



THE VALUATION EXPERTS

Product Valuation

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October 2014 | Exploitation training FFH2.0, Stuttgart

Venture Valuation

Mission

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

**Information services / Life Sciences Databases
Biotechgate.com**

- Experts Finance / High-tech industries
- Not a venture capitalist
- International experience
- Track record of over 250 valued companies
- Clients such as NVF, Fraunhofer Gesellschaft, European Investment Bank; VCs; Arpida/Evolva

Agenda

- **Overview of product valuation**
- **rNPV product valuation**
- **Company valuation**
- **Deal structure / Negotiation**
- **Case study**

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Product Valuation

Valuation of a product

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



Introduction

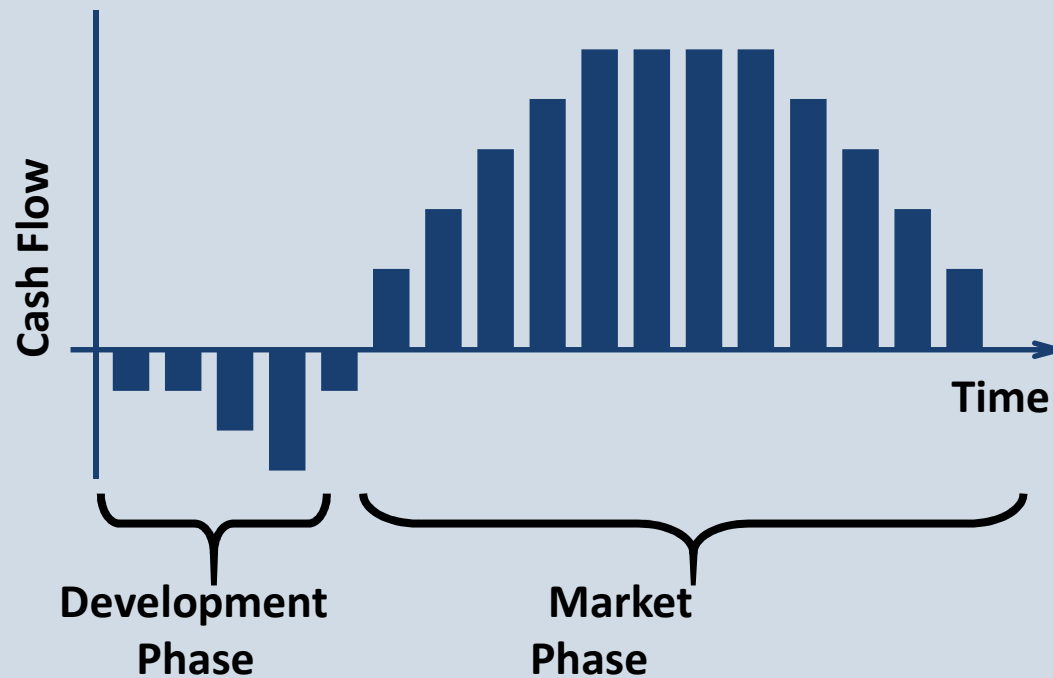
Input

- Development cost and timelines
- Production / Marketing cost
- Market / expected sales
- Success rate based on historical data

