

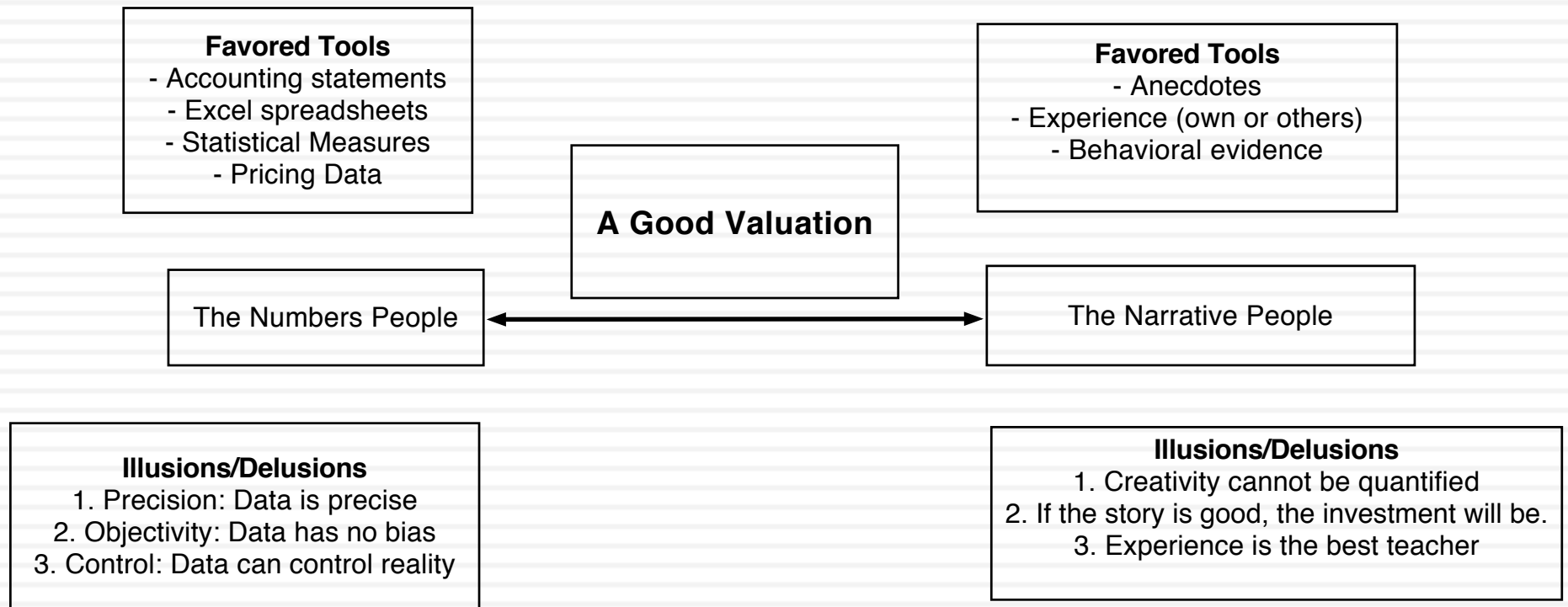
**NUMBERS AND NARRATIVE:  
MODELING, STORY TELLING AND  
INVESTING**

Aswath Damodaran

# What are you?

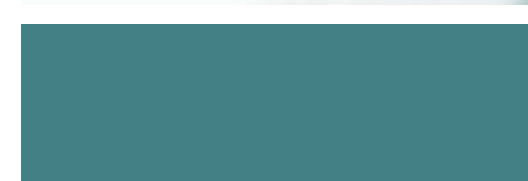
- If you were asked to categorize yourself, would you more naturally think of yourself as a
  - a) Numbers Person
  - b) Story Person
  - c) Not sure
- When did you make this decision and how has it affected your educational and career choices?
- At your current job or position, do you find yourself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

