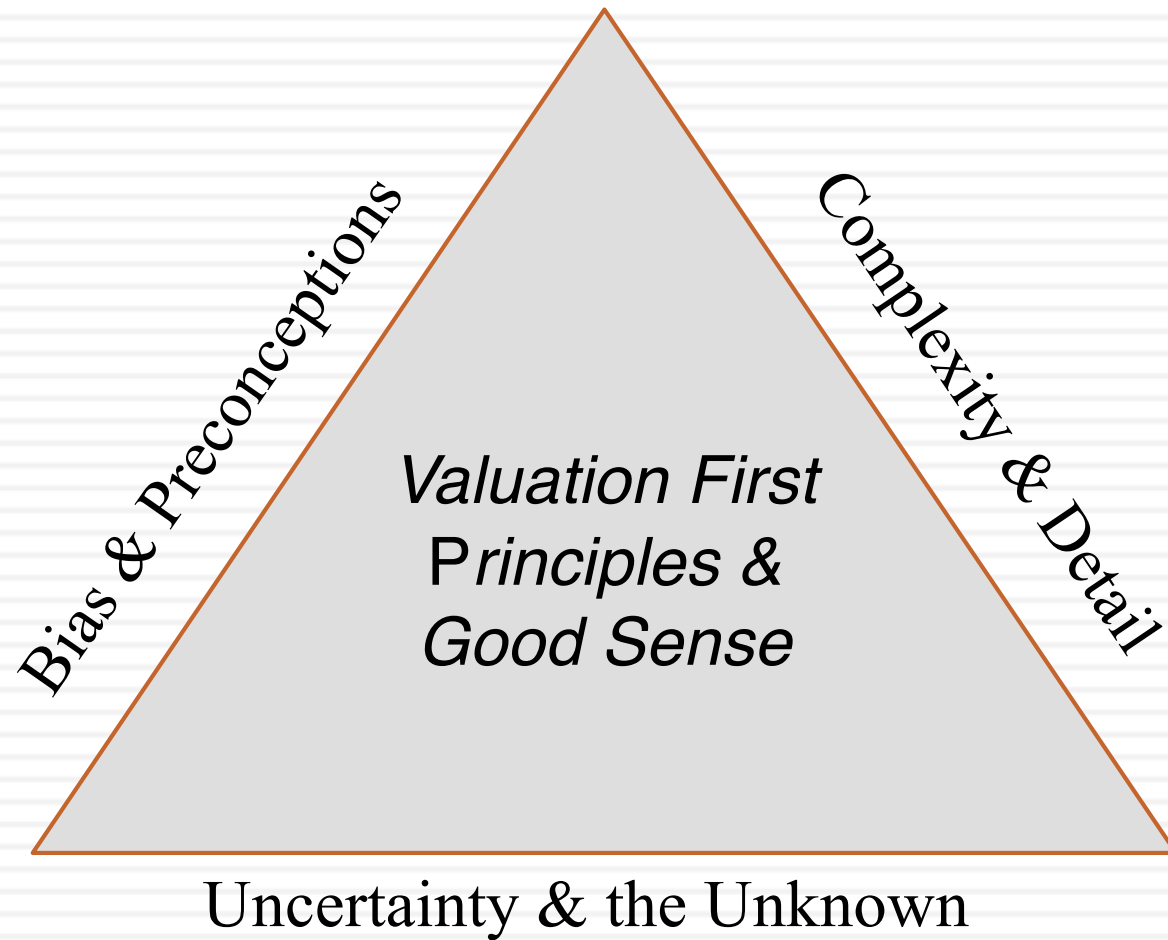


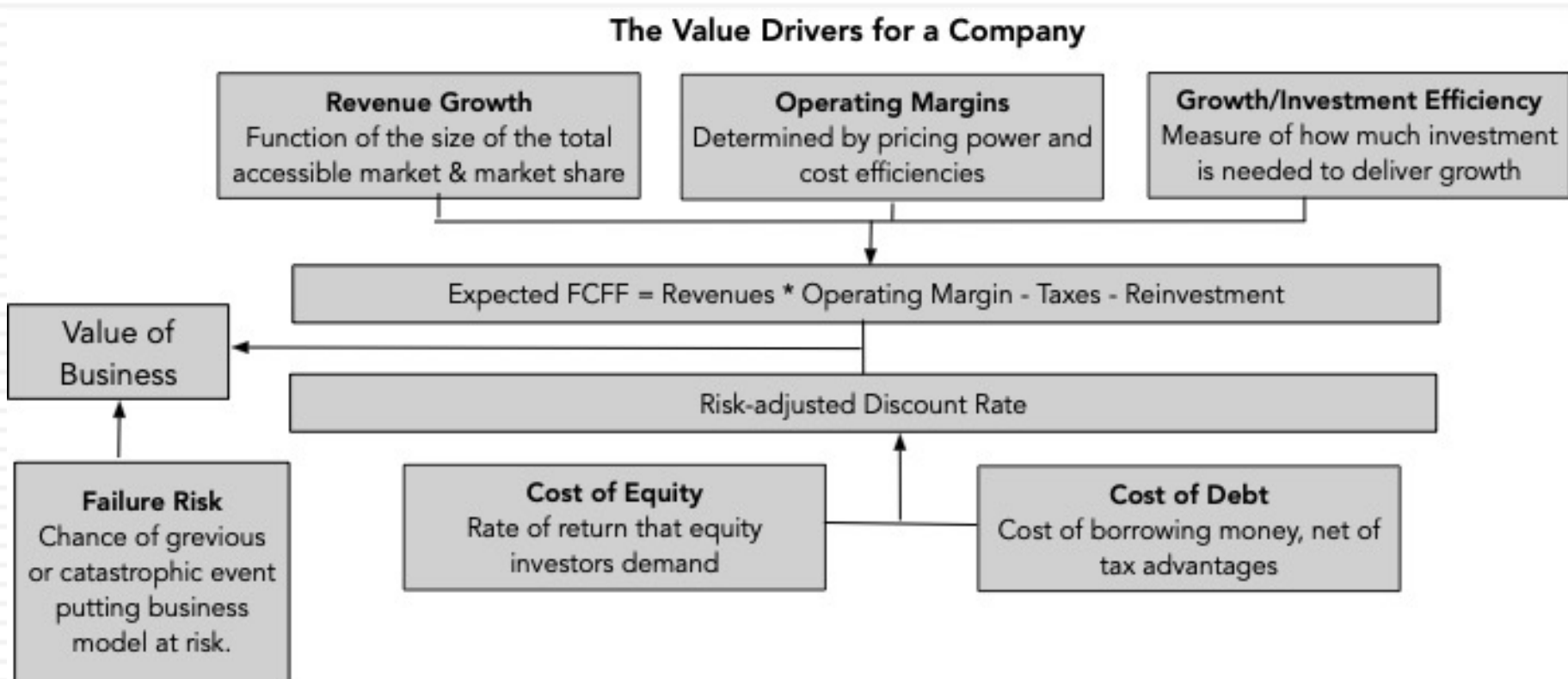
NUMBERS AND NARRATIVE:
MODELING, STORY TELLING AND
INVESTING

