VENTURE VALUATION

Workshop Presentation: Deal and Product Valuations

Jan 2018 | San Francisco, RESI

Agenda

VENTURE VALUATION

1. Overview of product valuation
2. rNPV product valuation
3. Deal structure / Negotiation
4. Case Study

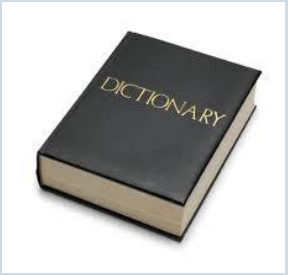
Company

VENTURE VALUATION

Mission	Independent assessment and valuation of technology driven companies / products in growth industries
	Biotechgate / Life Sciences Database
Offices	HQ: Zurich with representative offices in Europe, North America and Asia
Employees	30 people in Switzerland / UK / Ireland / Canada / USA Singapore / India / China
Clients	Pharma, Biotech and Investors such as Novartis Venture Fund, GSK, European Investment Bank, 4SC, Arpida/Evolva, Celtic Pharma Biotech Associations / Governments like Ausbiotech, CLSA, SwedenBio, BIOTECanada, Maryland

Value vs. Price

VENTURE 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, licensing deal

Product Valuation

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Valuation of a product

- Value of an asset
- Licensing deal
- Strategic development decision
- Expenses included are only those relevant to the product

Introduction

VENTURE VALUATION

Input

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

Output

- Expected annual discounted cash flows

rNPV Valuation

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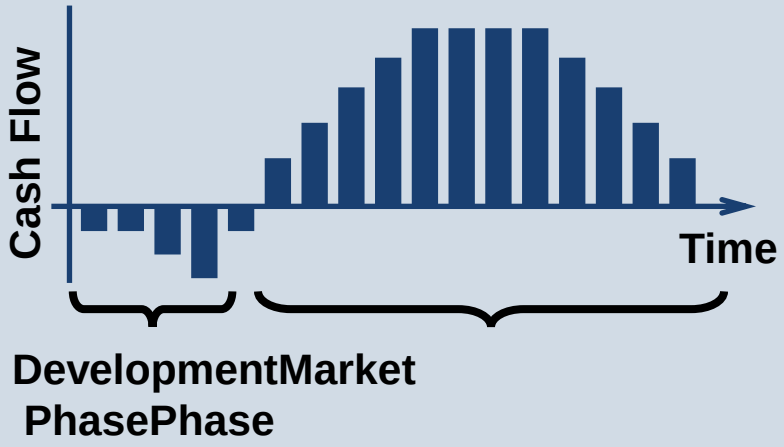
1. Development phase => investment
   Product Risk (r) => success rate or attrition rate