Output

- Expected annual discounted cash flows

Valuation components



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

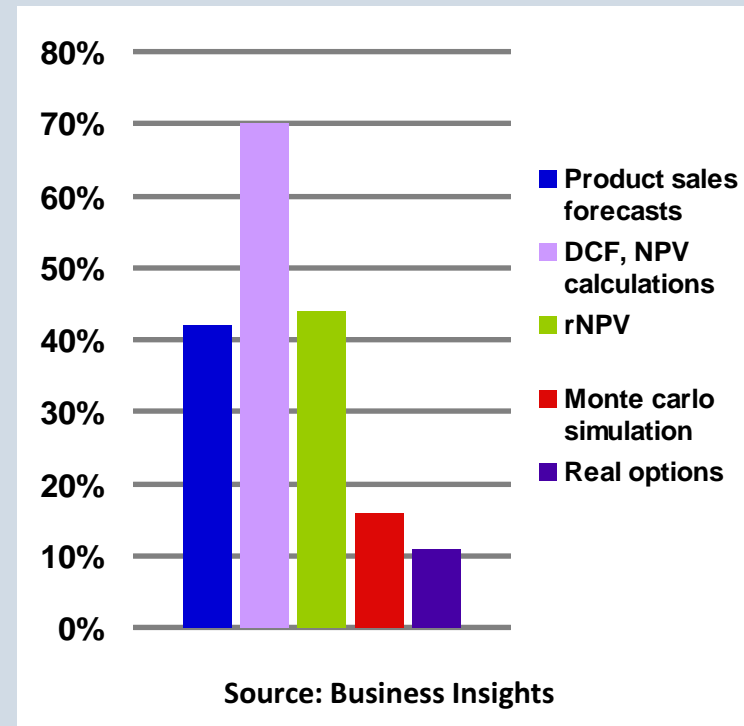
Valuation Methods

complexity

- Simple sales forecasts
- Discounted cash flows
- rNPV (eNPV)
- Real options

- Monte Carlo Analysis

Industry use



Risk-adjusted NPV

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

Risk adjusted Net Present Value

- Also called eNPV
- Method of choice for Big Pharma

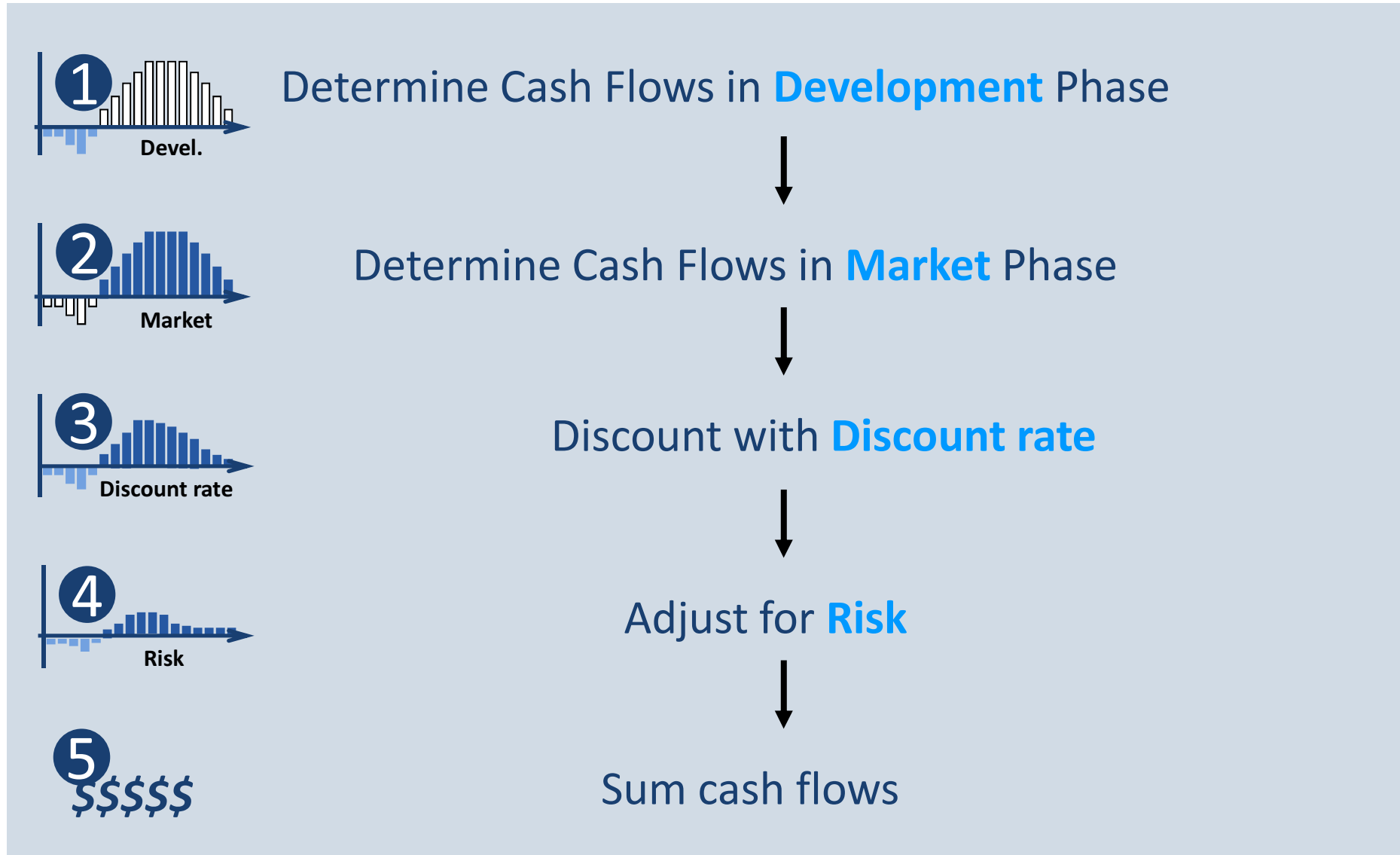
Benefits:

