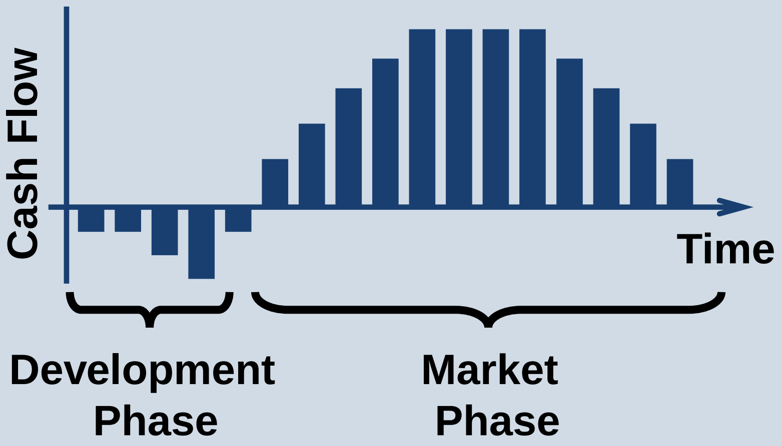
- Determine timelines and cash flows in each phase
- Develop solid assumptions for all key variables

rNPV Valuation

1. Development phase => investment
   Product Risk (r) => success rate

2. Market phase => revenues
   Patent expiry => end of revenues
   (often no terminal value)

3. Discount => non-specific risk (General Risk)



Risk-adjusted NPV

$$\sum_{i=1}^{7} \rho_i \sum_{t=1}^{T} \frac{DCF_{it}}{(1+r_a)^t} + \rho_7 \sum_{j=1}^{5} q_j \sum_{t=1}^{T} \frac{CCF_{jt}}{(1+r_c)^t}$$

Risk adjusted Net Present Value

- Also called eNPV
- Method of choice for Big Pharma

Benefits:

- Helps understand accurate value and maximises deal options
- Adjusts value for Development Risk and Discount rate

⇒ Risk is split in two components

1) Product Risk (attrition rate)
2) General Risk (discount rate)

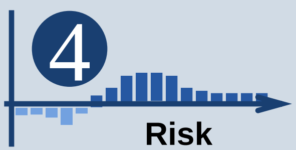
1. Overview of product valuation
2. **rNPV product valuation**
3. Company valuation
4. Deal structure
5. Case study

Five Step Process

Determine Cash Flows in **Development** Phase

Determine Cash Flows in **Market** Phase

Discount with **Discount rate**

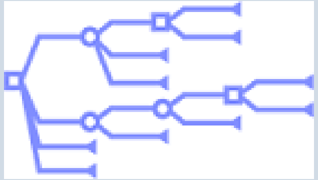


Adjust for **Risk**

5 $$$$$

Sum discounted risk-adjusted cash flows

rNPV – Example

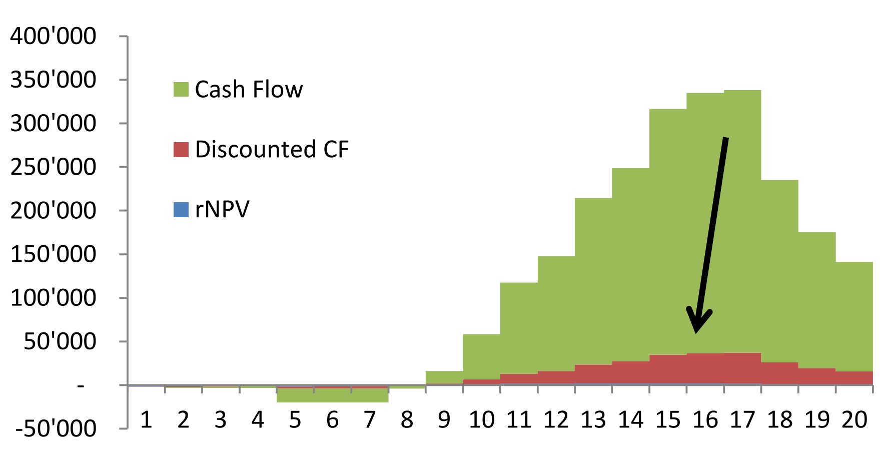


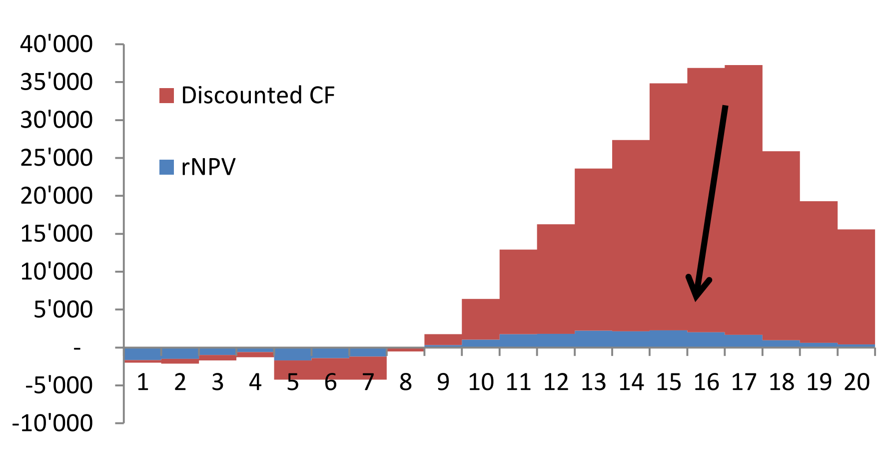
- Phase 1 product
- 20% discount rate
- 11% Probability of success (p1 to market)