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

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



VENTURE VALUATION

1. Overview of product valuation
2. **rNPV product valuation**
3. Deal structure / Negotiation
4. Case Study

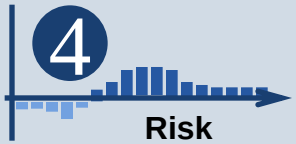
Five Step Process

VENTURE VALUATION

Determine Cash Flows in **Development** Phase

Determine Cash Flows in **Market** Phase

Discount with **Discount rate**



Adjust for **Risk**

Sum cash flows

rNPV – Example

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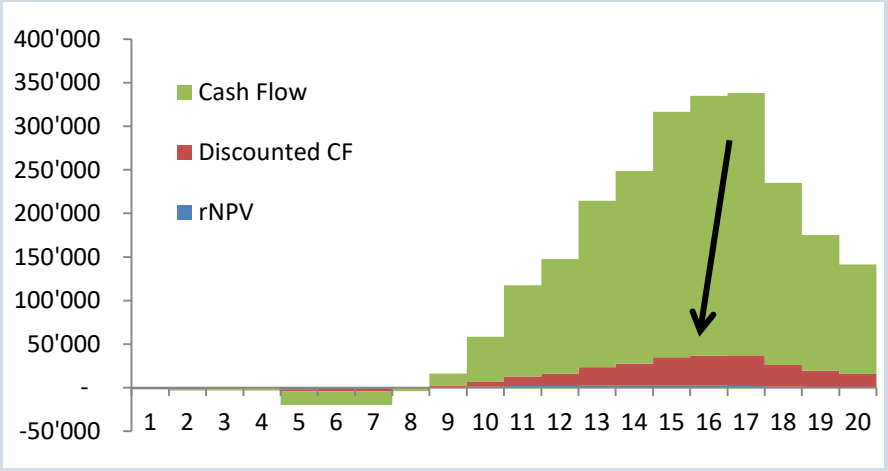
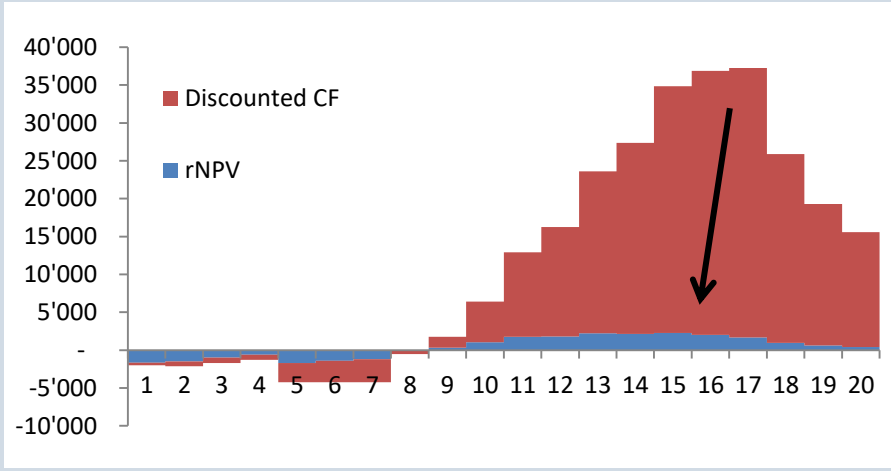