Aswath Damodaran

The Bermuda Triangle of Valuation



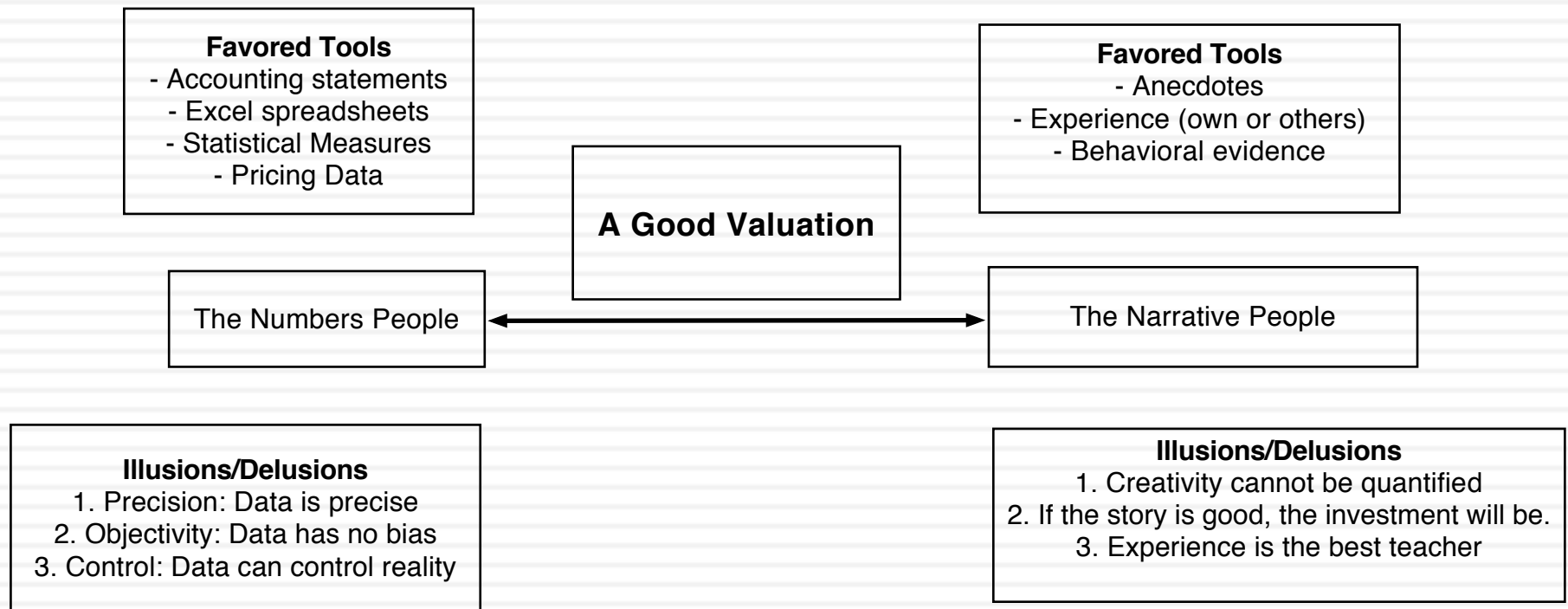
Value: The Drivers



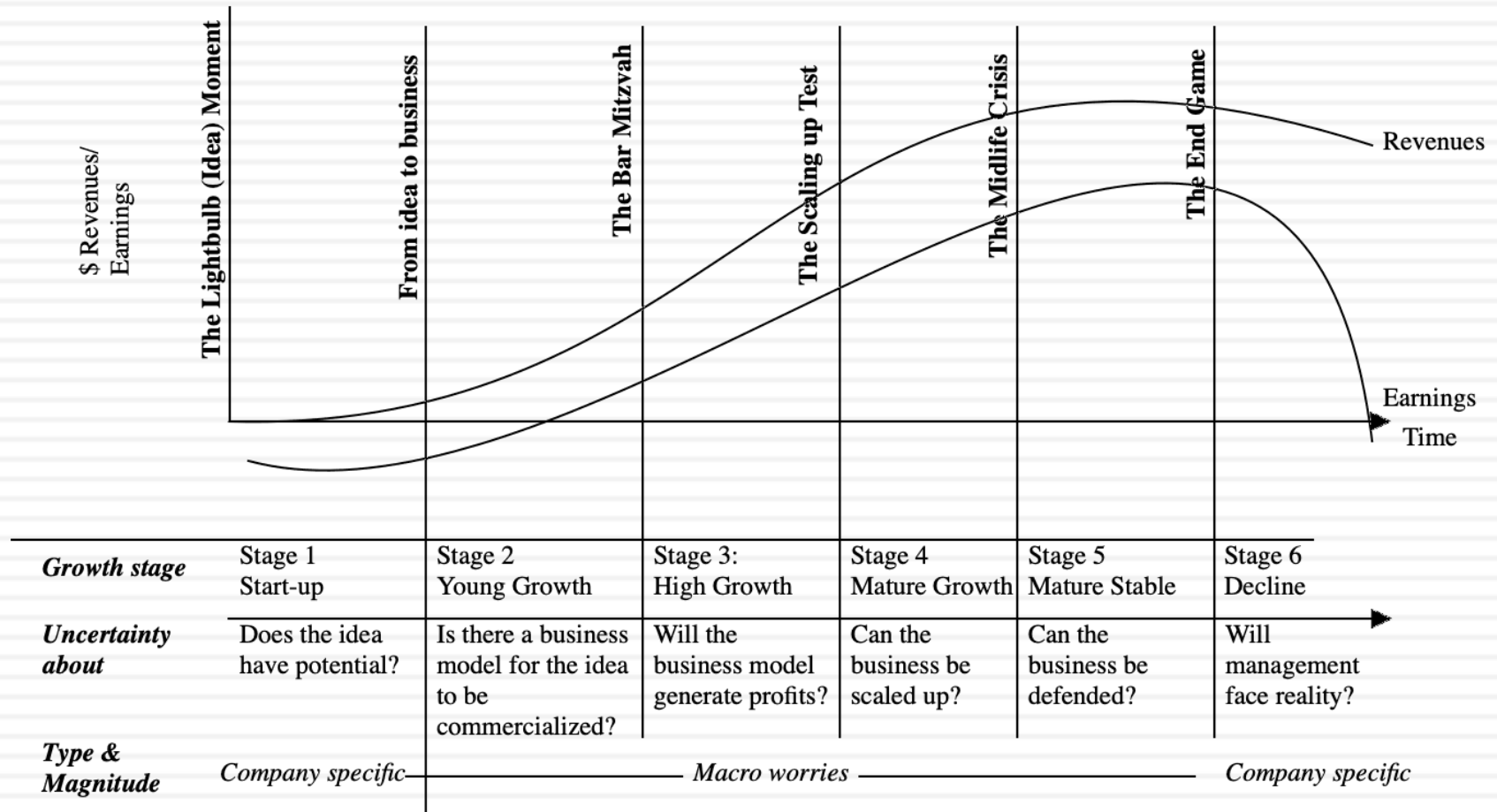
What are you?

- If you were asked to categorize yourself, would you more naturally think of yourself as a
 - a) Numbers Person
 - b) Story Person
 - c) Not sure
- When did you make this decision and how has it affected your educational and career choices?
- At your current job or position, do you find yourself hanging out with people who are like you (in inclination and training)?