⇒ CF: USD 2’269m

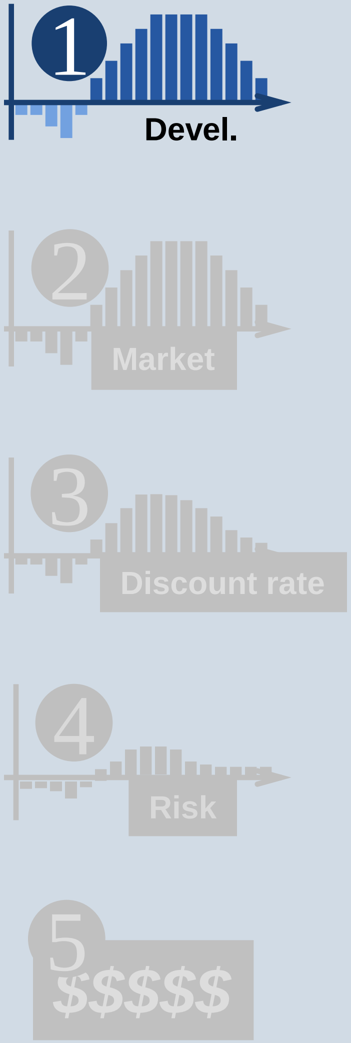
⇒ DCF: USD 127m

⇒ rNPV: USD 8m





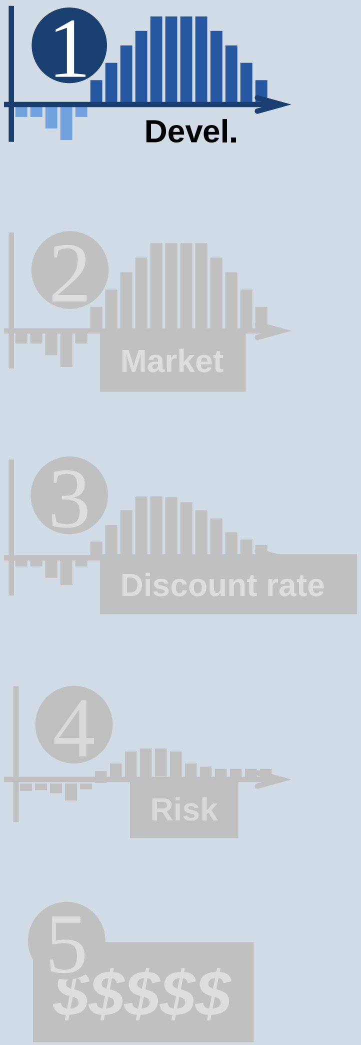
Development Phase



- Determine cost and duration of clinical trials
  - Geographic location
  - Number of patients and centres
  - Type of treatment

- Manufacturing
- Regulatory affairs
- Long term animal tox. studies
- Misc. administration

Example Trial Inputs



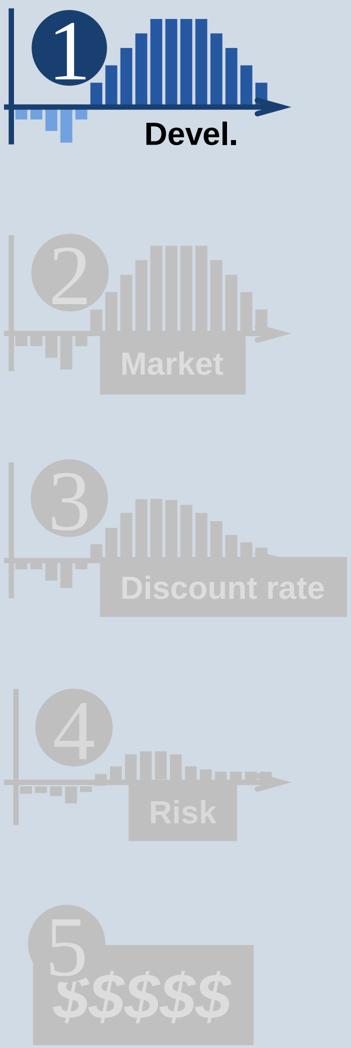
In US$ 000's	Phase I	Phase II	Phase III	Approval
Time (Years)	1	2	3	1
Number of Patients	~10	~200	~3000	
Cost per patient	7	7	7	
Total Patient costs	70	1400	21000	
Total patient costs as percentage of total costs*	30%	30%	30%	
Total non-patient costs	163	3267	49000	
Total costs	233	4667	70000	2500
Total Development Costs (unadjusted)				77400

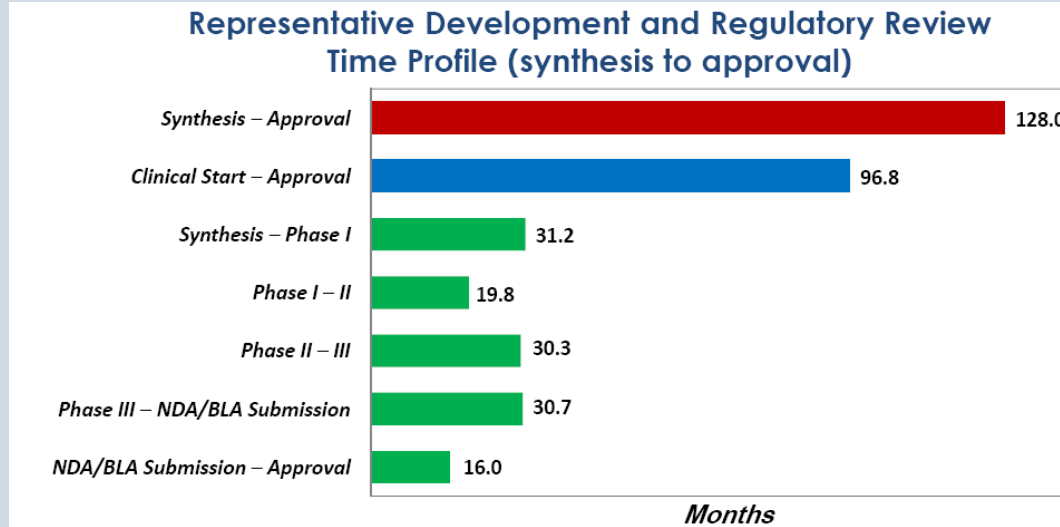
* To factor in other cost including animal studies, manufacturing, administration etc.