- Phase 1 product
- 20% discount rate
- 11% Probability of success (p1 to market)

⇒ CF: USD 2’269m

⇒ DCF: USD 127m

⇒ rNPV: USD 8m





Development Phase

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- 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

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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.

Market Phase

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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

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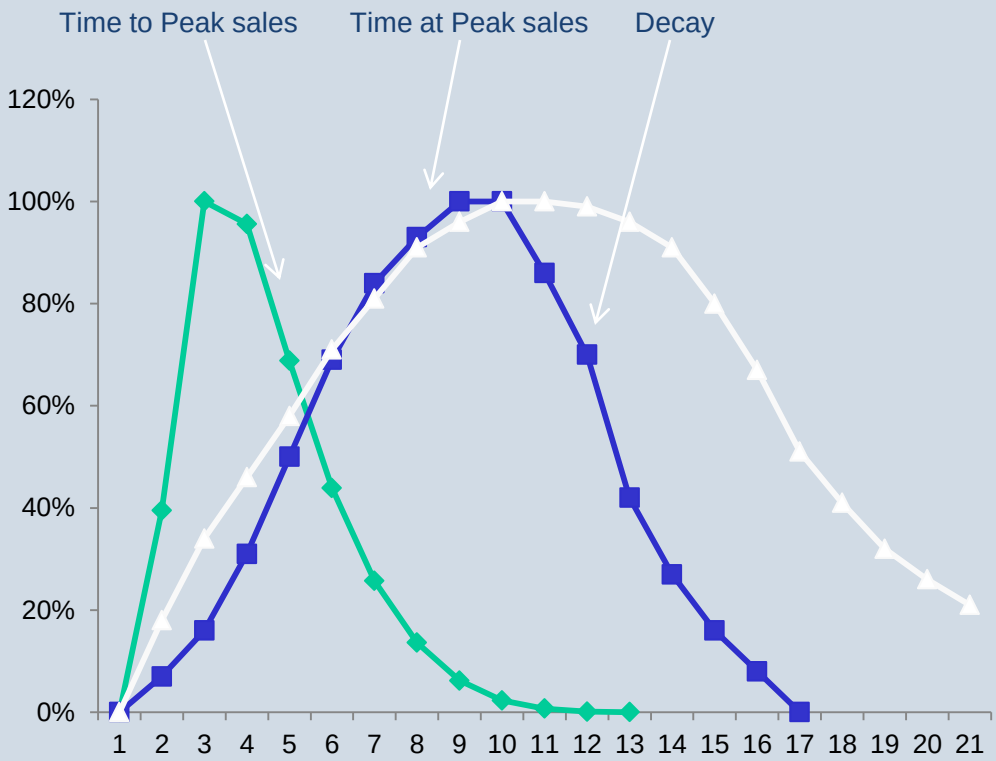