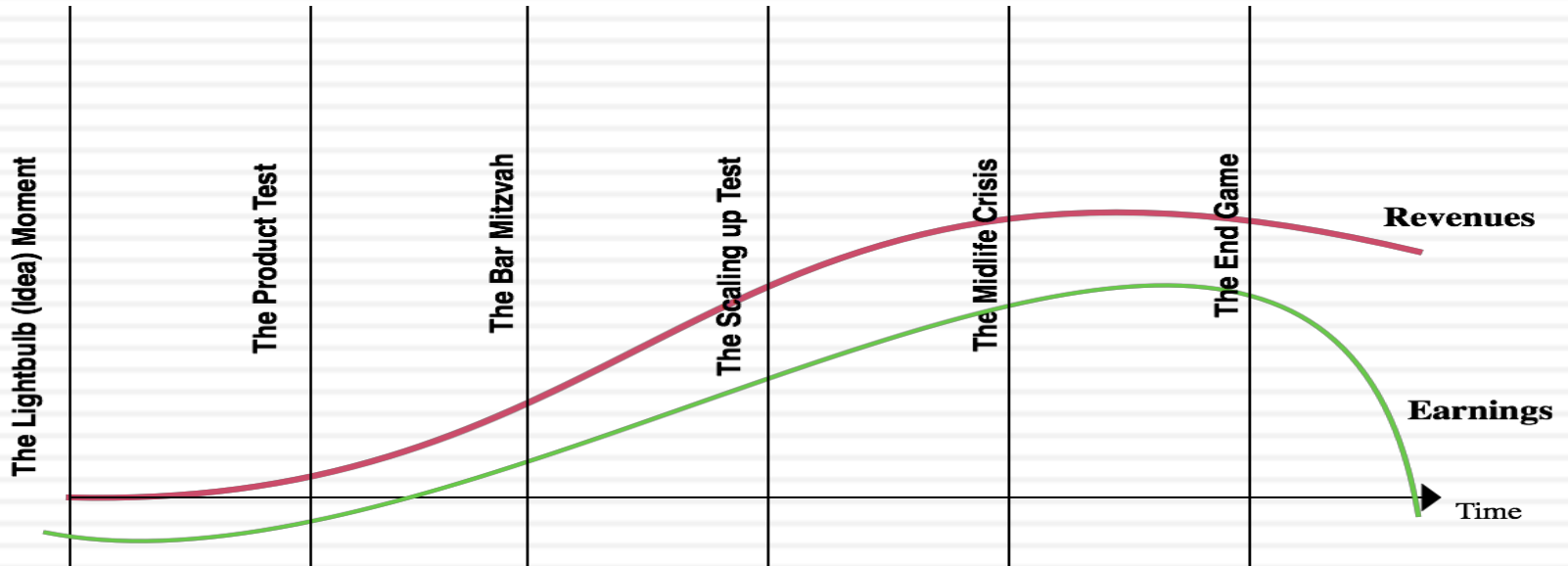
Bridging the Gap



A Life Cycle View of Uncertainty

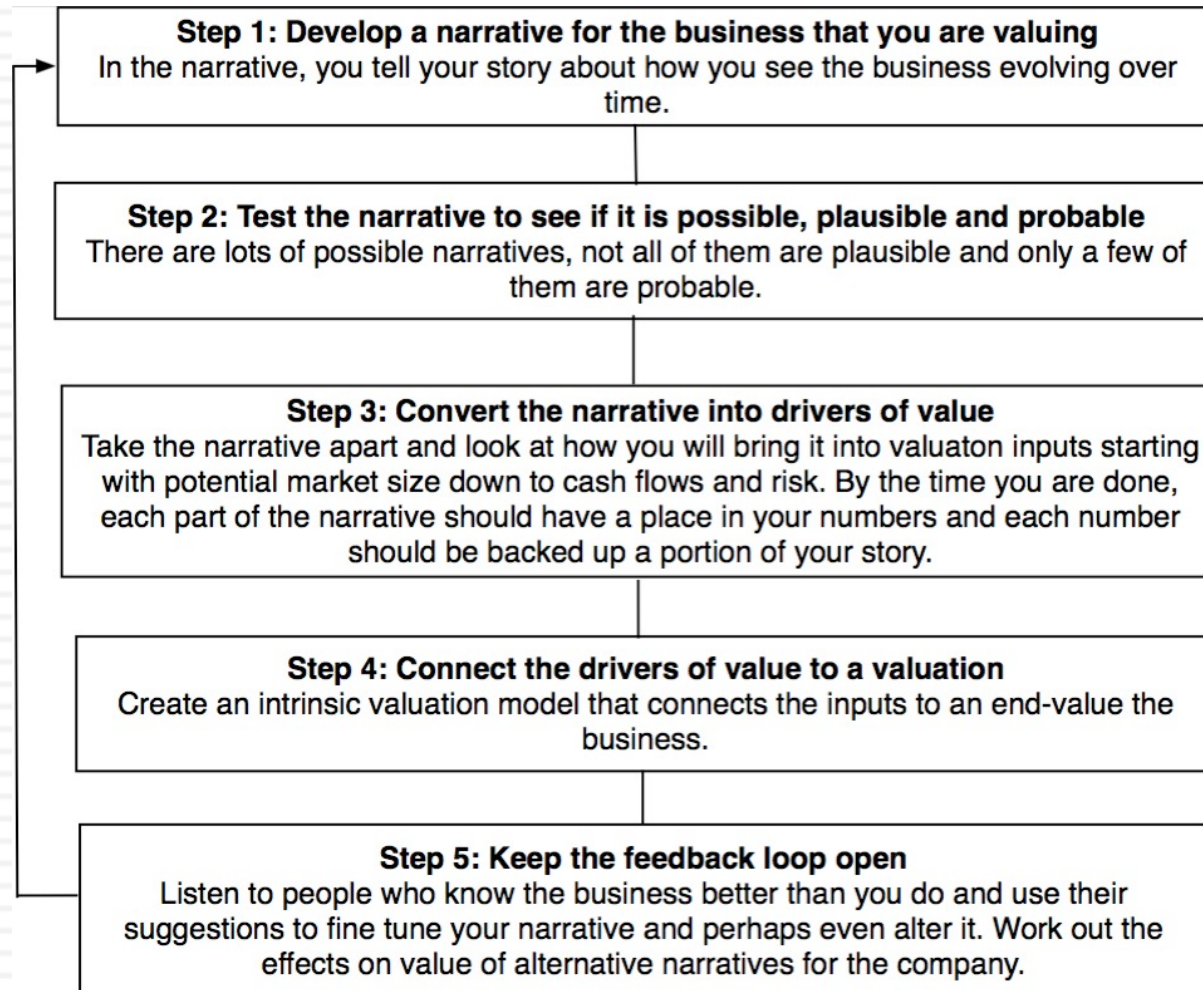


In value, the emphasis shifts as well, from narrative to numbers...



<i>Lifecycle stage</i>	Start-up	Young Growth	High Growth	Mature Growth	Mature Stable	Decline
<i>Narrative versus Numbers</i>	All Narrative	Mostly narrative	Narrative + Numbers	Numbers + Narrative	Mostly Numbers	All Numbers
<i>Narrative Drivers</i>	How big is the narrative?	How plausible is narrative?	How profitable is narrative?	How scalable is narrative?	How sustainable is narrative?	How happy is the ending?
<i>Narrative Differences</i>	Unconstrained & Large differences	<i>Constraints mount as numbers build up</i>				<i>Constrained & Narrow differences</i>
		<i>Differences across investors narrow, as history deepens</i>				