Cost and Lead Times

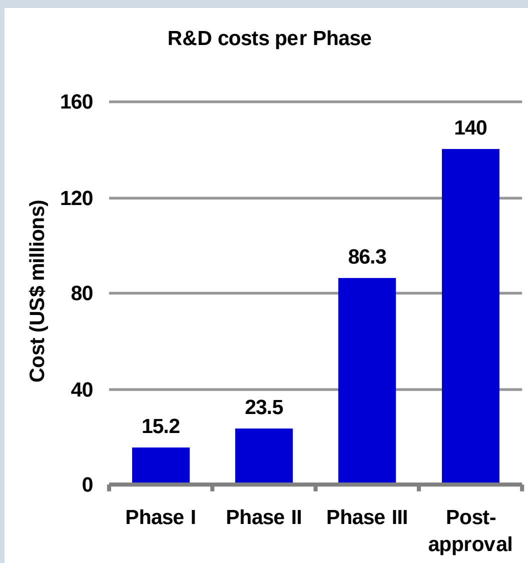
VENTURE VALUATION

Fit for Health 2.0



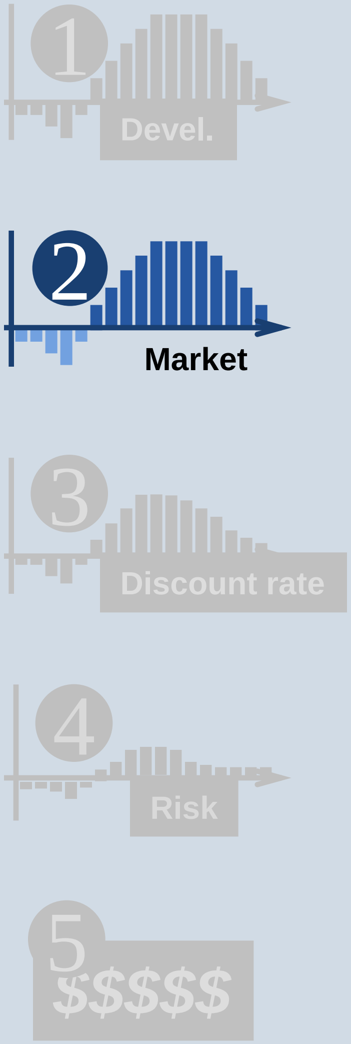


Source: Tufts Center, 2014



Source: Business Insights

Market Phase



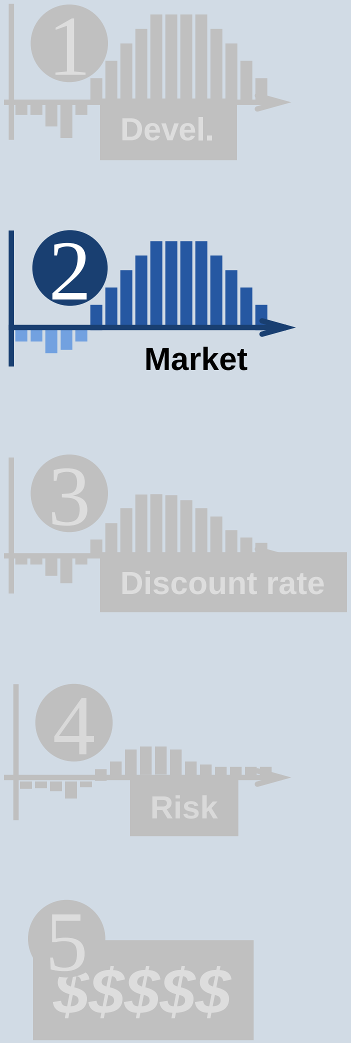
Develop assumptions to predict the future market

Methods used:

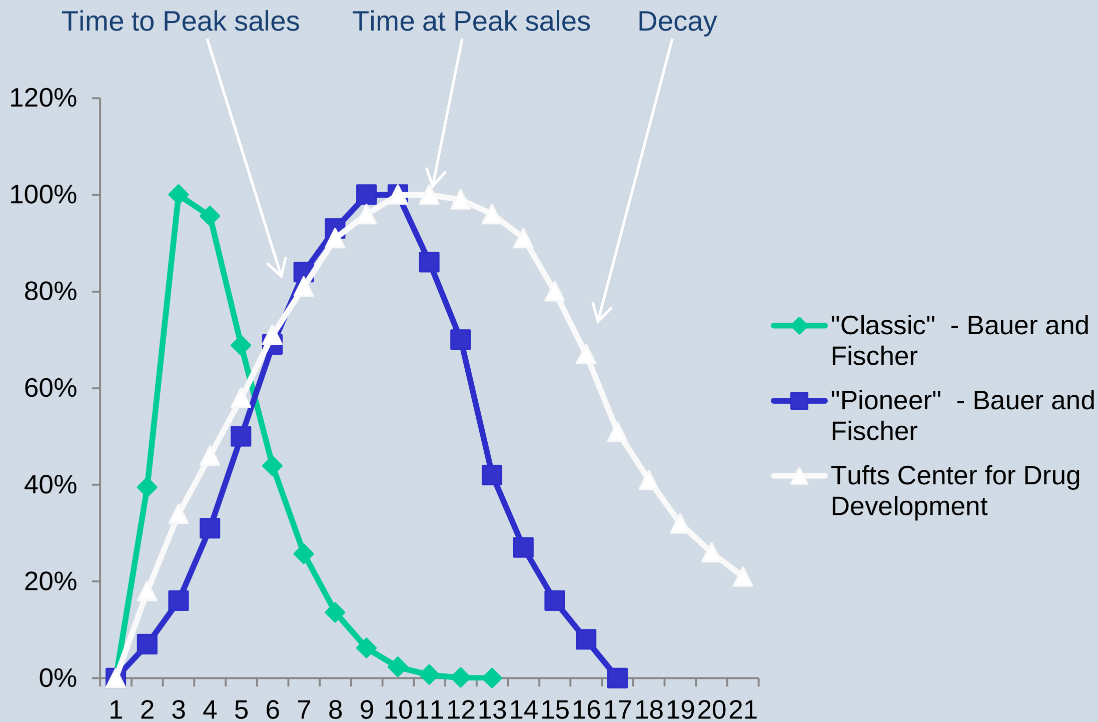
- Bottom-up approach
  - Based on primary market data