- 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)

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Five Step Process



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



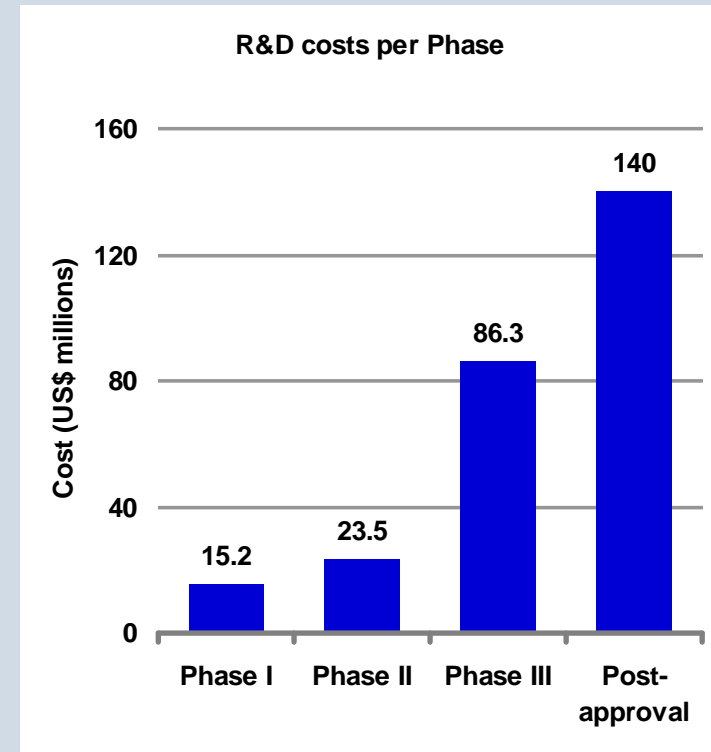
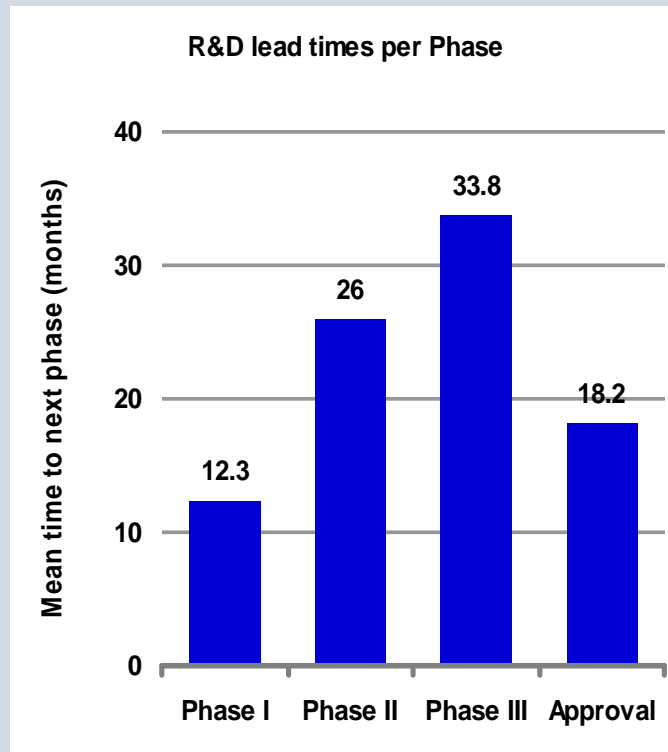
Example Trial Inputs