A. Define Growth Phase (4-8 years)
B. Define Mature Phase (1-4 years)
C. Define Decay Phase (7-10 years)

Bottom up approach

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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

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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 (I)

VENTURE VALUATION

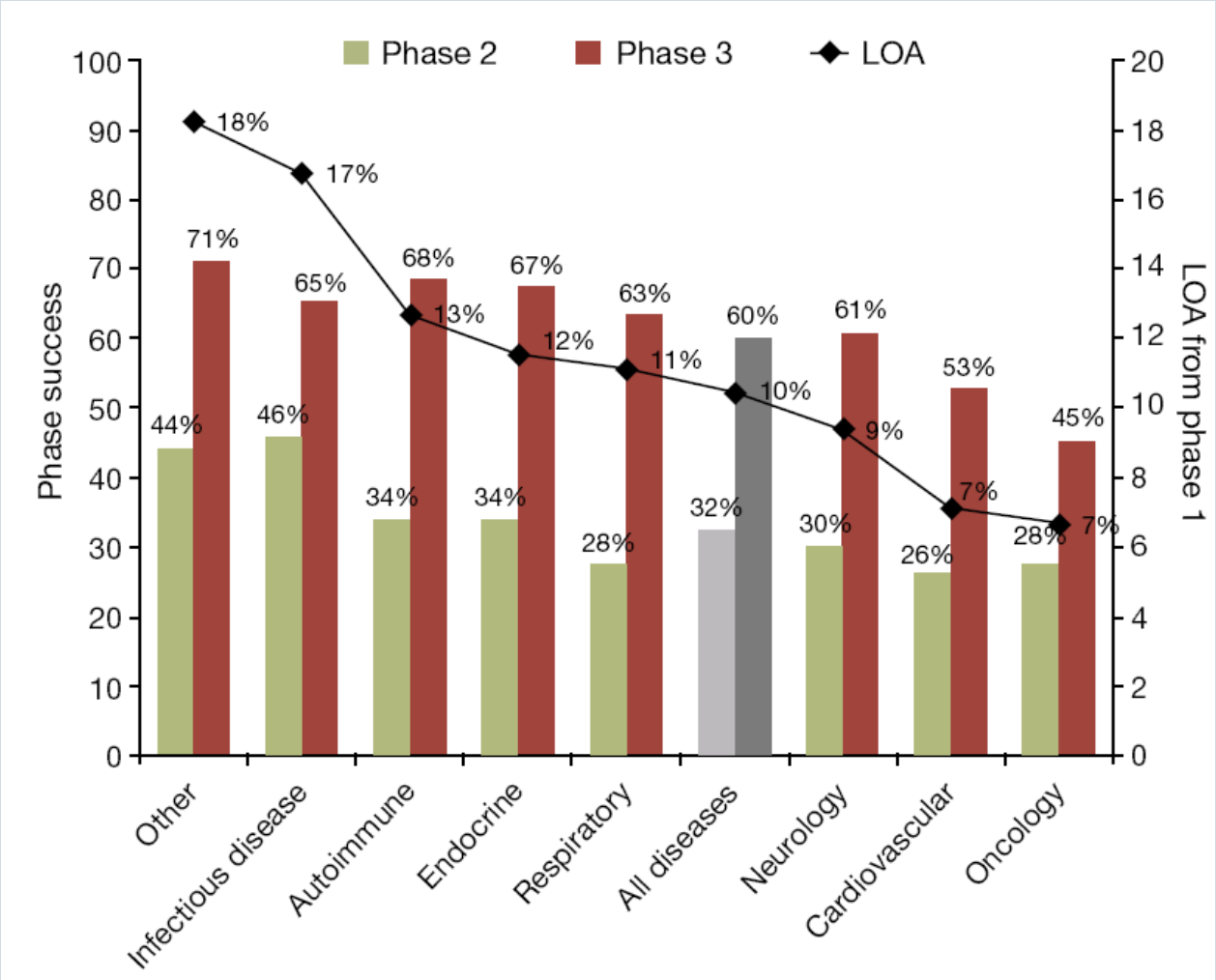
1 Devel.

