

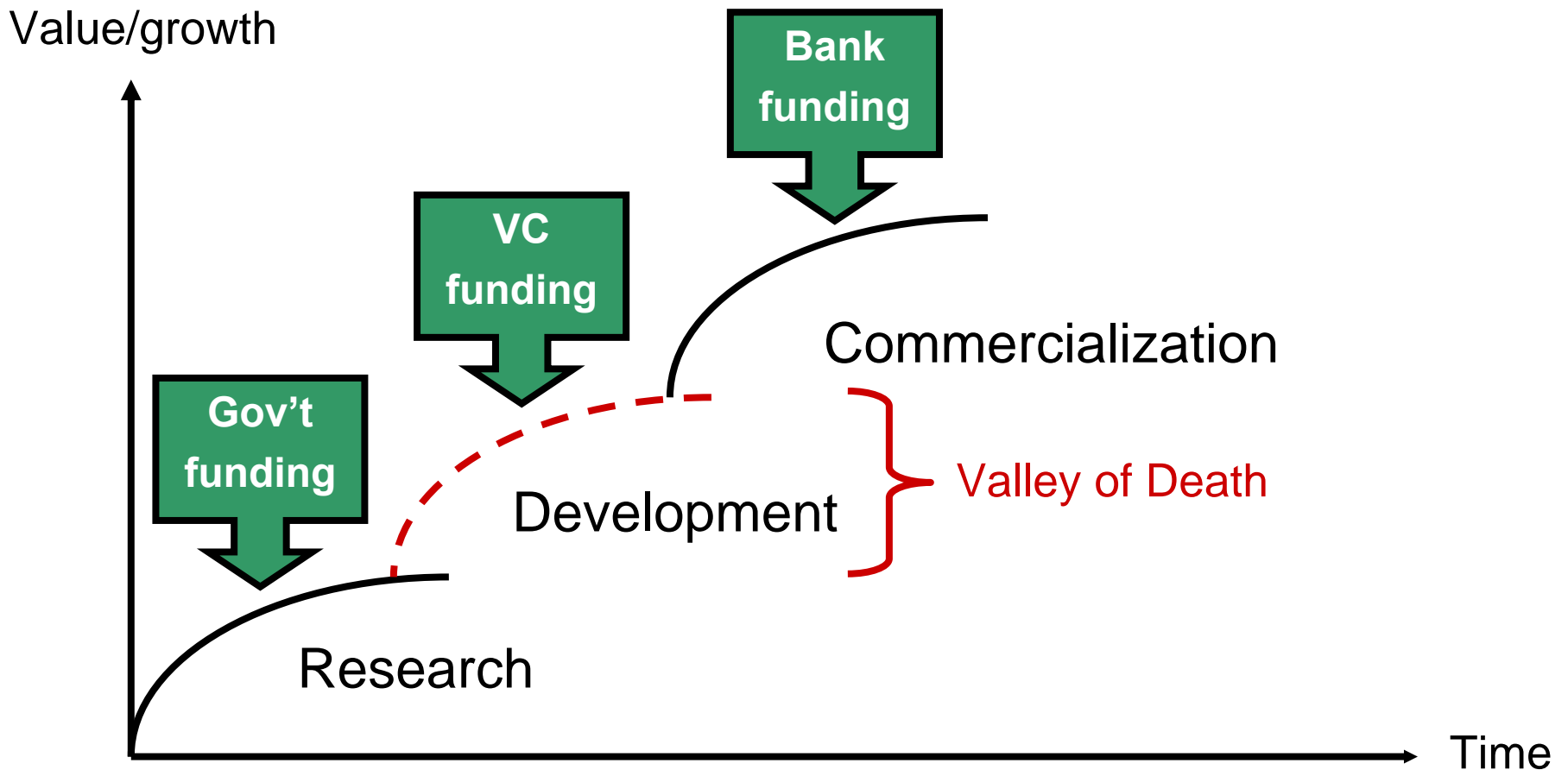
Funding and Knowledge Led Growth:

The Role of Banks, Venture Capital and Government Funders
in Research, Development and Commercialization

Exploring the challenges...