- Top-down approach
  - based on comparable products

Product Life Cycle

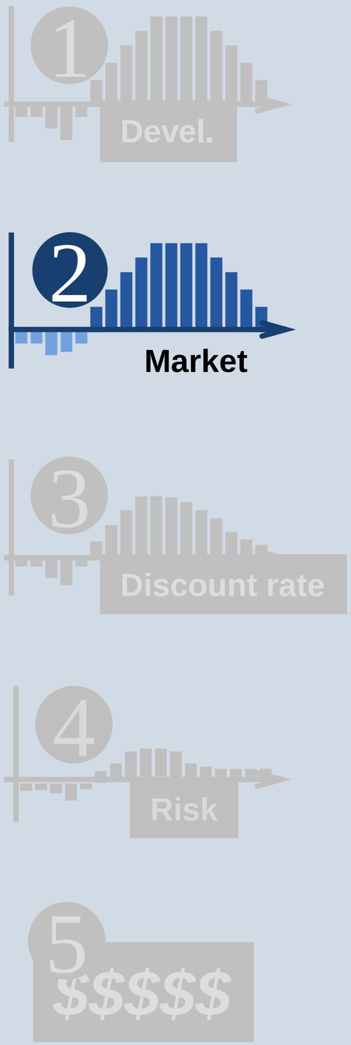


Market penetration:



A. Define Growth Phase (4-8 years)
B. Define Mature Phase (1-4 years)
C. Define Decay Phase (7-10 years)

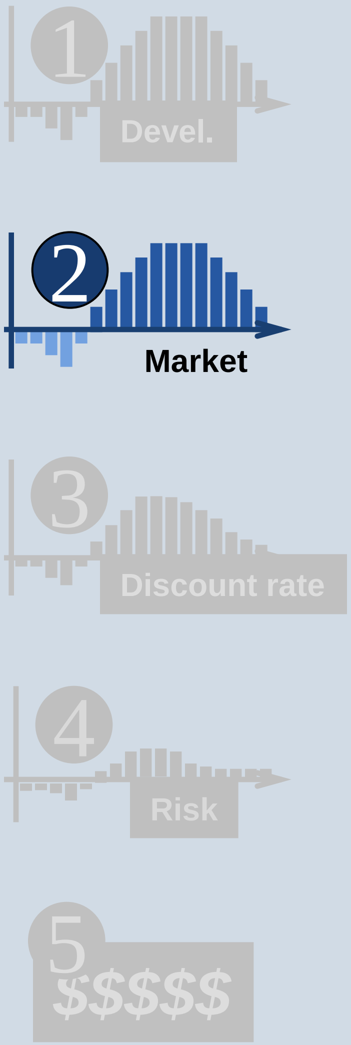
Product Life Cycle



Which variables affect the Life Cycle?

1. Me-too drug or a pioneer
2. Competitive landscape
3. Physician response
4. Ease of reaching physicians
5. Need for physician training
6. Payor reimbursement
7. Pharmacoeconomic reimbursement

Bottom up approach



Sales Forecast

Western EU		2018	2019
Population (000's)		300'000	306'000
Incidence rate (%)	0.020%	60.000	61.200
Diagnosed population	70%	42.000	42.840
Population treated with drugs	80%	33.600	34.272
Compliance rate	90%	30.240	30.845
Addressable population		30.240	30.845
Market penetration rate (%)		18%	34%
Patient population		5.443	10.487
Market share	12%		
Price (EUR)	2000		
Sales Western EU (EUR 000's)		**1'306**	**2'517**
USA Sales		**2'540**	**4'798**
Japan Sales		**392**	**755**
Rest of the World (RoW) Sales		**1'270**	**2'399**
Total sales (EUR 000's)		**5'508**	**10'469**

Peak Sales		**Value**
USD 1bn	=>	USD 8m
USD 0.7bn	=>	USD 3m
USD 2bn	=>	USD 25m

Discount rate

Used discount rate in rNPV:

• Early stage	12% - 28%
• Mid stage	10% - 22%
• Late stage	9% - 20%

Source. www.biostrat.dk

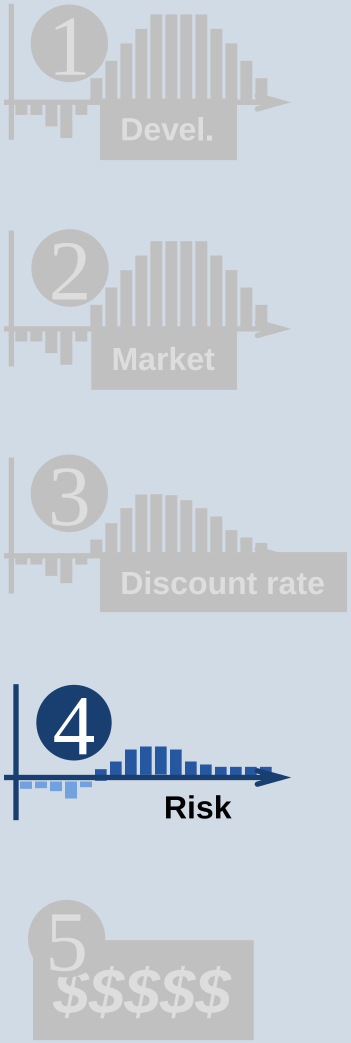
Cost of equity and non-development associated risks.