2 Market

3 Discount rate

4 Risk

5 $$$$$



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

Adjust for risk (III)

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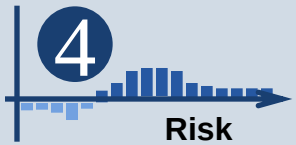
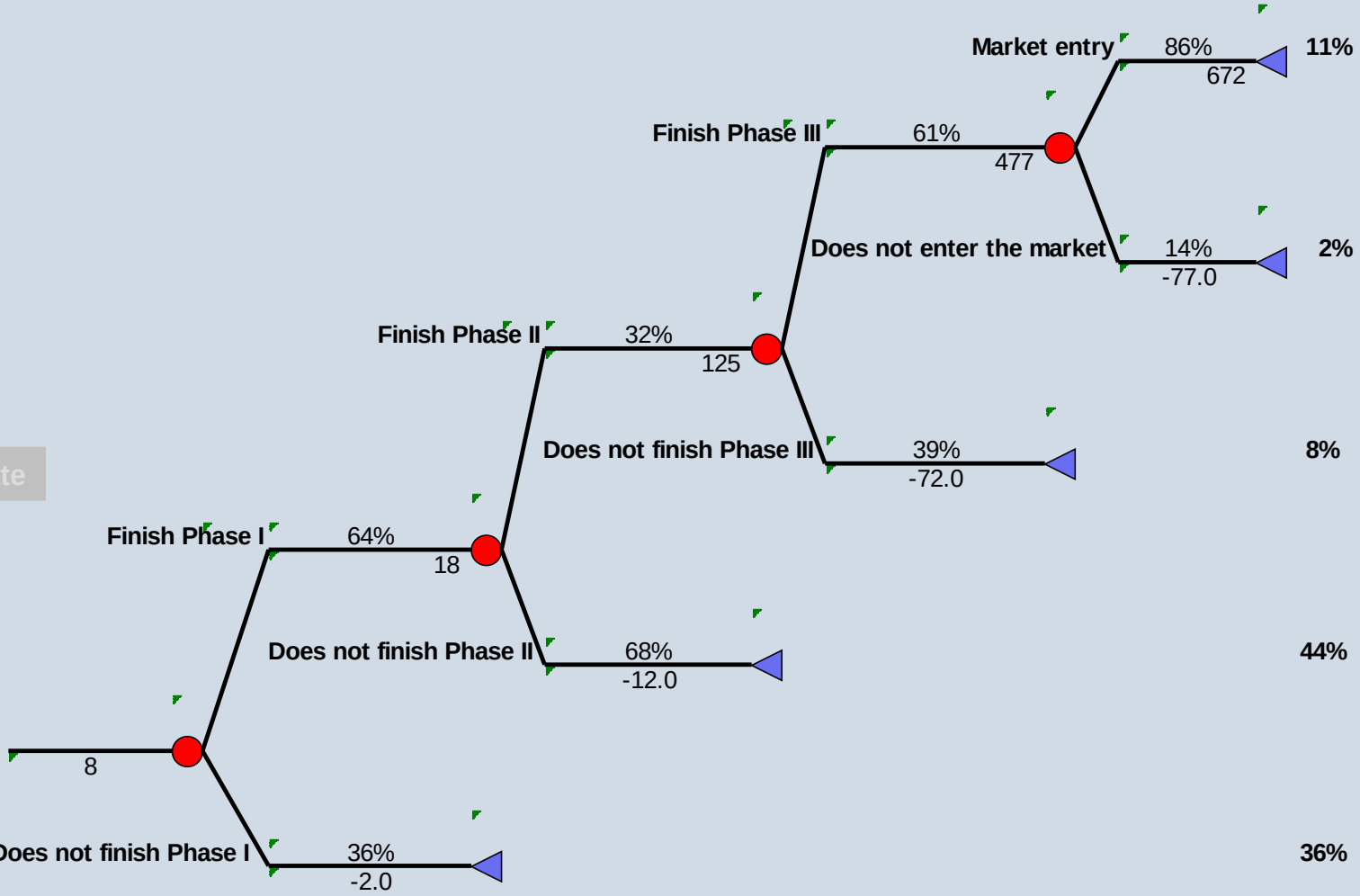
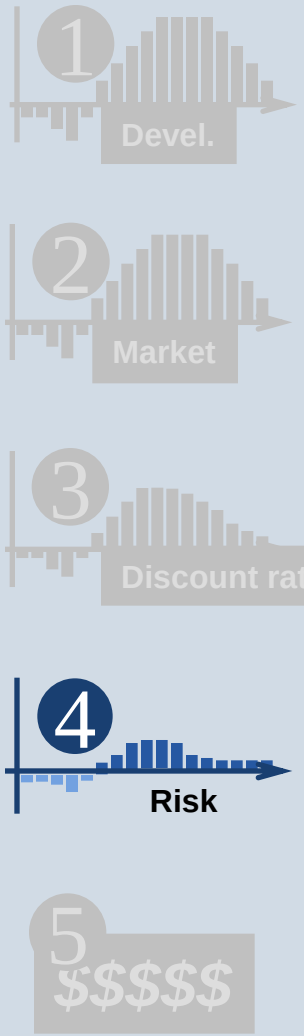




Adjust for Risk (III)