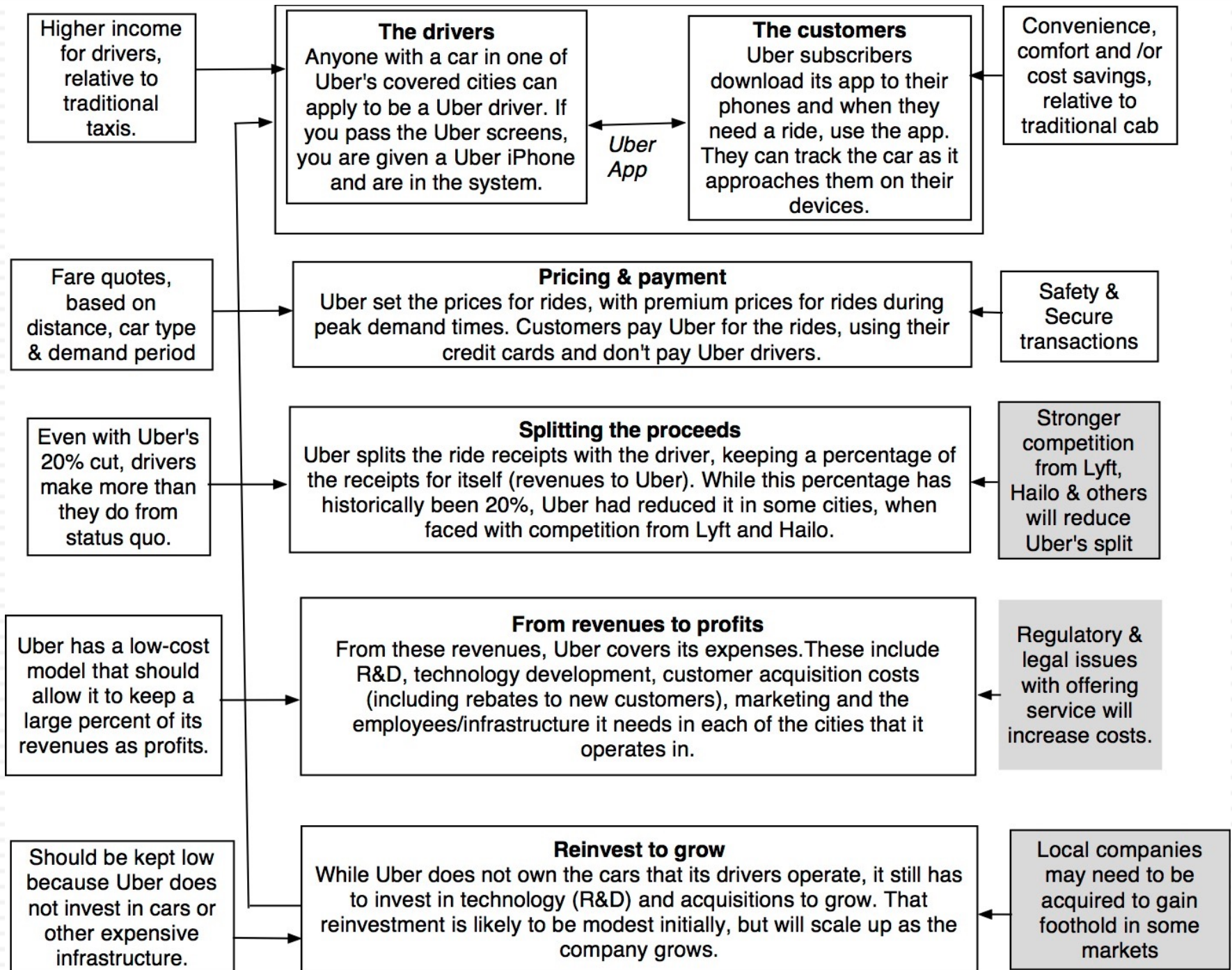
The Steps



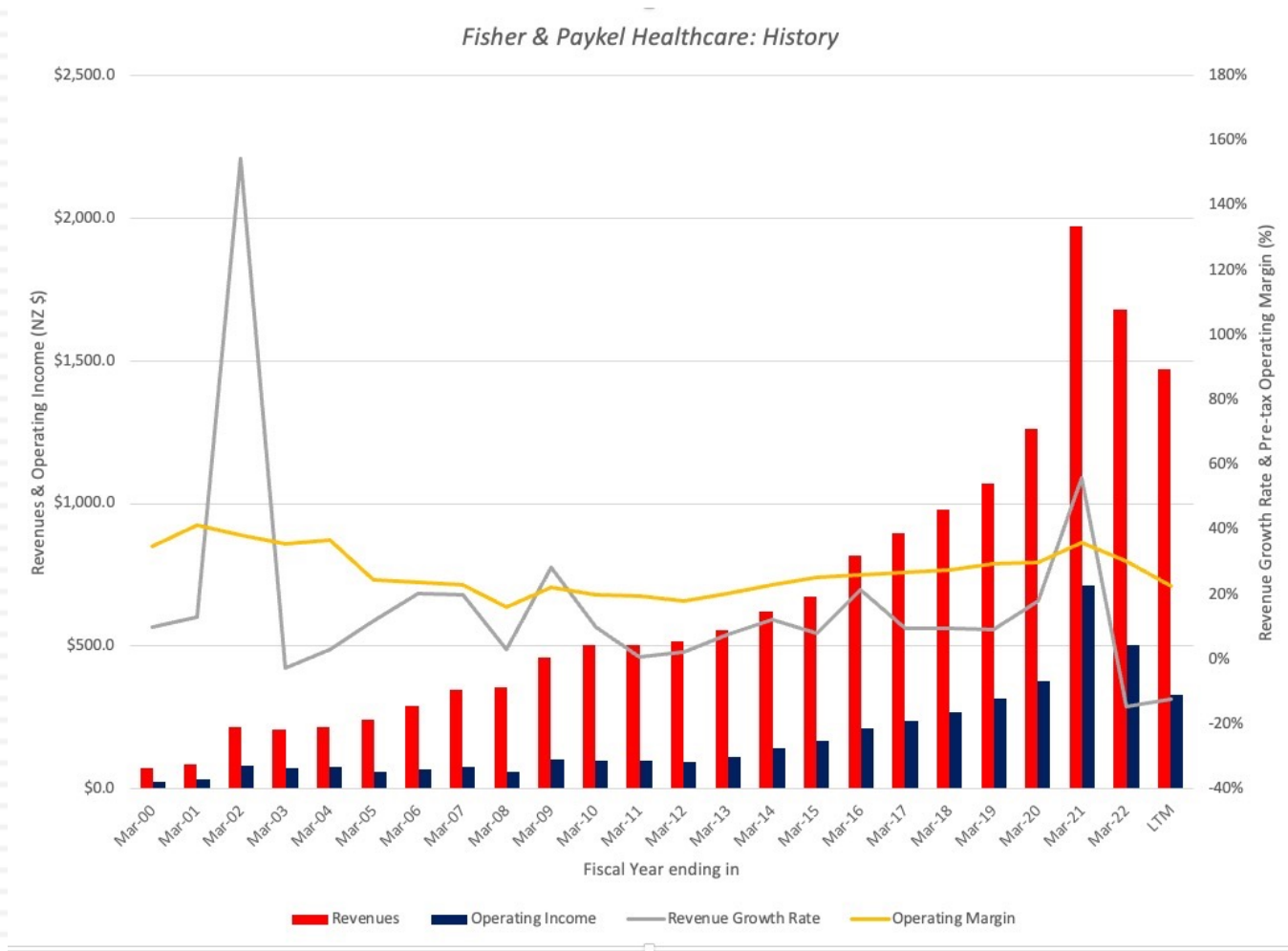
Step 1a: Survey the landscape

- Every valuation starts with a narrative, a story that you see unfolding for your company in the future.
- In developing this narrative, you will be making assessments of
 - ▣ Your company (its products, its management and its history).
 - ▣ The market or markets that you see it growing in.
 - ▣ The competition it faces and will face.
 - ▣ The macro environment in which it operates.

Understanding Uber in 2014



Fisher & Paykel Healthcare: History



Step 1b: Create a narrative for the future

- Every valuation starts with a narrative, a story that you see unfolding for your company in the future.
- In developing this narrative, you will be making assessments of your company (its products, its management), the market or markets that you see it growing in, the competition it faces and will face and the macro environment in which it operates.
 - ▣ Rule 1: Keep it simple.
 - ▣ Rule 2: Keep it focused.

The Uber Narrative: An Urban, Car Service disruptor

In June 2014, my initial narrative for Uber was that it would be

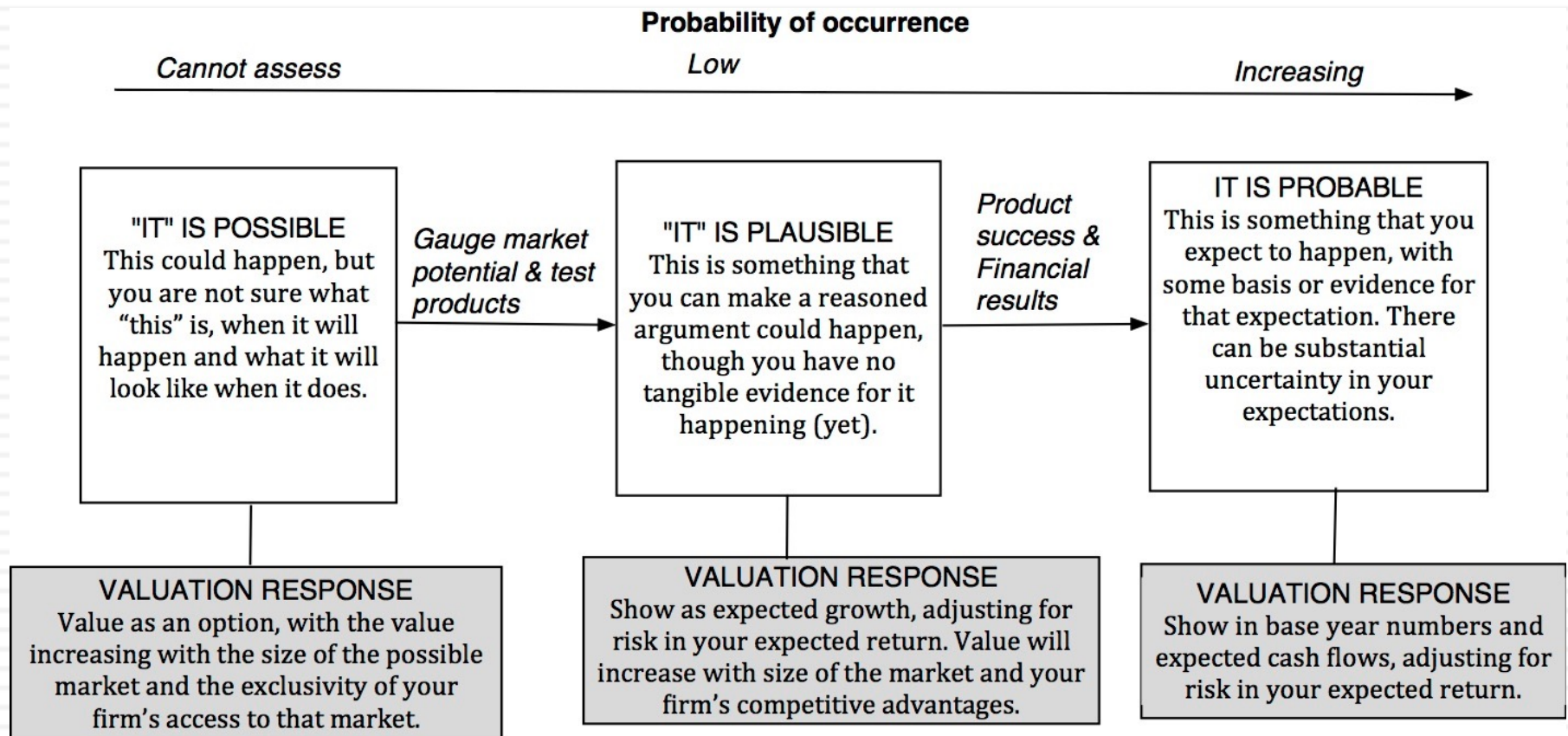
1. An urban car service business: I saw Uber primarily as a force in urban areas and only in the car service business.
2. Which would expand the business moderately (about 40% over ten years) by bringing in new users.
3. With local networking benefits: If Uber becomes large enough in any city, it will quickly become larger, but that will be of little help when it enters a new city.
4. Maintain its revenue sharing (20%) system due to strong competitive advantages (from being a first mover).
5. And its existing low-capital business model, with drivers as contractors and very little investment in infrastructure.