# Bridging the Gap

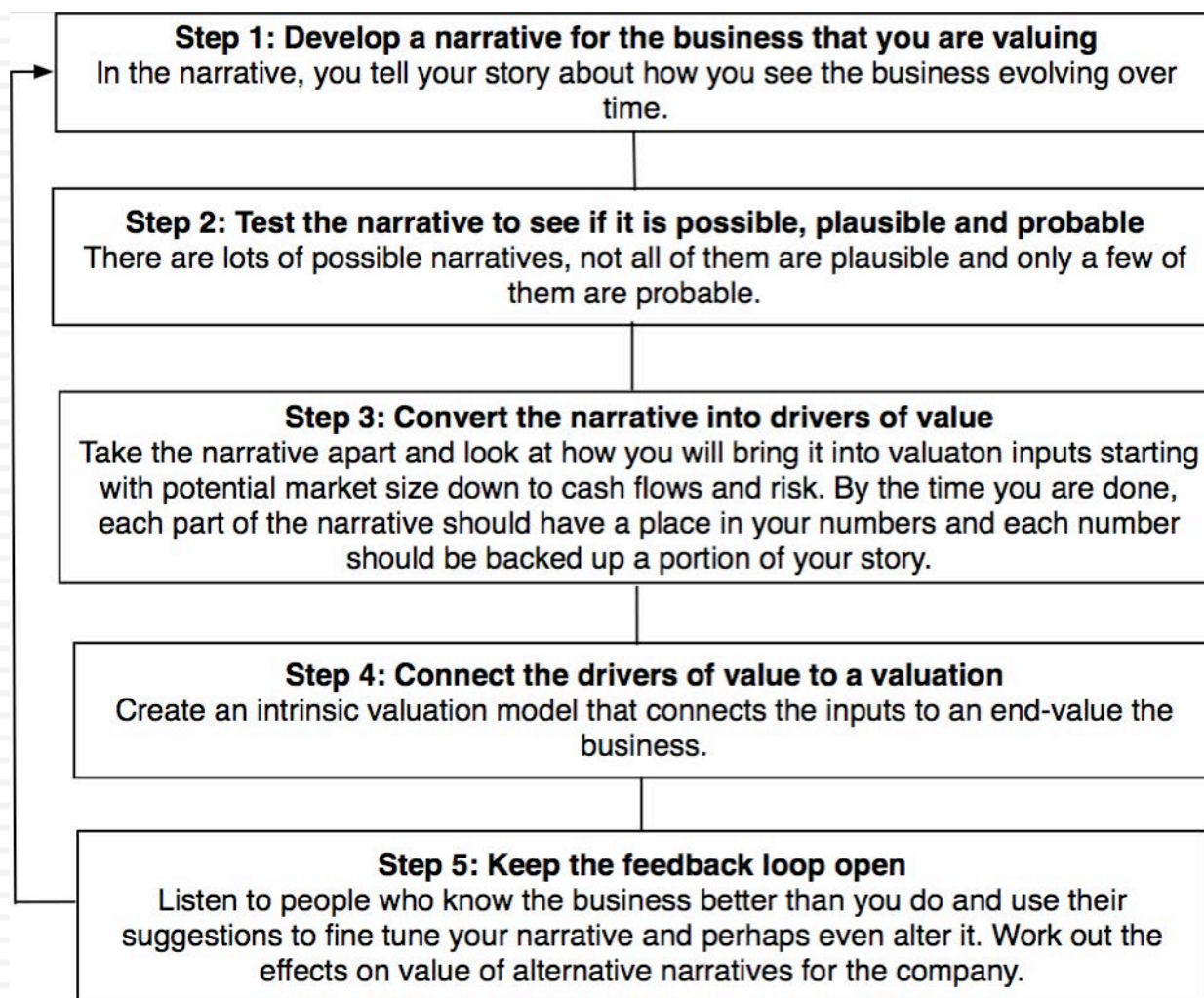




FROM NARRATIVE TO NUMBERS:  
THE MECHANICS



# The Steps

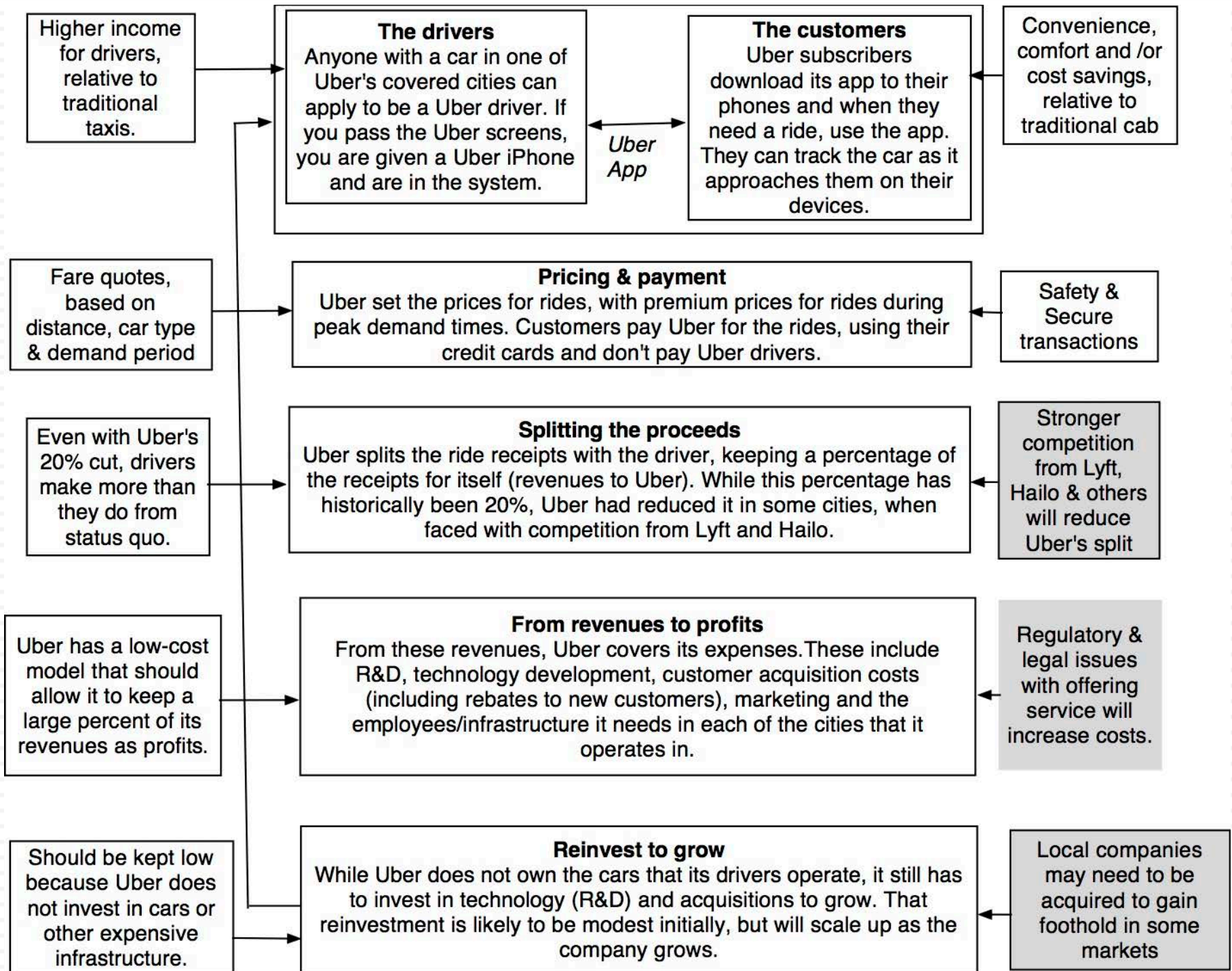


# Step 1a: Survey the landscape

- 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