In US\$ 000's	Phase I	Phase II	Phase III	Approval
Time (Years)	1	2	3	1
Number of Patients	~10	~200	~3'000	
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	3'267	49'000	
Total costs	233	4'667	70'000	2'500
Total Development Costs (unadjusted)				77'400

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

Cost and Lead Times



Source: Business Insights

Market Phase



Develop assumptions to predict the future market

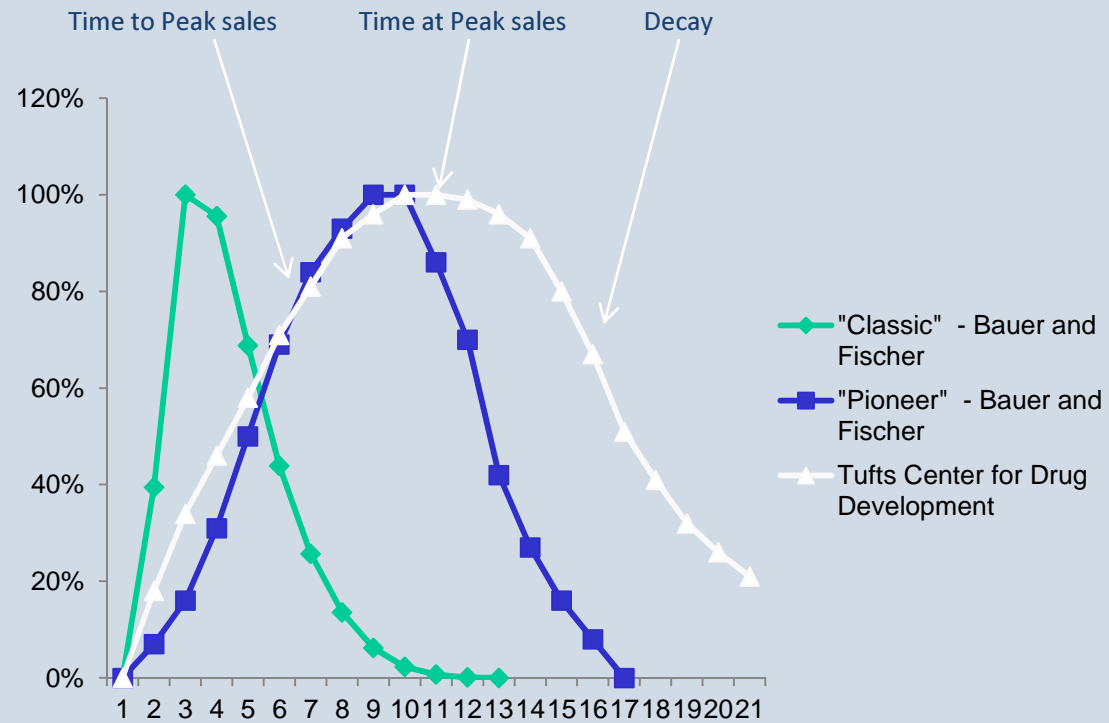


Methods used:

- Bottom-up approach
 - Based on primary market data
- Top-down approach
 - based on comparable products



Product Life Cycle



- 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



Primary Market Research

Physicians:

- What are the unmet medical needs
- What are the attitudes towards current therapies



Patients:

- How do the patients view the current treatments



Product:

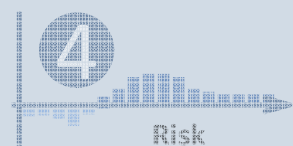
- What therapeutic position is the drug likely to achieve
 - (1st line, 2nd line; EU, US)
- Develop a pricing model



Product life cycle and Market share are obtained from top-down methods or industry accepted values



Bottom up approach



Sales Forecast

Western EU		2013	2014
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 (EUR 000's)		1'306	2'517
USA		2013	2014
Population (000's)		400'000	408'000
Incidence rate (%)	0.020%	80.000	80.000
Diagnosed population	70%	56.000	56.000
Population treated with drugs	80%	44.800	44.800
Compliance rate	90%	40.320	40.320
Addressable population		40.320	40.320
Market penetration rate (%)		18%	34%
Patient population		7.258	13.709
Market share	14%		
Price (EUR)	2500		
Sales (EUR 000's)		2540	4798
Total sales (EUR 000's)		3847	7315

Discount rate



Adjust yearly cash flows with a discount rate:



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



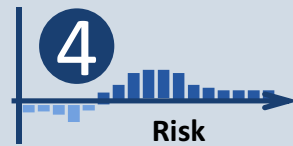
Source. www.biostrat.dk



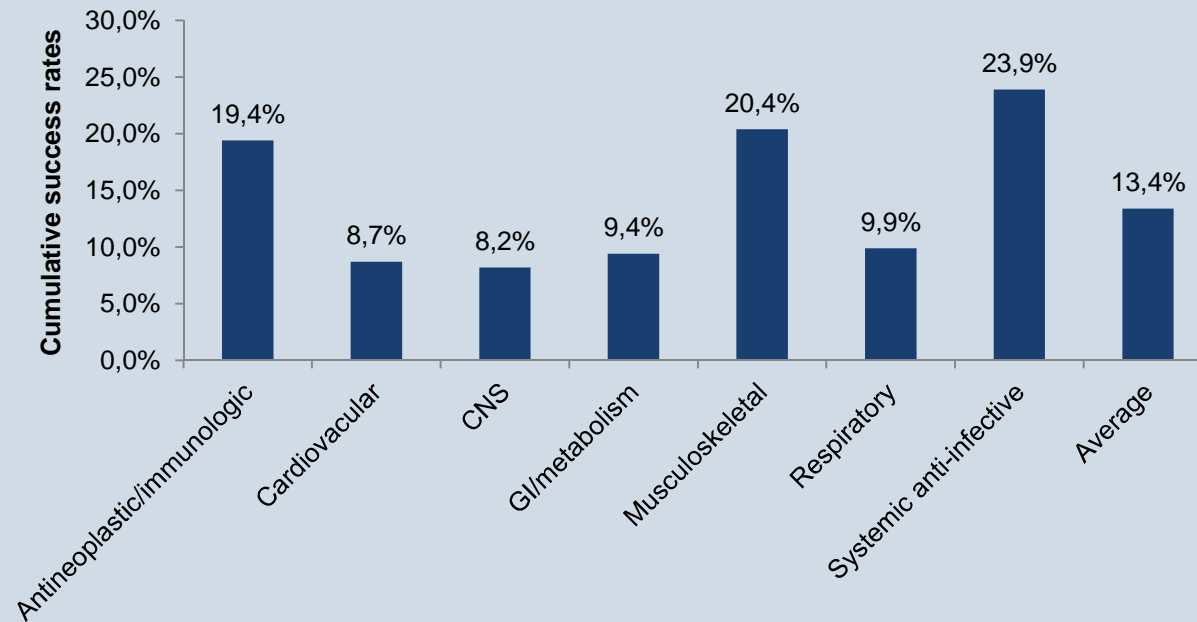
The discount rate account for cost of equity and non-development associated risks.