The Fisher Paykel Narrative

- If there is one thing that jumps out from the company's history, it is its consistency in delivering moderate revenue growth (roughly 10%) and high operating margins (25-30%) over long periods.
- It also operates in a sector with moderate revenue growth and solid operating margins, with customers (hospitals, doctors, health insurance) who tend to be sticky (once they have product preferences, they are reluctant to change).
- In my Fisher Paykel story,
 - I would assume the status quo for the near term (next 5 years), with continued revenue growth and sustained margins.
 - In the long term, the pricing pressures will build on health care (especially in the most lucrative market, the US) and margins will shrink.

Step 2: Check the narrative against history, economic first principles & common sense

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The Impossible, The Implausible and the Improbable

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The Impossible

Bigger than the economy

Assuming Growth rate for company in perpetuity > Growth rate for economy

Bigger than the total market

Allowing a company's revenues to grow so much that it has more than a 100% market share of whatever business it is in.

Profit margin > 100%

Assuming earnings growth will exceed revenue growth for a long enough period, and pushing margins above 100%

Depreciation without cap ex

Assuming that depreciation will exceed cap ex in perpetuity.

The Implausible

Growth without reinvestment

Assuming growth forever without reinvestment.

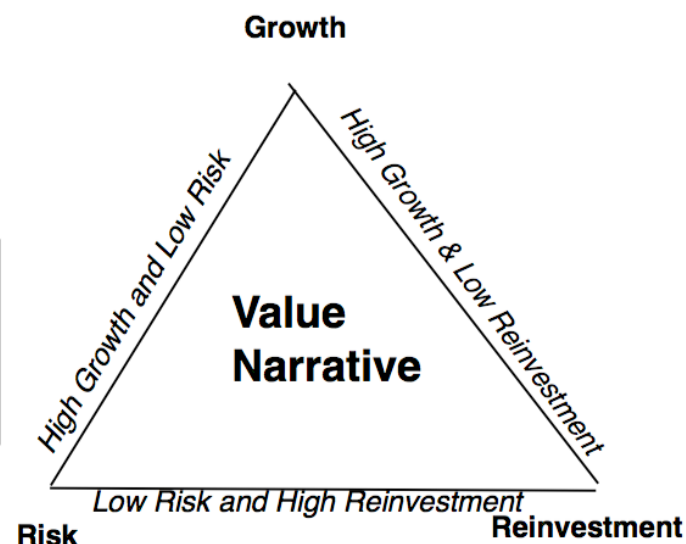
Profits without competition

Assuming that your company will grow and earn higher profits, with no competition.

Returns without risk

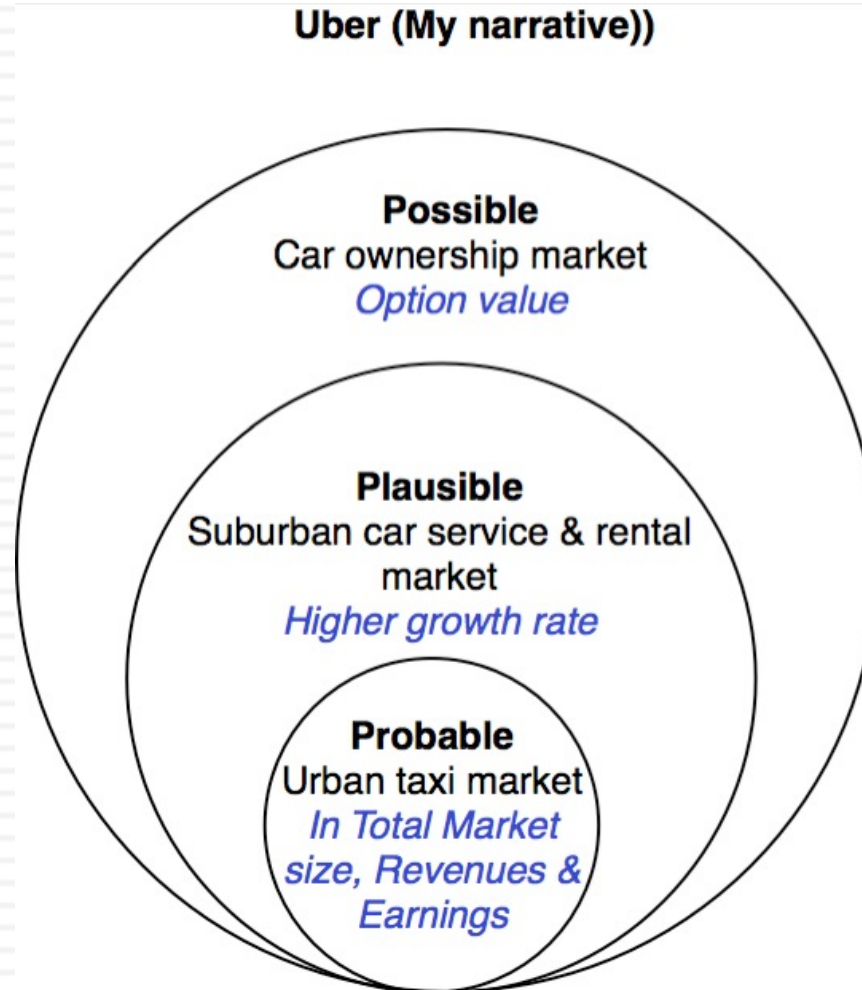
Assuming that you can generate high returns in a business with no risk.

The Improbable



Uber: Possible, Plausible and Probable

The larger & more ambitious your story, the more onus there is on you to show that it is possible, plausible & probable.

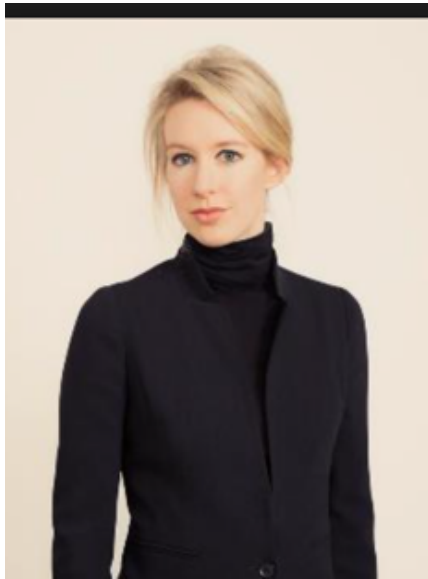


The Runaway Story: When you want a story to be true...