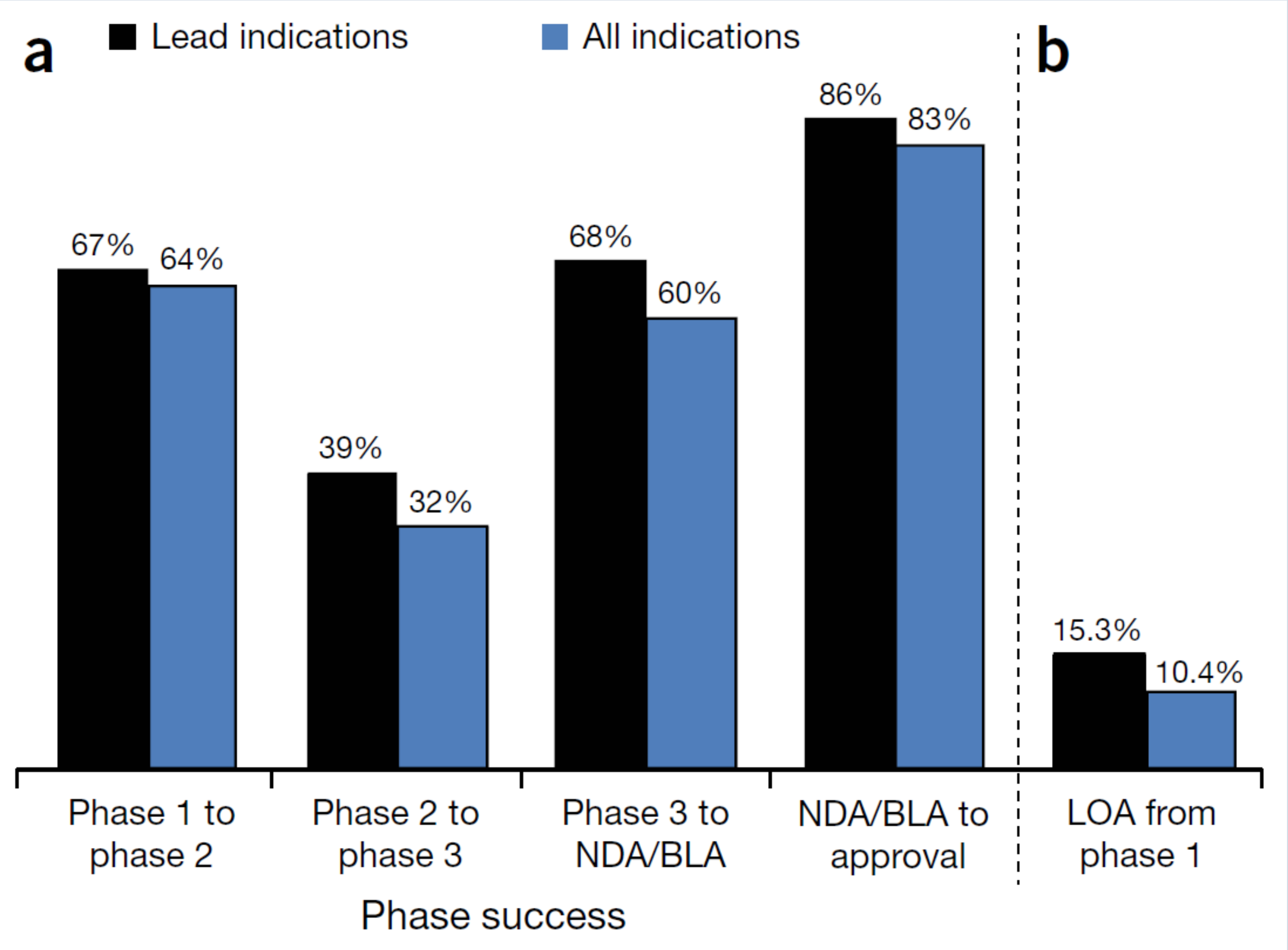
20% => USD 8m
25% => USD 2m
15% => USD 21m

Adjust for risk (II)