Funding knowledge-based ventures



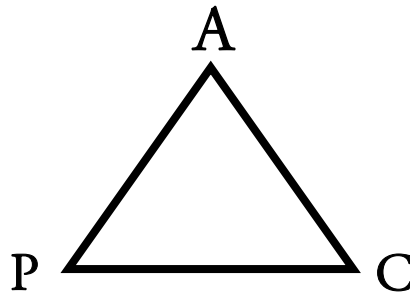
The role of property and capital in wealth creation

The total value of real estate not legally owned by the poor of the Third World and former communist nations is at least \$9,3 trillion... about twice as much as the total circulating US money supply... and nearly as much as the total value of all the companies listed on the main stock exchanges of the world's twenty most developed countries... twenty times the total direct foreign investment into all Third World and former communist countries in the ten years after 1989... forty-six times as much as all the World Bank loans of the past three decades, and ninety-three times as much as all development assistance from all advanced countries to the Third World in the same period.

- Hernando de Soto, *The Mystery of Capital*

Using the concepts of assets, property and capital

Assets as valuable objects

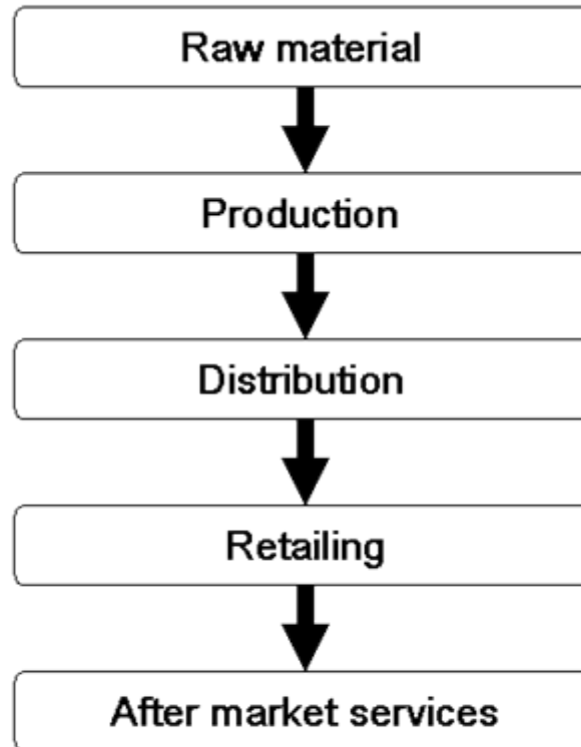


Property as objects for
commercial transactions

Capital as objects in an
machinery for creation of
wealth

Material Value Chain

Vertical
integration



Horizontal
integration



Transforming intellectual assets into financial capital

Intellectual value creation

Financial value extraction

Creation of intellectual building blocks

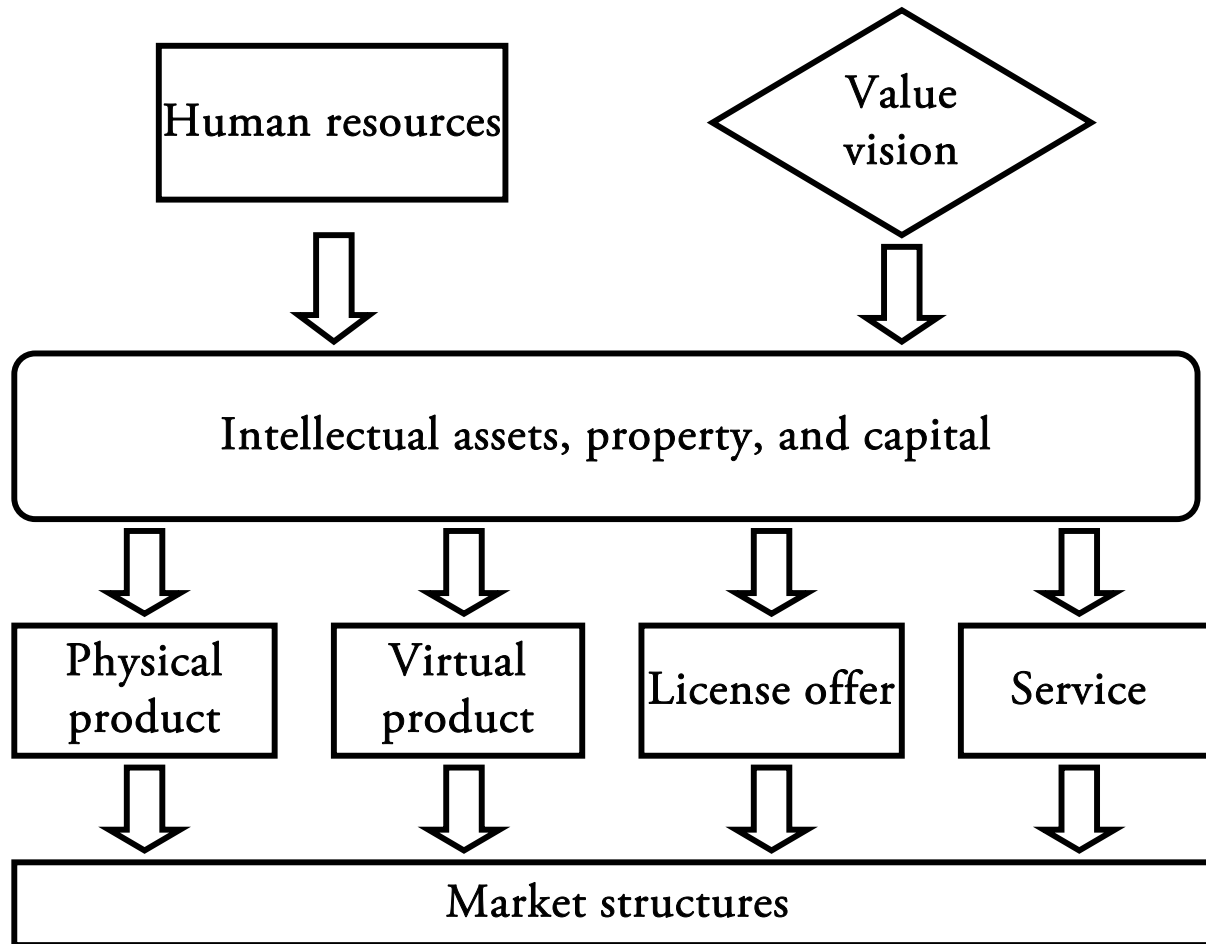
- Technology
- Artistic work
- Know-how
- Knowledge
- Feature
- Trademark
- Descriptive mark
- Core value
- Business idea
- Patent
- Copyright
- Design right
- Trademark right
- License
- Contract
- Standard
- IP strategy
- Business plan