- With a runaway business story, you usually have three ingredients:
 1. Charismatic, likeable Narrator: The narrator of the business story is someone that you want to see succeed, either because you like the narrator or because he/she will be a good role model.
 2. Telling a story about disrupting a much business, where you dislike the status quo: The status quo in the business that the story is disrupting is dissatisfying (to everyone involved)>
 3. With a societal benefit as bonus: And if the story holds, society and humanity will benefit.
- Since you want this story to work out, you stop asking questions, because the answers may put the story at risk.

The Impossible: The Runaway Story

The Story



+

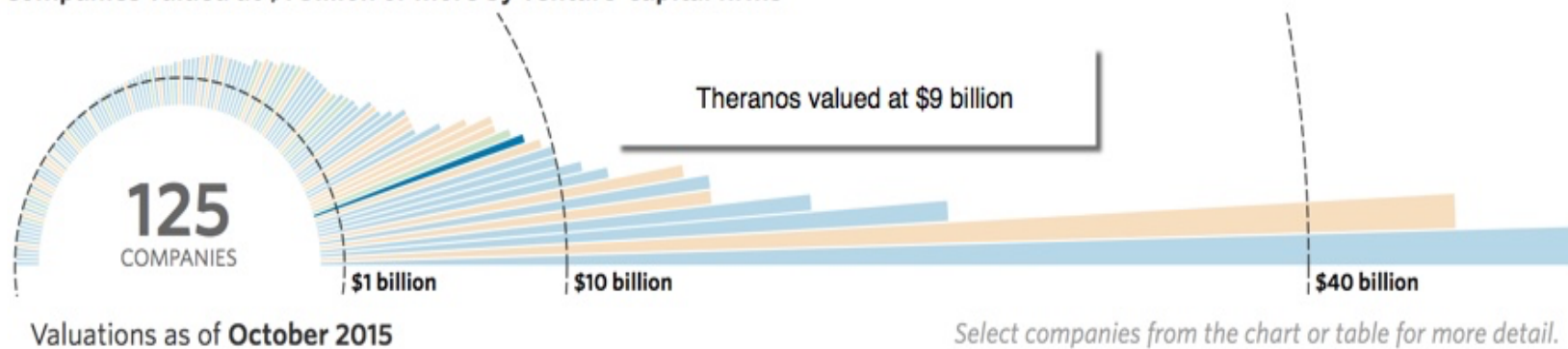
The Checks (?)

Board Member	Designation	Age
Henry Kissinger	Former Secretary of State	92
Bill Perry	Former Secretary of Defense	88
George Schultz	Former Secretary of State	94
Bill Frist	Former Senate Majority Leader	63
Sam Nunn	Former Senator	77
Gary Roughead	Former Navy Admiral	64
James Mattis	Former Marine Corps General	65
Dick Kovocovich	Former CEO of Wells Fargo	72
Riley Bechtel	Former CEO of Bechtel	63
William Foege	Epidemiologist	79
Elizabeth Holmes	Founder & CEO, Theranos	31
Sunny Balwani	President & COO, Theranos	NA

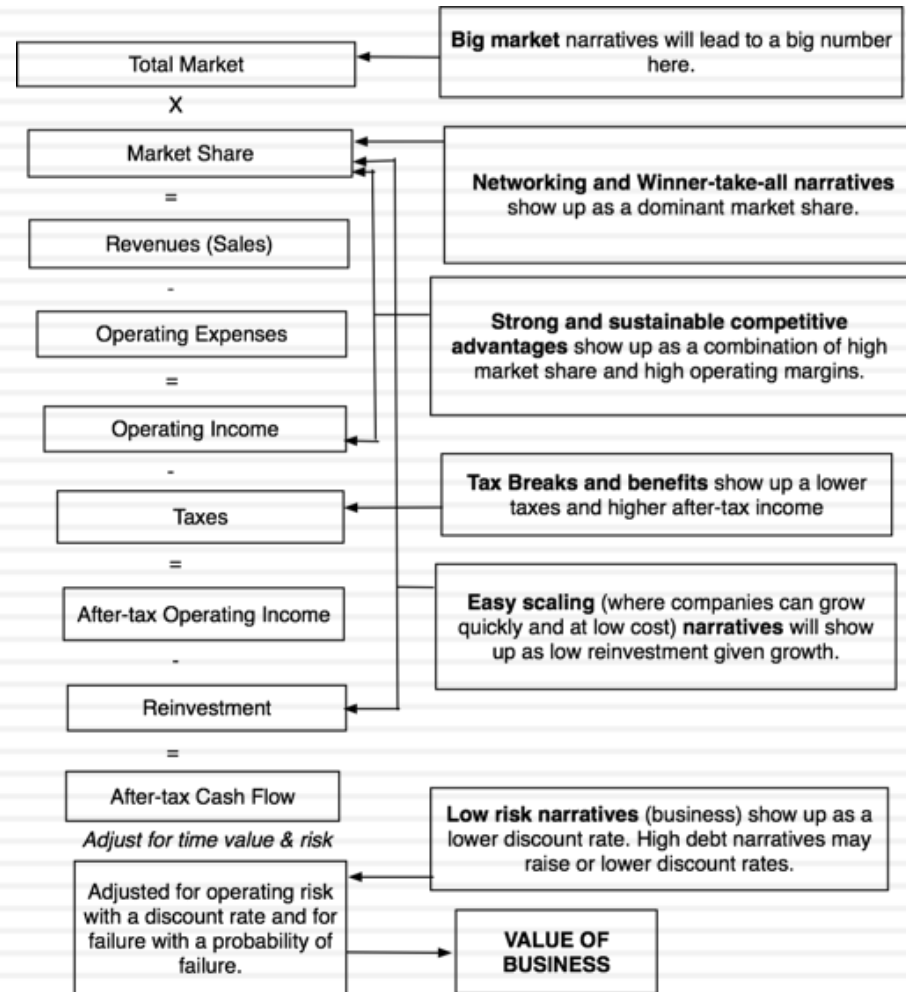
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Money

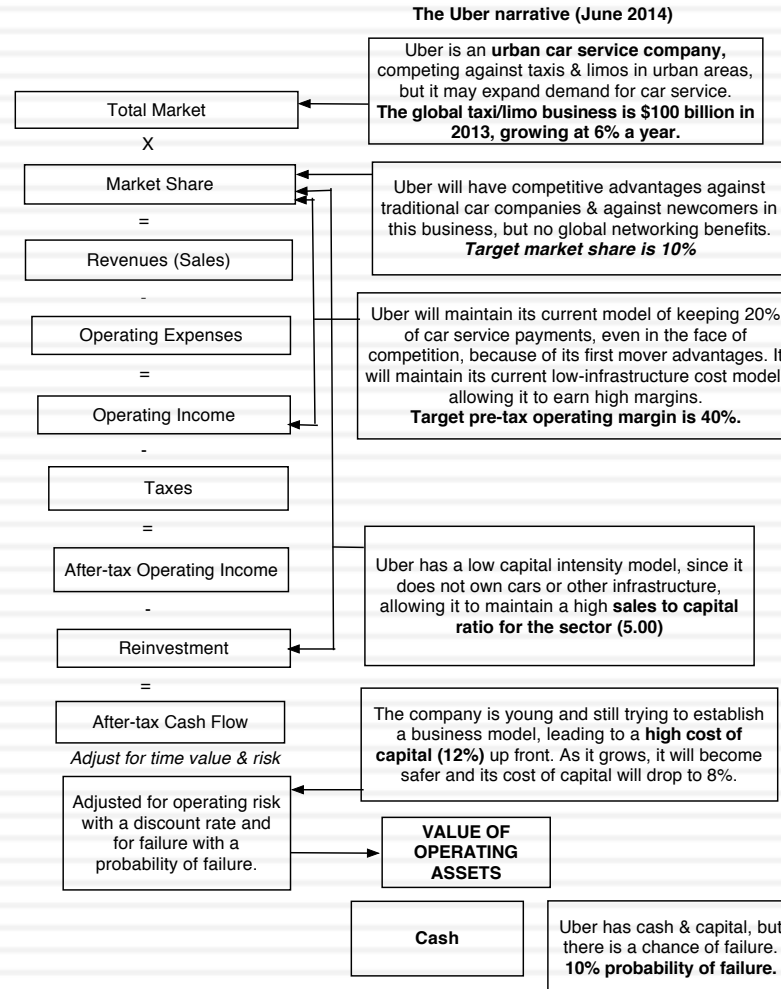
Companies valued at \$1 billion or more by venture-capital firms