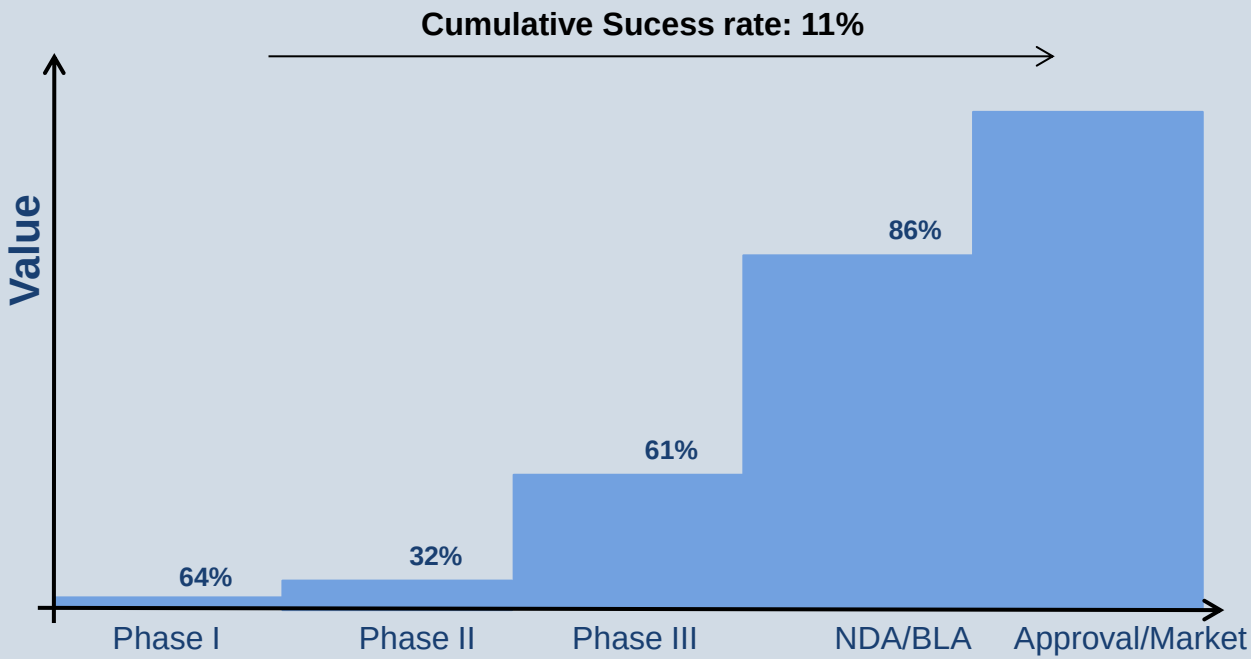
VENTURE VALUATION



The relation between Risk and Value

- Completion of a phase ➡ Direct value increase

m USD
672
477
125
18
8



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Structuring the deal

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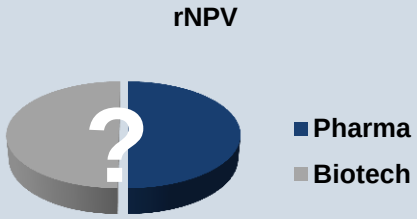

AIM: to develop a fair deal structure

- 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

Timing of payments

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- 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)

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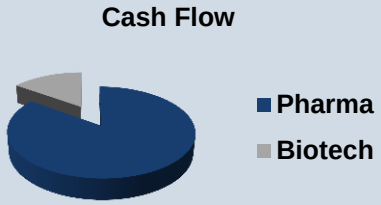
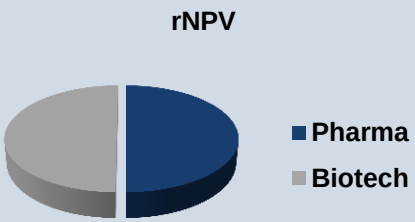
- Two very different deal structures can look identical



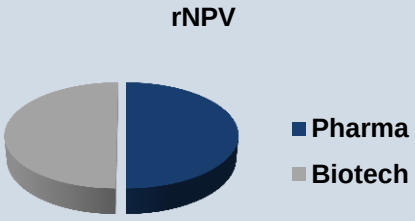
- Non-discounted, non-risk adjusted

1



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

2



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

VENTURE VALUATION

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4. **Case Study**

Case Study

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- Mid-size Pharma to in-license from a Biotech
- Phase I finished pancreatic cancer product
- Prevalence: 14/100’000
- Patents expiring in Q1 2036

Proposal from Biotech:

- EUR 20m up-front
- EUR 90m milestone at market entry
- 10% royalties on net revenues

Case Study - Market

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- 1 competitor product on the market since 2004

  (Patent expiry in 2014), had 60% market share

2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
150	370	550	760	980	1000	1200	1400	**1600**	1500	1200	900
9%	23%	34%	48%	61%	63%	75%	88%	**100%**	94%	75%	56%

In EUR 000

- Competing products in development:

  7 pre-clinical

  3 in phase I

Case Study - Sales

VENTURE VALUATION

Sales Forecast

Western EU		2024	2025	2026	2027	2028	2029	2030	2031	2032
Population (000's)		400'000	408'000	416'160	424'483	432'973	441'632	450'465	459'474	468'664
Prevalence rate (%)	0.014%	56	57	58	59	61	62	63	64	66
Diagnosed population	90%	50	51	52	53	55	56	57	58	59
Population treated w. drugs	80%	40	41	42	43	44	45	45	46	47
Compliance rate	90%	36	37	38	39	39	40	41	42	43
Market penetration rate (%)		10%	26%	38%	50%	62%	73%	83%	90%	100%
Max patient potential		4	10	14	19	24	29	34	38	43
Market share	60%									
Price (EUR)	40’000									
Sales (EUR m)		65	173	258	347	438	526	611	675	765
USA										
Sales (EUR m)		56	149	223	299	378	454	527	582	660
Total sales (WEU & USA)		122	323	481	646	816	981	1137	1258	1425

Case Study – Costs

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Phase II:	EUR 18m	2 years
Phase III:	4’200 patients @ EUR 9’000 patient costs = 1/3 of total costs Total costs: EUR 113m (3 * EUR 38m)	3 years
Approval:	US and EU: EUR 3 m	1 year

Case Study – Cost

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- Discounts to wholesalers: 8%
- Sales & marketing costs: 25% of net revenues
- G&A costs: 5% of net revenues
- Cost of goods sold (COGS): 11% of net revenues
- Capital expenditures: 2% of net revenues

Case Study – Developm.

VENTURE VALUATION

In m EUR		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
		P II	P II	P III	P III	P III	Approval	Market	Market	Market	Market
Cash Flows Development stage											
DEVELOPMENT COSTS		-9	-9	-38	-38	-38	-3		-	-	-
Cash Flows in Market Stage											
TOTAL SALES								122	323	481	646
Discounts, Returns	8%	-	-	-	-	-	-	-10	-26	-38	-52
NET REVENUES		**-**	**-**	**-**	**-**	**-**	**-**	**112**	**297**	**442**	**594**
Product Costs	***% of Net Sales***										
Sales and Marketing	25%	-	-	-	-	-	-	-30	-81	-120	-161
COGS	11%	-	-	-	-	-	-	-13	-35	-53	-71
Capital Expenditure	2%	-	-	-	-	-	-	-2	-6	-10	-13
G&A	5%	-	-	-	-	-	-	-6	-16	-24	-32
TOTAL PRODUCT COSTS		**-**	**-**	**-**	**-**	**-**	**-**	**-52**	**-139**	**-207**	**-278**
EBIT / FREE CASH FLOW		**-9**	**-9**	**-38**	**-38**	**-38**	**-3**	**60**	**158**	**236**	**316**

Case Study – Sucessrate

VENTURE VALUATION

Indication	Success rates (lead indication)				
	P I	P II	P III	Approval	Cumulative
Infectious disease	67%	46%	70%	90%	19%
Respiratory	64%	32%	85%	95%	16%
Autoimmune	68%	37%	81%	76%	15%
Endocrine	61%	38%	69%	90%	15%
Oncology	69%	42%	55%	83%	13%
Neurology	63%	34%	67%	85%	12%
Cardiovascular	63%	27%	57%	90%	9%
Total	**67%**	**40%**	**68%**	**86%**	**15%**

Phase II ready oncology product: 42% * 55% * 83%

Cumulative: 19%

Case Study – Summary

VENTURE VALUATION

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
FREE CASH FLOW	**-9**	**-9**	**-38**	**-38**	**-38**	**-3**	**60**	**158**	**236**	**316**
Discounted Free Cash Flows										
Discount rate 21%										
DISCOUNTED CASH FLOWS	**-7**	**-6**	**-21**	**-18**	**-15**	**-1**	**16**	**34**	**42**	**47**
Risk Adjusted Discounted Free Cash Flows										
Annual Success Rate Used	100%	100%	42%	42%	42%	23%	19%	19%	19%	19%
RISK ADJUSTED CASH FLOWS	**-7**	**-6**	**-9**	**-7**	**-6**	**-0**	**3**	**7**	**8**	**9**
Sum Risk Adjusted Discounted Cash Flows										
TOTAL PRODUCT VALUE **53**										