Adjust for risk (I)

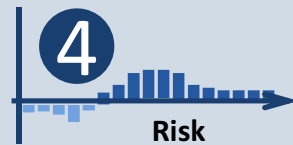


Cumulative success rates: Phase I - Market

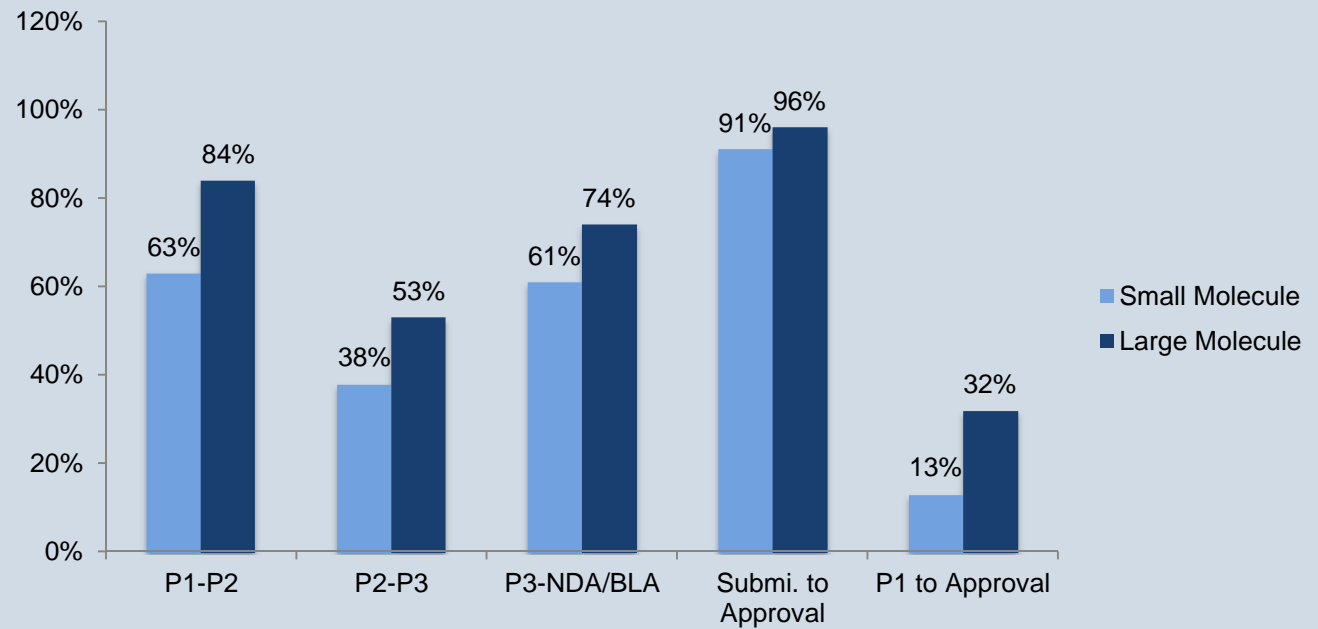


Source: Dimasi, *et al.* Clinical Pharmacology & Therapeutics 87, 272-277, March 2010

Adjust for risk (II)