VENTURE VALUATION

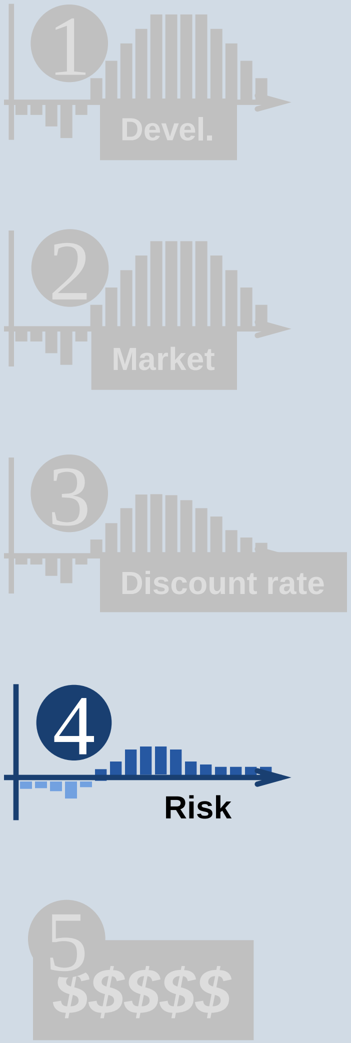
Fit for Health 2.0

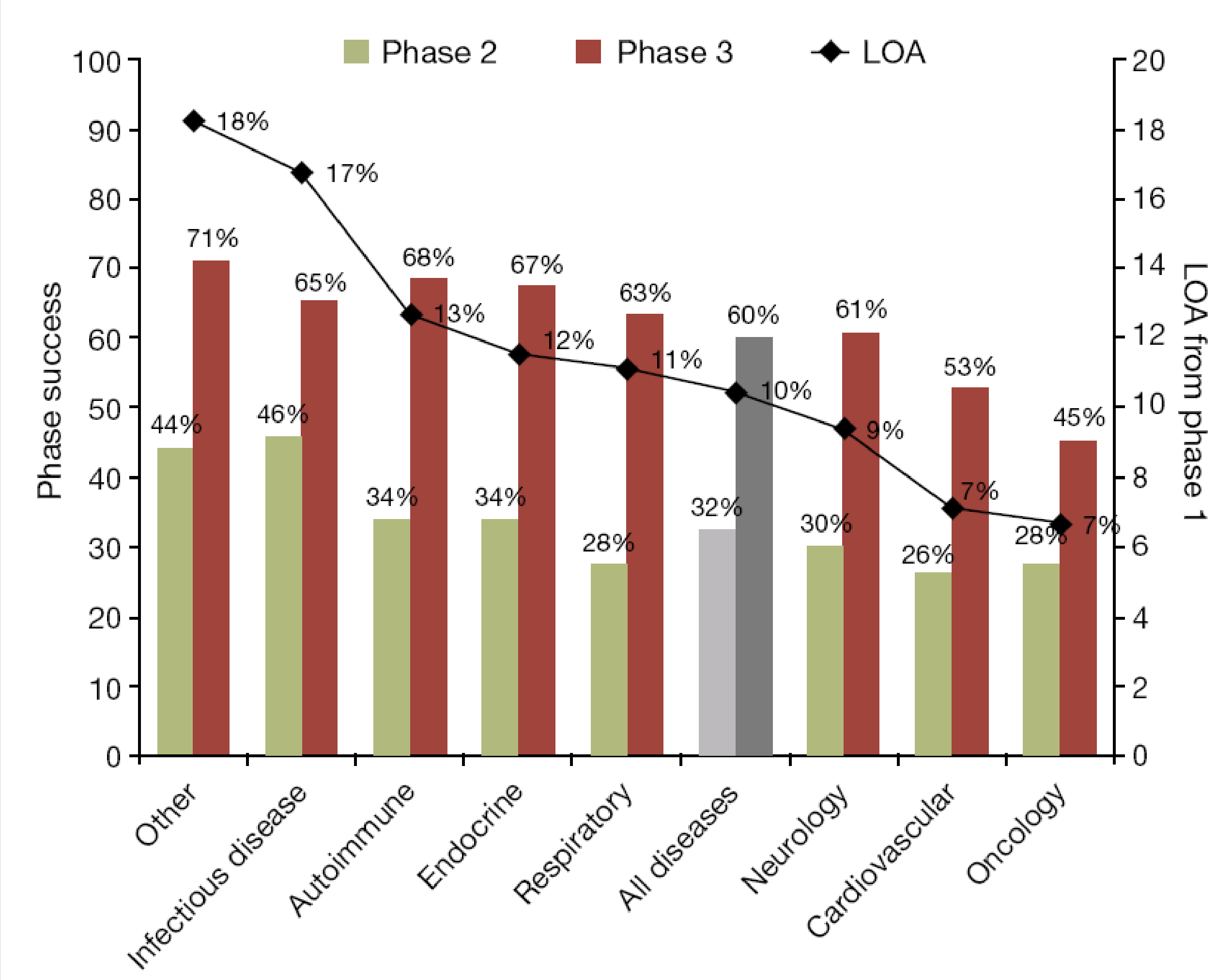




Source: Nature Biotechnology; Clinical development success rates for investigational drugs; January 2014
LOA: Likelihood of approval

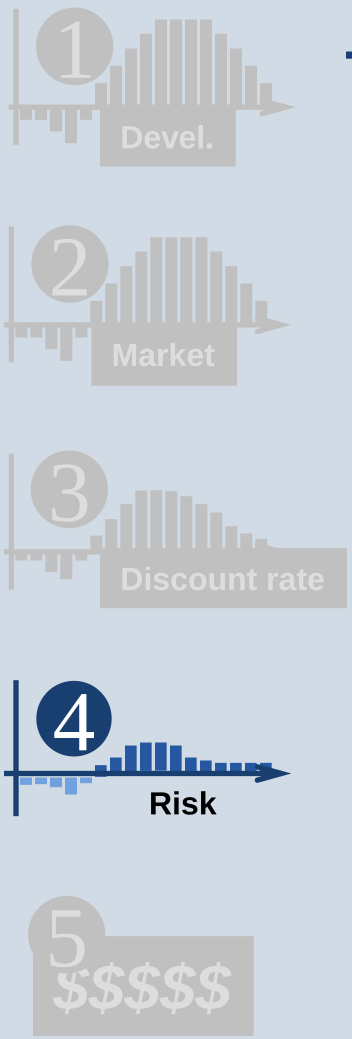
Adjust for risk (I)





Source: Nature Biotechnology; Clinical development success rates for investigational drugs; January 2014
LOA: Likelihood of approval

Adjust for Risk (III)