# Understanding Ferrari in 2015

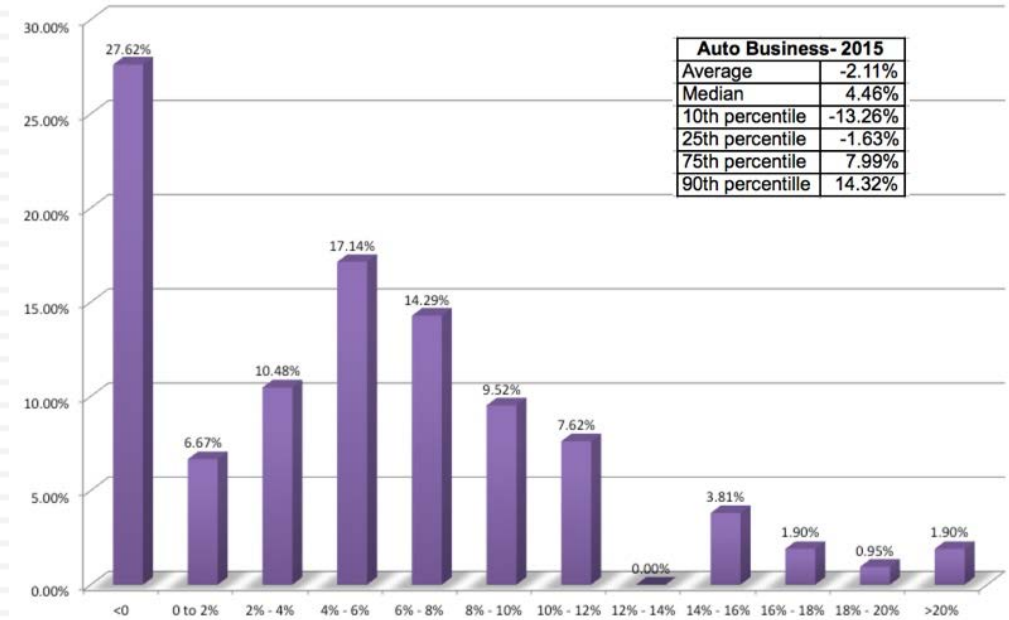
## It is in the Auto Business Low Margins

### Low Growth

Year	Revenues (\$)	% Growth Rate
2005	1,274,716.60	
2006	1,421,804.20	11.54%
2007	1,854,576.40	30.44%
2008	1,818,533.00	-1.94%
2009	1,572,890.10	-13.51%
2010	1,816,269.40	15.47%