Product development success rates: Small Molecules vs Large Molecules

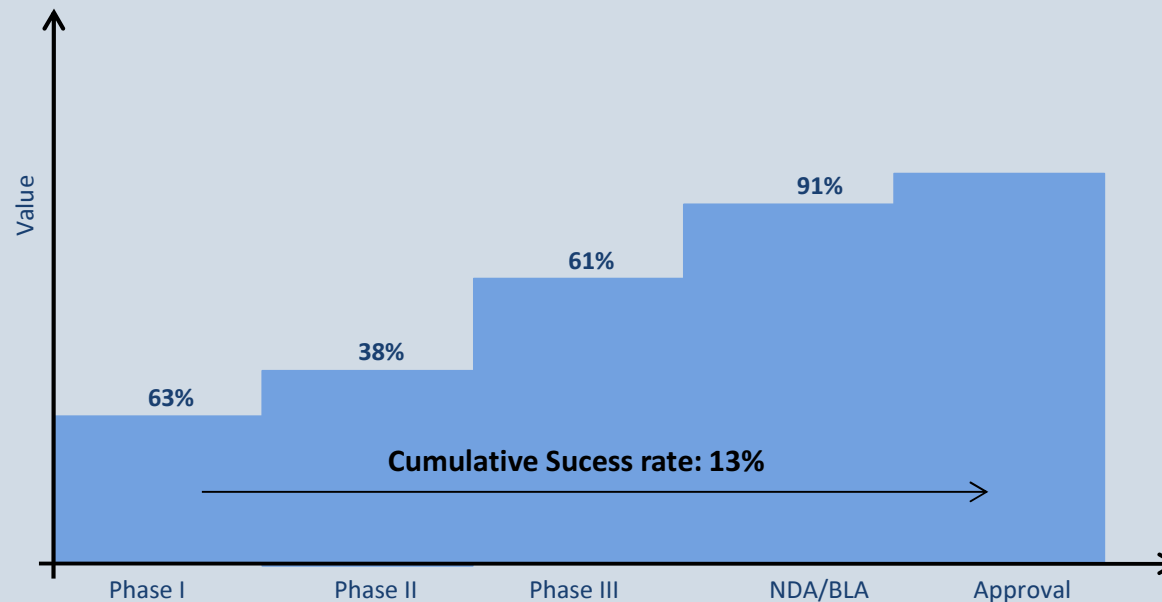
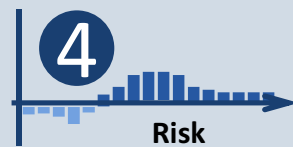


Source: Dimasi, *et al.* Clinical Pharmacology & Therapeutics 87, 272-277, March 2010

Adjust for risk (III)

The relation between Risk and Value

- Completion of a phase → Direct value increase



Sum Cash Flows

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



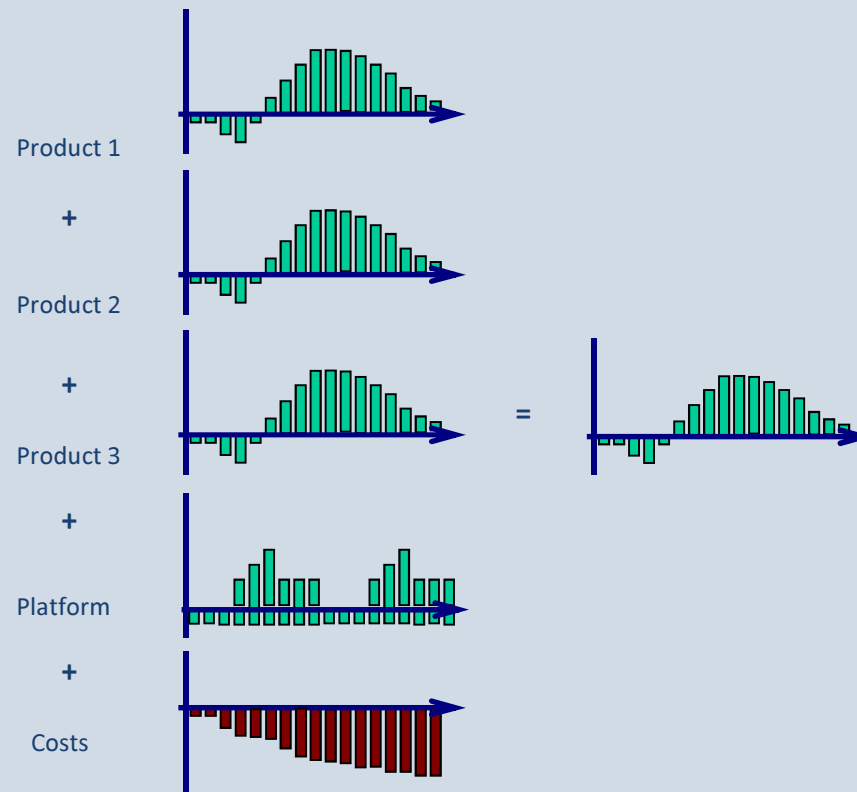
YEAR	2012	2013	2014	2015	2016
Phase	P III	Approval	Market	Market	Market
DEVELOPMENT COSTS	-50'000	-2'500			
SALES			50'000	100'000	250'000
-Discounts, Returns, Allowances	0%	-	-	-	-
NET REVENUES (USD 000's)	-	-	50'000	100'000	250'000
Total Product Costs	-	-	-10'000	-20'000	-50'000
EBIT	-50'000	-2'500	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 success rate*	100%	75%	71%	71%	71%
RISK ADJUSTED CASH FLOWS	-43'478	-1,418	18'674	32'475	105'899
TOTAL PRODUCT VALUE	113'570				