Creation of intellectual structures

- Ventures
- Innovations
- Relations
- Markets
- Commons
- Infrastructures

- New value propositions
- Increase price
- Reduce costs
- More venture capital for less equity
- Accepted collateral to generate more favorable loans
- Securitize to generate capital

Towards an Intellectual Value Chain



Multiplying models for value extraction

- 10 000 Chinese sweatshirts
- 5 Volvo cars
- 10 000 pieces of a certain computer game software
- A biomarker

Low-tech physical product

- What do I have?
 - 10,000 Chinese manufactured sweatshirts
 - A finite volume of physical goods
 - The end-product of a material manufacturing chain



Material value chain business model

- How can I exploit the value in the sweatshirts?
 - Wearing them (direct utility value)
 - Selling them (direct one-time revenue)

A photograph of a Walmart store sign. The sign is blue with a red horizontal stripe at the top. The words "WAL*MART" are written in large, white, 3D block letters. The asterisk is a small white star. The sign is mounted on a grey brick pillar. The background is a clear blue sky.

WAL*MART

High-tech physical product

- What do I have?
 - Five Volvo-manufactured cars
 - Individually specific machines
 - End products of a high-tech material manufacturing chain



Leveraged material value chain business model

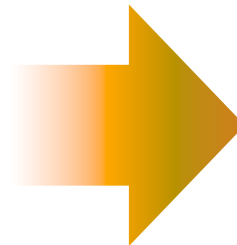
- How can I exploit the value in the Volvo cars?
 - Driving them (direct utility value)
 - Selling them (direct one-time revenue – five times)
 - Renting them out (repeated direct revenue)
 - Leasing them out (deferred revenues over time)