2011	1,962,630.40	8.06%
2012	2,110,572.20	7.54%
2013	2,158,603.00	2.28%
2014	2,086,124.80	-3.36%
ounded Average =		5.63%

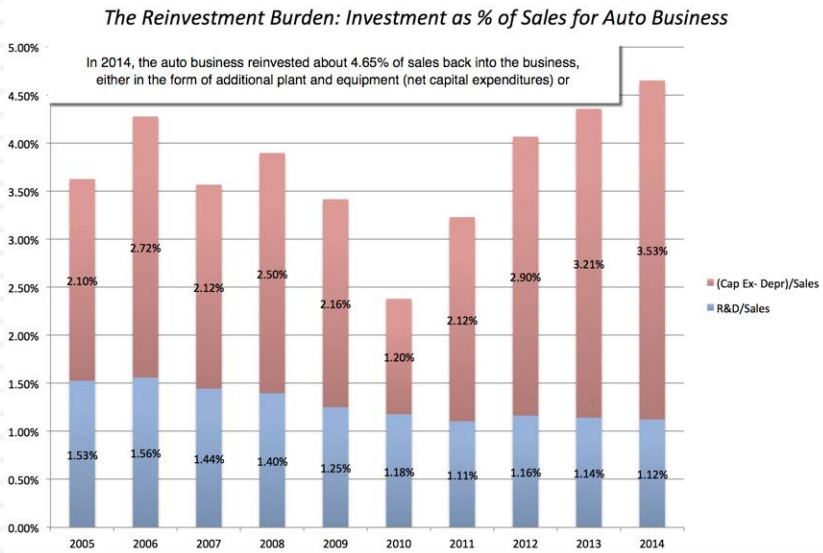
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The Automobile Business: Pre-tax Operating Margins in 2015