The relation between Risk and Value

- Completion of a phase ➡ Direct value increase

m USD

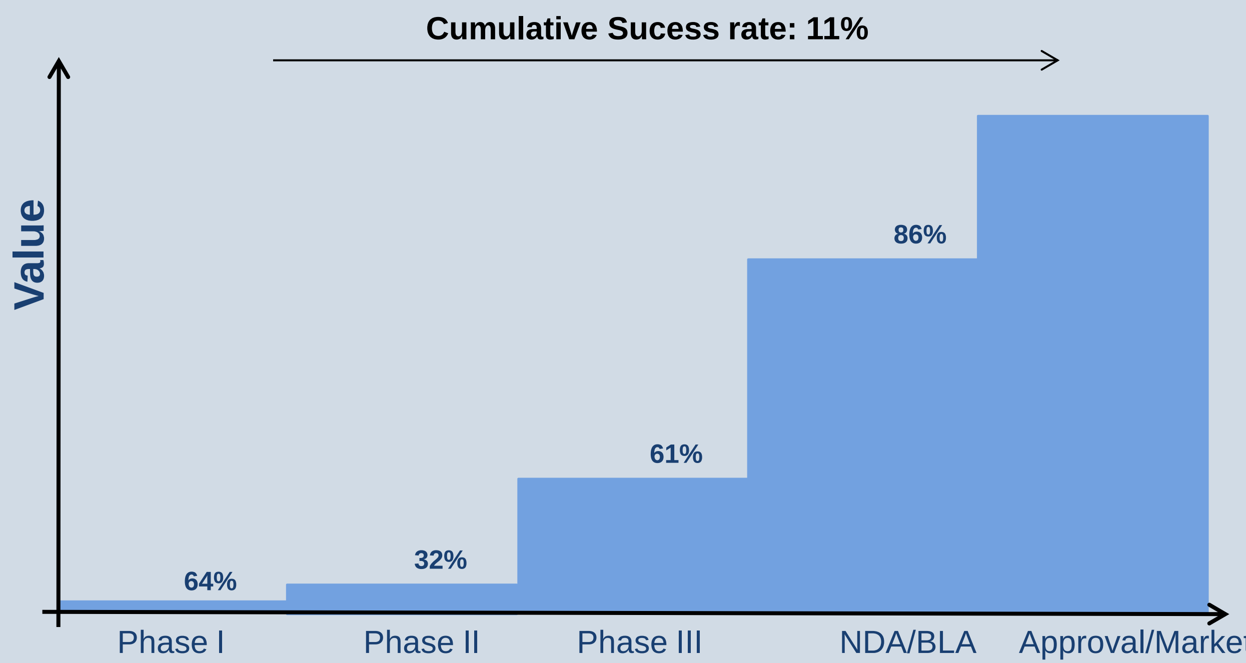
672

477

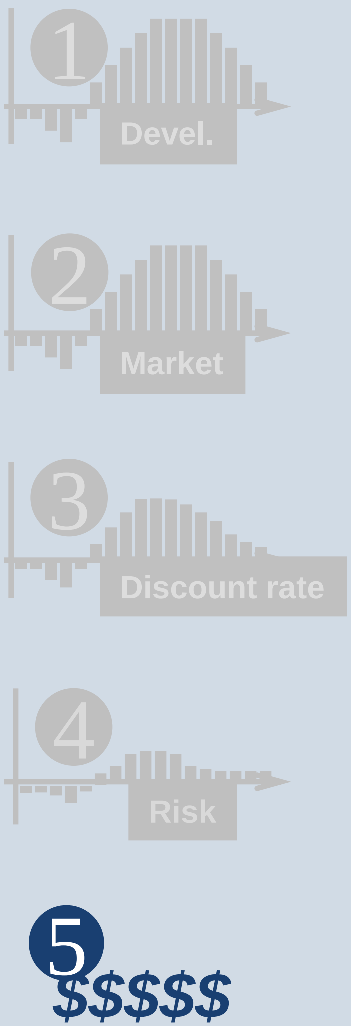
125

18

8



Sum Cash Flows



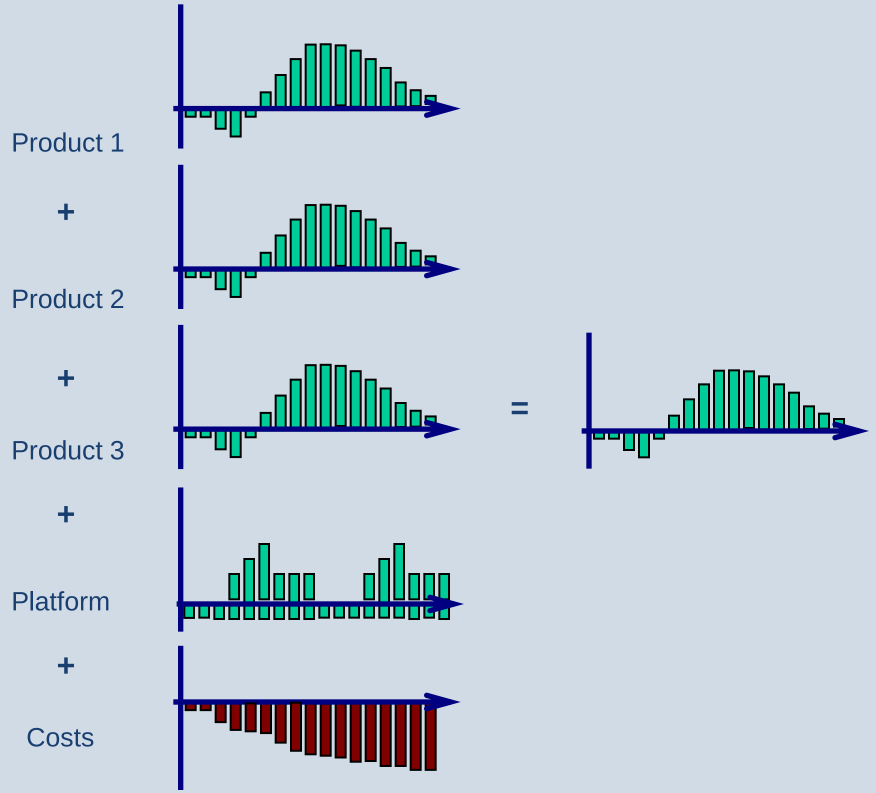
- Sum discounted, risk-adjusted yearly cash flows to a single value