Step 4a: Connect your narrative to key drivers of value



Uber: Story to Numbers

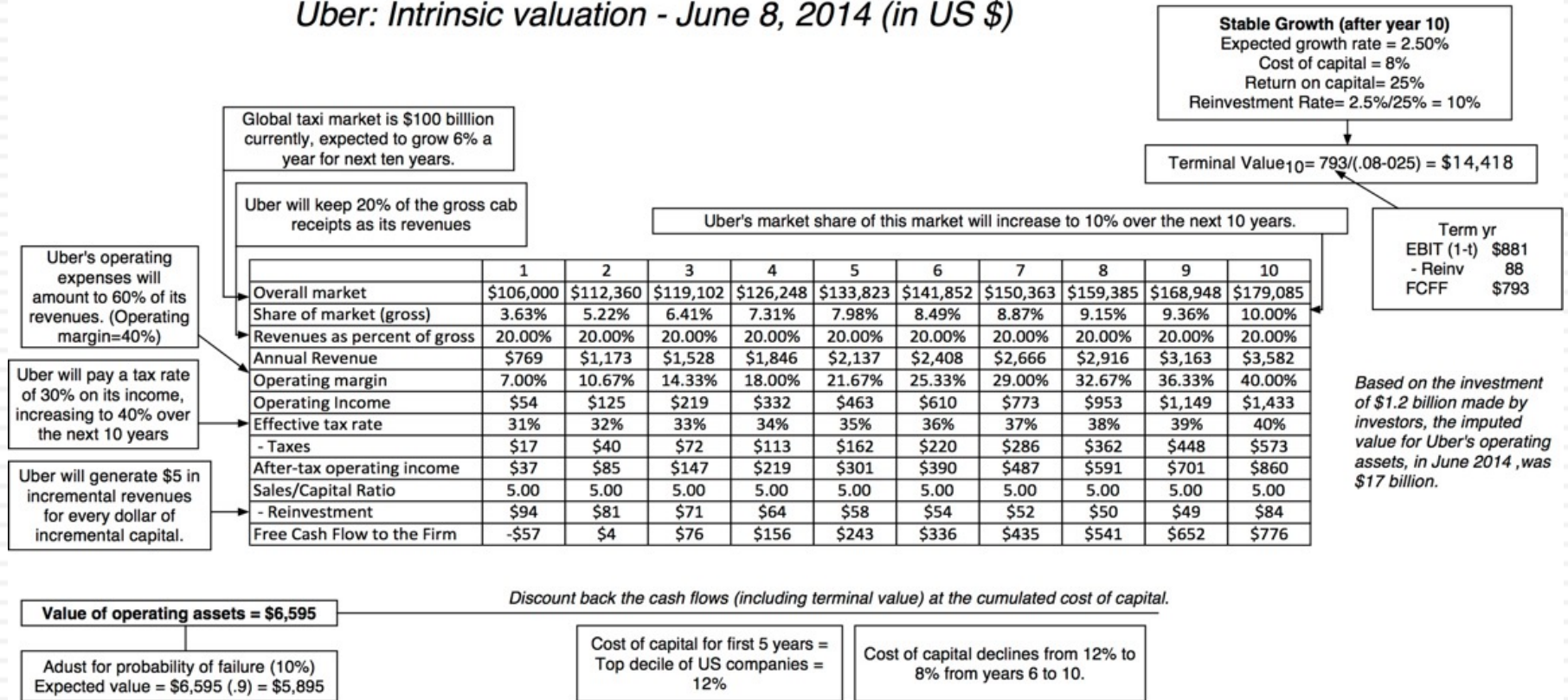


F&P Healthcare: Story to Numbers

Consistency, with a COVID Boost						
F&P healthcare has been a model of consistency over its lifetime, delivering revenue growth rate of about 10% and sustaining operating margins of 25-30% over much of its life. We will assume that the company will preserve this consistency, but that over time, its growth will start to scale down and changes in health care practices (especially in the US) will push margins down. Finally, the company has already done the bulk of the investing it needs to make for growth in the next 5 years, but will eventually have to get back to reinvesting at superior industry levels (in R&D and more traditional cap ex)						
The Assumptions						
	<i>Base year</i>	<i>Next year</i>	<i>Years 2-5</i>	<i>Years 6-10</i>	<i>After year 10</i>	<i>Link to story</i>
Revenues (a)	\$1,472.30	10.0%	10.00%	→	4.17%	Maintain historical growth
Operating margin (b)	25.24%	25.0%	→		23.00%	Sustain margins for near term, but competitive pressures & changes in the health care business will push margins down.
Tax rate	20.90%		20.90%	→	25.00%	Global/US marginal tax rate over time
Reinvestment (c)		5.00	5.00	1.79	34.75%	Maintained at Amazon's current level
Return on capital	14.64%	Marginal ROIC =	37.22%		12.00%	Patents and customer stickiness
Cost of capital (d)			11.15%	→	9.61%	Moves to median cost of capital over time

Step 4b: Value the company (Uber)

Uber: Intrinsic valuation - June 8, 2014 (in US \$)



Value F&P Healthcare

<i>The Cash Flows</i>						
	<i>Revenues</i>	<i>Operating Margin</i>	<i>EBIT</i>	<i>EBIT (1-t)</i>	<i>Reinvestment</i>	<i>FCFF</i>
1	\$1,619.53	25.00%	\$404.88	\$320.26	\$32.39	\$287.87
2	\$1,781.48	24.60%	\$438.24	\$346.65	\$35.63	\$311.02
3	\$1,959.63	24.40%	\$478.15	\$378.22	\$39.19	\$339.02
4	\$2,155.59	24.20%	\$521.65	\$412.63	\$43.11	\$369.52
5	\$2,371.15	24.00%	\$569.08	\$450.14	\$117.02	\$333.12
6	\$2,580.62	23.80%	\$614.19	\$480.79	\$110.55	\$370.24
7	\$2,778.50	23.60%	\$655.73	\$507.93	\$100.93	\$407.00
8	\$2,959.16	23.40%	\$692.44	\$530.69	\$88.21	\$442.48
9	\$3,117.06	23.20%	\$723.16	\$548.30	\$72.62	\$475.68
10	\$3,247.04	23.00%	\$746.82	\$560.12	\$75.64	\$484.47
Terminal year	\$3,382.45	23.00%	\$777.96	\$583.47	\$202.76	\$380.72
<i>The Value</i>						
Terminal value			\$6,998.45			
PV(Terminal value)			\$2,535.32			
PV (CF over next 10 years)			\$2,146.29			
Value of operating assets =			\$4,681.61			
Adjustment for distress			\$0.00		Probability of failure =	0.00%
- Debt & Minority Interests			\$167.70			
+ Cash & Other Non-operating assets			\$69.80			
Value of equity			\$4,583.71			
- Value of equity options			\$0.00			
Number of shares			577.40			
Value per share			\$7.94		Stock was trading at =	\$27.04

Step 5: Keep the feedback loop open

- When you tell a story about a company (either explicitly or implicitly), it is natural to feel attached to that story and to defend it against all attacks. Nothing can destroy an investor more than hubris.
- Being open to other views about a company is not easy, but here are some suggestions that may help:
 - ▣ Face up to the uncertainty in your own estimates of value.
 - ▣ Present the valuation to people who don't think like you do.
 - ▣ Create a process where people who disagree with you the most have a say.
 - ▣ Provide a structure where the criticisms can be specific and pointed, rather than general.