*Success rate	Phase I	Phase II	Phase III	Approval
Per phase	100%	100%	75%	94%
Cumulative	100%	100%	75%	71%

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Example



Early stage company
Sum-of parts valuation
Total value of project

Summary

- Use **Independent** and **unbiased** models
- Provide **simple** and **clear** valuations to understand costs, risks and revenues
- Product valuations **help to understand** investment, risk and return
- The value of the product has to be **shared** between licensee and licensor.

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Negotiation - Definition

- **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

Licensing process

Activities	Search & Evaluation	Pre-negotiation	Negotiation	Alliance Management
Objectives	Identify potential partners	Getting prepared	Build the collaboration	Manage the collaboration
Actions	<p>Market assessment</p> <p>Industry network Attend partnering events</p> <p>Web based Partnering databases</p>	<p>BATNA</p> <p>Product/Company valuation</p> <p>Define preferred deal structure</p> <p>Learn about the people behind the deal</p>	<p>Aim for a win-win deal</p> <p>Identify the type of negotiator you are about to deal with</p> <p>Select a negotiating team</p> <p>Cultural aspects</p>	<p>Assign an alliance manager</p> <p>Country/company culture</p> <p>Nurture the collaboration</p>
Time frame	1-3 months	1-2 months	3-6 months	2-10 years

Structuring the deal

rNPV



■ Pharma
■ Biotech

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

Deal structuring process

1
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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 EURm	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

Cash Flow

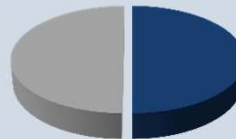


■ Pharma
■ Biotech

- Non-discounted, non-risk adjusted

1

rNPV

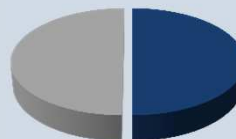


■ Pharma
■ Biotech

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

2

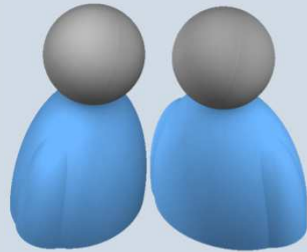
rNPV



■ Pharma
■ Biotech

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

Benchmarking data



Biotechnology deal terms

Biotech Deals	Upfront (USD m)	Milestones (USD m)	Royalty (%)
Preclinical	2	15	7
Phase I	5	25	10
Phase II	10	35	20
Phase III	15	50	25

Source: Keegan K. D., Biotechnology valuation – An Introductory Guide, 2008

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Case Study



1) Case study reading time: 15 min

2) Group work: 45 hour

3) Presentation and wrap up: 15 min

- 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
- d) Present the results in a short presentation, justifying all major assumptions



Thank you!

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