VOLVO of Victoria

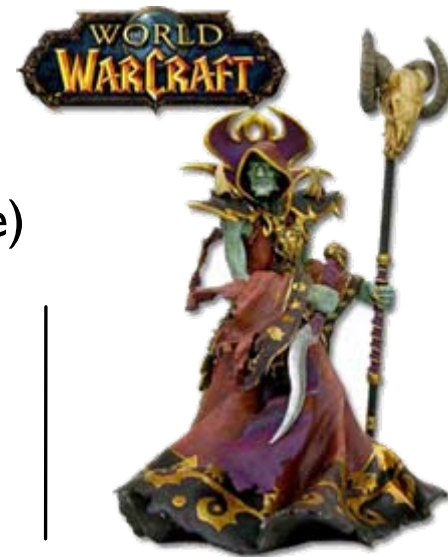
Virtual Product

- What do I have?
 - 10,000 physical discs? Can copies be made?
 - The data libraries of the game? Can they be reused?
 - The source code for the game? Can changes be made?
 - The game concept and characters?



Virtual value chain business model

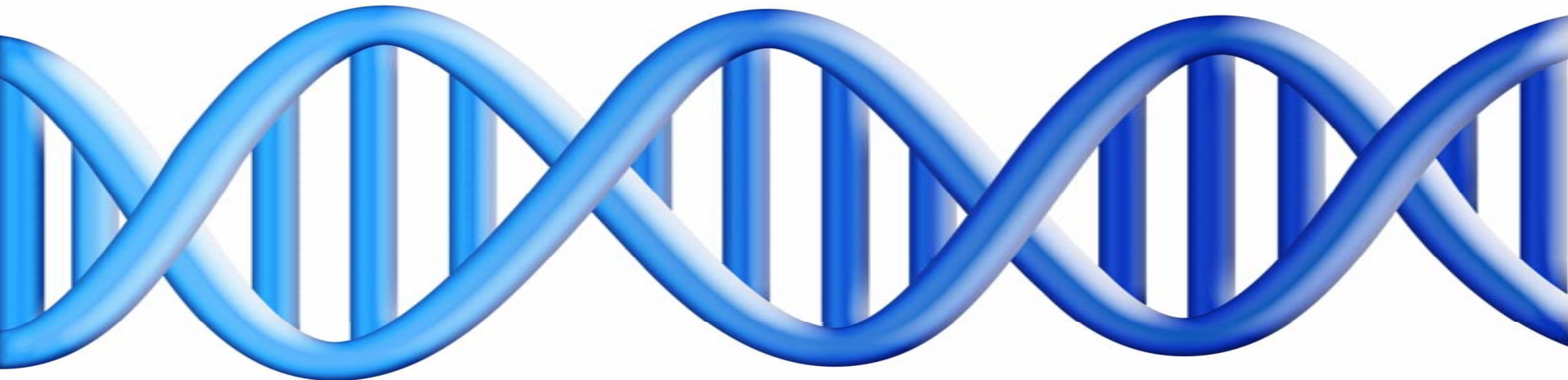
- How can I exploit the value in the 10,000 games?
 - Selling physical copies (direct one-time revenue, license)
 - Copying them and selling (unlimited revenue, license)
 - Reverse-engineering the code (future value creation)
 - Creating merchandize (secondary value creation)
 - Selling subscriptions (continuous license-based revenue)
 - Etc





High-tech knowledge-based product

- What do I have?
 - A specific molecule to indicate biological materials?
 - A research tool for exploring genetic material?
 - A method of determining the effect of therapeutic drugs?
 - A foundation for a genetic database?



Knowledge-based business model

- How can I exploit the value in the biomarker?
 - Creating research methods (continuous contract-based revenues)
 - Developing diagnostic methods (secondary value creation)
 - Forming research collaborations (future value creation)
 - Selling database access (continuous license-based revenue)
 - Selling the know-how and IP (knowledge-transfer revenue)
 - Etc.