Stage	**Phase I**	**Phase II**	**Phase III**	**Approval**	**Market**
Probability of sucess	100%	42%	55%	83%	n/a
Cumulative Success Rate	**100%**	**42%**	**23%**	**19%**	**19%**

Case Study – Deal

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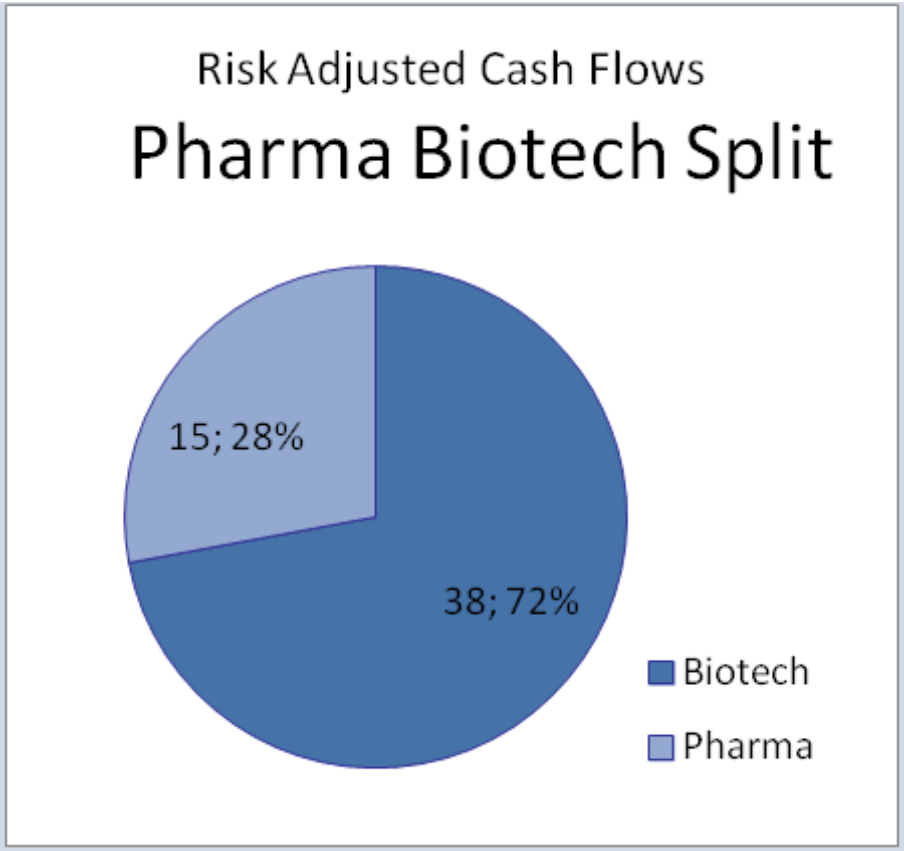

Deal Proposal:

EUR 20m up-front

EUR 90m milestones

10% royalties

Fair Deal:

EUR 6m up-front

EUR 90m milestones

10% royalties

Alternative: EUR 20m up-front & 6% royalties

Conclusion

VENTURE VALUATION

- Valuation is key in development of biotechs / LS
- Value = future risk & potential
- Valuation is not an exact science
- Its all about the assumptions

VENTURE VALUATION

Thank you for listening!

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65‘000 products, 19‘000 licensing opportunities

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2) Deals Database with financial information

3) Investors database

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