The Uber Feedback Loop: Bill Gurley

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1. Not just car service company.: Uber is a car company, not just a car service company, and there may be a day when consumers will subscribe to a Uber service, rather than own their own cars. It could also expand into logistics, i.e., moving and transportation businesses.
2. Not just urban: Uber can create new demands for car service in parts of the country where taxis are not used (suburbia, small towns).
3. Global networking benefits: By linking with technology and credit card companies, Uber can have global networking benefits.

Valuing Bill Gurley's Uber narrative

	<i>Uber (Gurley)</i>	<i>Uber (Gurley Mod)</i>	<i>Uber (Damodaran)</i>
Narrative	Uber will <u>expand the car service market substantially</u> , bringing in mass transit users & non-users from the suburbs into the market, and use its <u>networking advantage</u> to gain a <u>dominant market share</u> , while maintaining its revenue slice at 20%.	Uber will <u>expand the car service market substantially</u> , bringing in mass transit users & non-users from the suburbs into the market, and use its <u>networking advantage</u> to gain a <u>dominant market share</u> , while cutting prices and margins (to 10%).	Uber will expand the car service market moderately, primarily in urban environments, and use its <u>competitive advantages</u> to get a <u>significant but not dominant market share</u> and maintain its revenue slice at 20%.
Total Market	\$300 billion, growing at 3% a year	\$300 billion, growing at 3% a year	\$100 billion, growing at 6% a year
Market Share	40%	40%	10%
Uber's revenue slice	20%	10%	20%
Value for Uber	\$53.4 billion + Option value of entering car ownership market (\$10 billion+)	\$28.7 billion + Option value of entering car ownership market (\$6 billion+)	\$5.9 billion + Option value of entering car ownership market (\$2-3 billion)

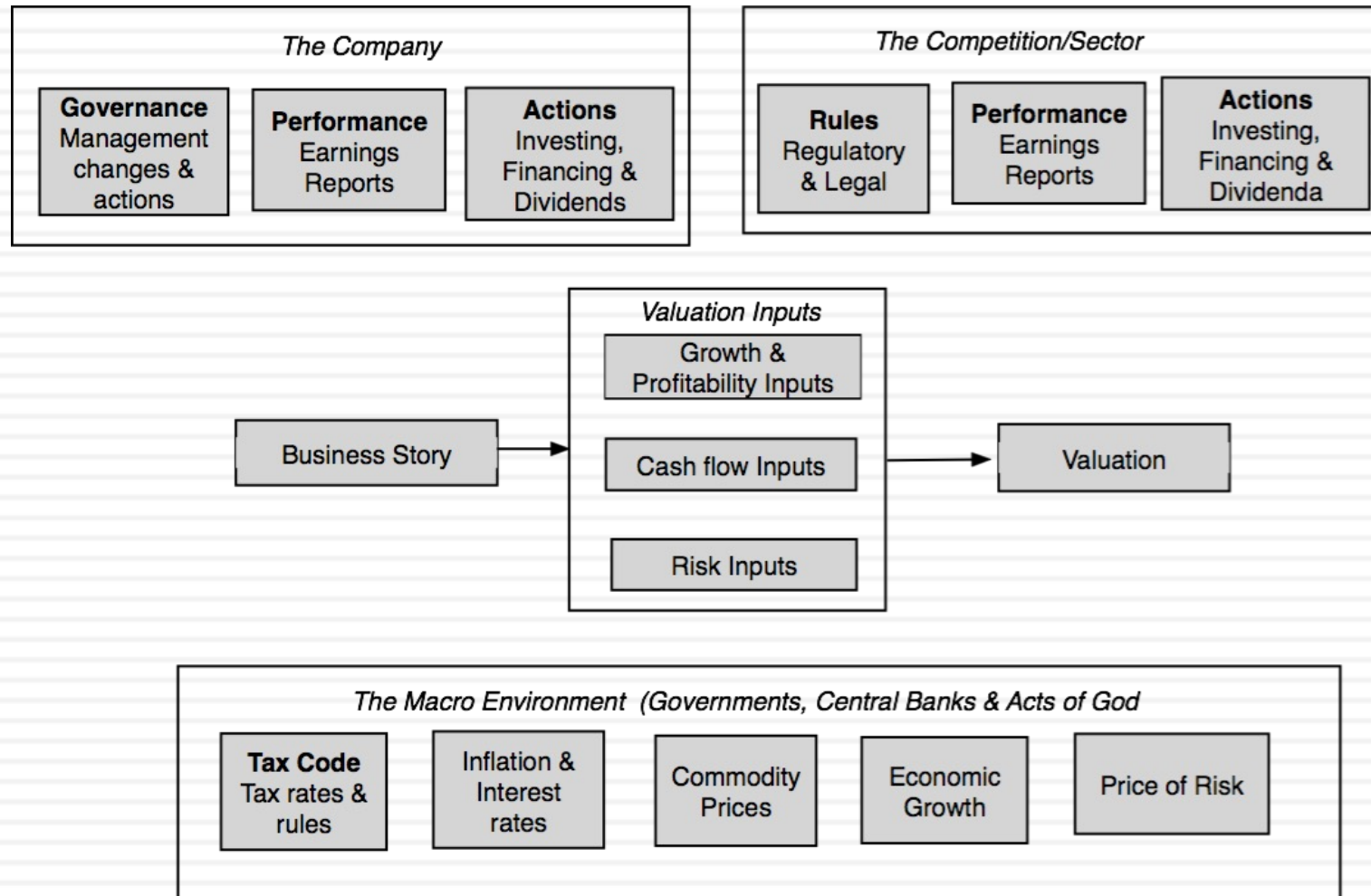
Different narratives, Different Numbers

<i>Total Market</i>	<i>Growth Effect</i>	<i>Network Effect</i>	<i>Competitive Advantages</i>	<i>Value of Uber</i>
A4. Mobility Services	B4. Double market size	C5. Strong global network effects	D4. Strong & Sustainable	\$90,457
A3. Logistics	B4. Double market size	C5. Strong global network effects	D4. Strong & Sustainable	\$65,158
A4. Mobility Services	B3. Increase market by 50%	C3. Strong local network effects	D3. Semi-strong	\$52,346
A2. All car service	B4. Double market size	C5. Strong global network effects	D4. Strong & Sustainable	\$47,764
A1. Urban car service	B4. Double market size	C5. Strong global network effects	D4. Strong & Sustainable	\$31,952
A3. Logistics	B3. Increase market by 50%	C3. Strong local network effects	D3. Semi-strong	\$14,321
A1. Urban car service	B3. Increase market by 50%	C3. Strong local network effects	D3. Semi-strong	\$7,127
A2. All car service	B3. Increase market by 50%	C3. Strong local network effects	D3. Semi-strong	\$4,764
A4. Mobility Services	B1. None	C1. No network effects	D1. None	\$1,888
A3. Logistics	B1. None	C1. No network effects	D1. None	\$1,417
A2. All car service	B1. None	C1. No network effects	D1. None	\$1,094
A1. Urban car service	B1. None	C1. No network effects	D1. None	\$799

What am I missing about F&P Healthcare?

- My knowledge of F&P Healthcare is paltry and based upon a peripheral and quick assessment of historical numbers and news stories about the company.
- It is possible that I have been shoddy and made a fundamental error or missed a key element of the company's story.
 - Under fundamental error, I checked to make sure that the numbers I entered were in NZ \$ and not US \$. If it had been the latter, my value per share would be about 60% higher...
 - Under story change, It is entirely possible that this remarkably consistent company has reincarnated and become high-growth engine, but the ingredients you need for this are not visible (new management team, a new patent that will deliver blockbuster results, a permanent surge in demand for a core product...)
- So, what am I missing?

Why narratives change



How narratives change

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Narrative Break/End	Narrative Shift	Narrative Change (Expansion or Contraction)
Events, external (legal, political or economic) or internal (management, competitive, default), that can cause the narrative to break or end.	Improvement or deterioration in initial business model, changing market size, market share and/or profitability.	Unexpected entry/success in a new market or unexpected exit/failure in an existing market.
Your valuation estimates (cash flows, risk, growth & value) are no longer operative	Your valuation estimates will have to be modified to reflect the new data about the company.	Valuation estimates have to be redone with new overall market potential and characteristics.
Estimate a probability that it will occur & consequences	Monte Carlo simulations or scenario analysis	Real Options



The End

“There is no real ending. It’s just the place where you stop the story.”