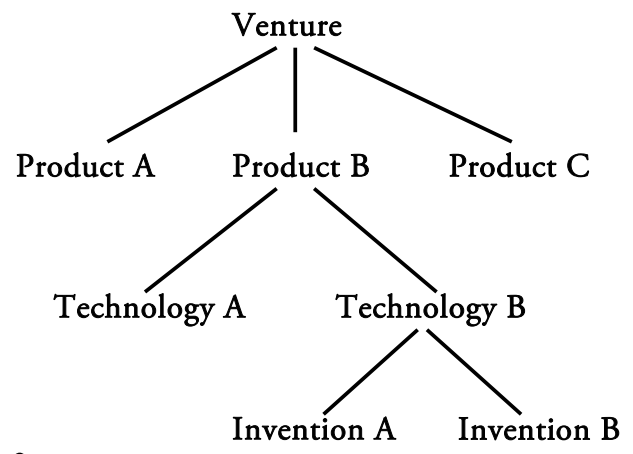


Valuing different propositions...

- Venture
- Product
- Technology
- Patented invention

$$PV = \frac{NI_t \times P/E}{(1+r)^t}$$

$$PV = \sum_{t=1}^n \frac{CF(t)}{(1+r)^t}$$



within different contexts...

- Financing
- Sale
- License

$$PaV = \sum_{t=1}^n \frac{\Delta CF_p(t)}{(1+r)^t}$$

Example: AquaTech

A small technology venture, AquaTech, has developed a new water purification technology based on a high pressure distillation technique for which they have applied for a patent. The technology produces purified drinking water from seawater or sewage with a 50% reduction in energy consumption and a 70% size reduction to comparable systems. AquaTech was spun-out from the university that developed the technology and is focused on producing portable water purification systems for medical purposes in regions with underdeveloped infrastructure.

As is common for most start-ups, AquaTech is faced with the need for financial capital to fund the continued development necessary to create commercial validation of the technology, which is estimated at \$2M and will take approximately one year to complete. Once successfully completed a new factory to support the estimated growth in sales will require a \$20M investment and one year to build. In the interim, the small estimated volumes for year one will be produced in the existing workshop used to build the prototype.

Pro forma DCF model

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Terminal
Units Sold		1000	2000	4000	8000	40000	60000	90000	120000	
Price (\$)		1000	1000	1000	1000	1000	1000	1000	1000	
Revenue (\$M)		1,00	2,00	4,00	8,00	40,00	60,00	90,00	120,00	
COGS		0,25	0,50	1,00	2,00	10,00	15,00	22,50	30,00	
Gross Profit		0,75	1,50	3,00	6,00	30,00	45,00	67,50	90,00	
SG&A		0,15	0,30	0,60	1,20	6,00	9,00	13,50	18,00	
R&D	2,00									
Capital Investment	0,00	20,00	0,10	0,20	0,40	2,00	3,00	4,50	6,00	
Depreciation	0,00	4,00	4,02	4,06	4,14	4,54	1,14	2,02	3,18	
EBIT	-2,00	-3,40	-2,82	-1,66	0,66	19,46	34,86	51,98	68,82	
Income Tax	0,00	0,00	0,00	0,00	0,30	0,30	0,30	0,30	0,30	
Net Income	-2,00	-3,40	-2,82	-1,66	0,46	13,62	24,40	36,39	48,17	
Cash Flow	-2,00	-19,40	1,10	2,20	4,20	16,16	22,54	33,91	45,35	680
NPV (\$M)	255									

DCF Model assumptions

- Net sales are expected to start at \$1M and then grow 100% in years 2-4 and then rise 400% in year five after which growth slows to 50% in years 6-7 and 33% in year eight and 5% from there on out.
- Cash flows are forecasted for nine years including year 0 after which a terminal value of the business was calculated.
- COGS will be approximately 25% of net sales.
- SG&A is approximately 15% of net sales.
- R&D is expected to be \$2M.
- Capital investment is expected to be \$20M for a new production facility.
- Capital investments were depreciated uniformly over 5 years
- Income tax is estimated at 30%.
- Discount rate is determined to be 12%.
- Net working capital related to changes in inventories, accounts payable, and accounts receivable are removed from the model for simplicity sake.