YEAR		***2017***	***2018***	***2019***	***2020***	***2021***
Phase		P III	Approval	Market	Market	Market
DEVELOPMENT COSTS		-50'000	-2'500			
SALES				50'000	100'000	250000
-Discounts, Returns, Allowances	0%	-	-	-	-	-
NET REVENUES (USD 000's)		***-***	***-***	***50'000***	***100'000***	***250'000***
Total Product Costs		***-***	***-***	***-10'000***	***-20'000***	***-50'000***
EBIT		**-50'000**	**-2'500**	**40'000**	**80'000**	**300'000**
Tax	0%	-	-	-	-	
FREE CASH FLOW		***-50'000***	***-2'500***	***40'000***	***80'000***	***300'000***
DISCOUNTED CASH FLOWS		-43'478	-1'890	26'301	45'740	149'153
Stage		**Phase III**	**Approval**	**Market**	**Market**	
Cumulative sucess rate*		100%	75%	66%	66%	66%
RISK ADJUSTED CASH FLOWS		**-43'478**	**-1,418**	**17'359**	**30'188**	**98'441**
TOTAL PRODUCT VALUE		**125'548**				

***Success rate**	Phase I	Phase II	Phase III	Approval
Per phase	100%	100%	75%	88%
Cumulative	100%	100%	75%	66%

1. Overview of product valuation
2. rNPV product valuation
3. **Company valuation**
4. Deal Structure
5. Case study

Example



Early stage company

Sum-of parts valuation

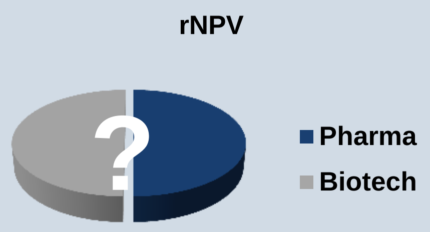
Total value of project

VENTURE VALUATION

Fit for Health 2.0

1. Overview of product valuation
2. rNPV product valuation
3. Company valuation
4. **Deal structure**
5. Case study

Structuring the deal



AIM: to develop a fair deal structure

- Product value has to be shared
- The licensee (Pharma) is compensated for taking on risk
- The licensor (Biotech) receives payments and shares some of the risk and rewards
- The model inputs and assumptions are simple, understandable, and transparent

The rNPV valuation can help to understand the deal terms

VENTURE VALUATION

Fit for Health 2.0

Deal structuring process

1 $$$$$

Determine Product **Value**

Determine handover time point

Determine preferred **Milestones** and **Royalties**

Negotiate terms

Timing of payments

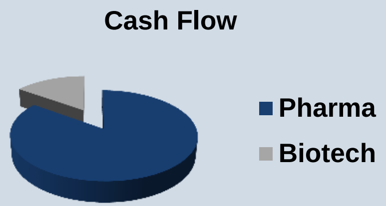
- Front/ back-loading a deal can heavily influence deal structure
- Deal terms dependent on needs of both parties

In USD m	Payment of	rNPV* (or up-front)
Up-front	1 m	1 m
Finish Pre-clinical	1 m	0.44 m
Finish Phase I	1 m	70’000
Finish Phase II	1 m	17’000
Finish Phase III	1 m	8’000
Approval / Enter market	1 m	5’000
Royalties	1%	0.70 m

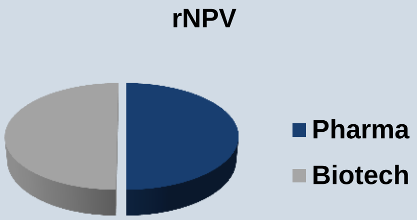
*** Time value of money and Risk adjusted**

Timing of payments (II)

- Two very different deal structures can look identical

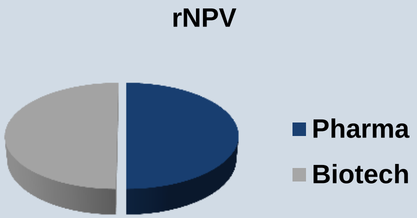


- Non-discounted, non-risk adjusted



1

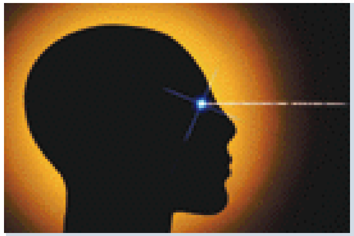
- 25 million upfront
- 300 million milestones
- 5% royalties



2

- 5 million upfront
- 50 million milestones
- 12% royalties

Case Study



1) Case study reading time (10 min)
2) Valuation / Discussion

A) Determine the current value of XC-71F.

B) Would you accept the deal terms suggested by the biotech company?

C) Develop a deal scenario that is fair for both parties.

VENTURE VALUATION

Thank you for listening!

Slides available on www.venturevaluation.com

Tel.: +41 (43) 321 86 60
Fax: +41 (43) 321 86 61
www.venturevaluation.com
p.frei@venturevaluation.com

Venture Valuation AG
Kasernenstrasse 11
8004 Zürich
Switzerland