Licensing transaction

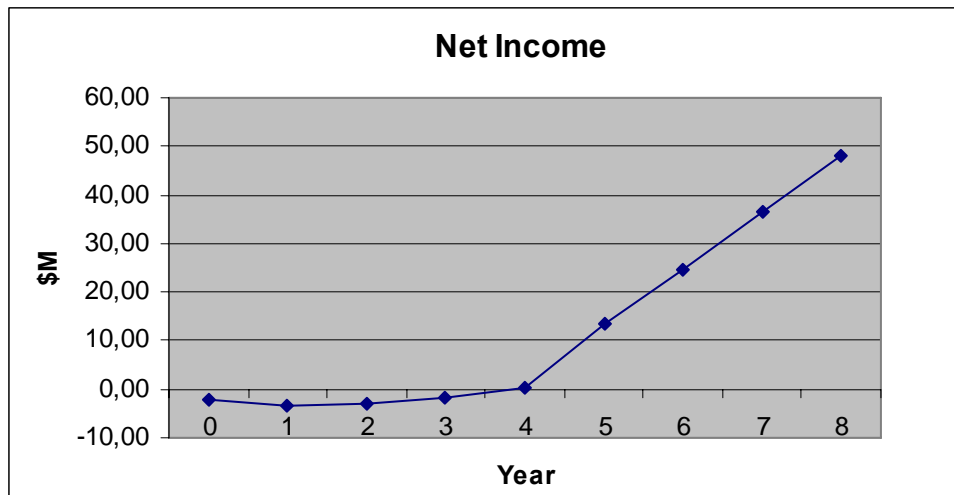
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
Revenue (\$M)	0	250	400	600	750	900	1000	1000	1000	1000
Δ Revenue	0	50	150	350	500	650	750	750	750	750
Royalty rate	0	5,0%	5,0%	5,0%	5,0%	5,0%	5,0%	5,0%	5,0%	5,0%
Gross Profit	0	2,5	7,5	17,5	25	32,5	37,5	37,5	37,5	37,5
R&D (\$M)	2	0	0	0	0	0	0	0	0	0
EBIT	-2	2,5	7,5	17,5	25	32,5	37,5	37,5	37,5	37,5
Income Tax	0	30%	30%	30%	30%	30%	30%	30%	30%	30%
Net Income	-2	1,75	5,25	12,25	17,50	22,75	26,25	26,25	26,25	26,25
Cash Flow	-2	1,75	5,25	12,25	17,50	22,75	26,25	26,25	26,25	26,25
NPV (\$M)	73									

Licensing model assumptions

- A \$2M R&D process is required to make the technology commercially viable
- The revenue shown is based on the estimated sales forecast of the buyer for a ten year period with starting point at \$200M in year 0.
- All increases in revenue are associated to the commercial introduction of the licensed technology from AquaTech, modeled as $\Delta\text{Revenue}$. Expectations are that the licensee's market share will rise from 2% to 10%, \$200M to \$1000M.
- A flat royalty rate of 5% of the increase in revenue over the ten year period.

Venture Capital Model

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Terminal
Units Sold		1000	2000	4000	8000	40000	60000	90000	120000	
Price (\$)		1000	1000	1000	1000	1000	1000	1000	1000	
Revenue (\$M)		1,00	2,00	4,00	8,00	40,00	60,00	90,00	120,00	
COGS		0,25	0,50	1,00	2,00	10,00	15,00	22,50	30,00	
Gross Profit		0,75	1,50	3,00	6,00	30,00	45,00	67,50	90,00	
SG&A		0,15	0,30	0,60	1,20	6,00	9,00	13,50	18,00	
R&D	2,00									
Capital Investment	0,00	20,00	0,10	0,20	0,40	2,00	3,00	4,50	6,00	
Depreciation	0,00	4,00	4,02	4,06	4,14	4,54	1,14	2,02	3,18	
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Income Tax	0,00	0,00	0,00	0,00	0,30	0,30	0,30	0,30	0,30	
Net Income	-2,00	-3,40	-2,82	-1,66	0,46	13,62	24,40	36,39	48,17	
Cash Flow	-2,00	-19,40	1,10	2,20	4,20	16,16	22,54	33,91	45,35	680
NPV (\$M)	255									



$$PV = \frac{NI_t \times P/E}{(1+r)^t}$$

Exit Year	5	6
P/E ratio	17	17
Net Income at exit (\$M)	13,62	24,40
IRR	50%	50%
PV (\$M)	20,3	24,3



**In the knowledge economy,
we are all developing countries.**

How to learn more and interact with CIP in the future...

- Join the knowledge-based business community at CIP FORUM 2007 (www.cipforum.org)
- Become a CIP Partner
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an engine to facilitate knowledge-based business.