Auto Business- 2015	
Average	-2.11%
Median	4.46%
10th percentile	-13.26%
25th percentile	-1.63%
75th percentile	7.99%
90th percentile	14.32%

### High & Increasing Reinvestment



### Bad Business

=

	ROIC	Cost of capital	ROIC - Cost of capital
2004	6.82%	7.93%	-1.11%
2005	10.47%	7.02%	3.45%
2006	4.60%	7.97%	-3.37%
2007	7.62%	8.50%	-0.88%
2008	3.48%	8.03%	-4.55%
2009	-4.97%	8.58%	-13.55%
2010	5.16%	8.03%	-2.87%
2011	7.55%	8.15%	-0.60%
2012	7.80%	8.55%	-0.75%
2013	7.83%	8.47%	-0.64%
2014	6.47%	7.53%	-1.06%

Only once in the last 10 years have auto companies collectively earned more than their cost of capital

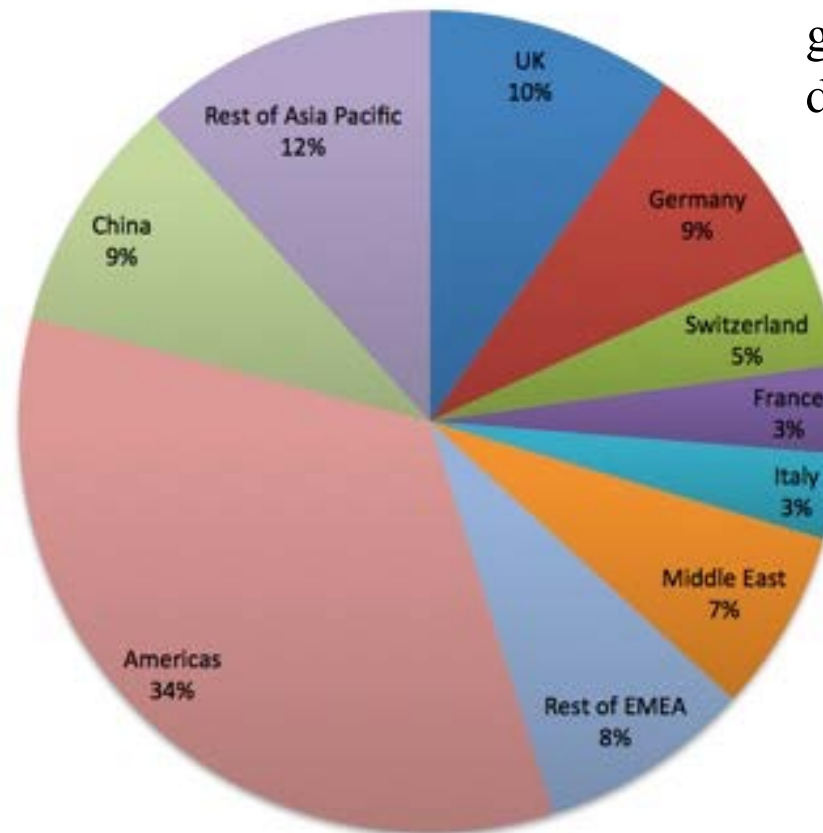


# But it is not just another auto company..

Ferrari sold only 7,255 cars in all of 2014

Ferrari had a profit margin of 18.2%, in the 95<sup>th</sup> percentile, partly because of its high prices and partly because it spends little on advertising.

*Ferrari: Geographical Sales (2014)*



Ferrari sales (in units) have grown very little in the last decade & have been stable

Ferrari has not invested in new plants.

# 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

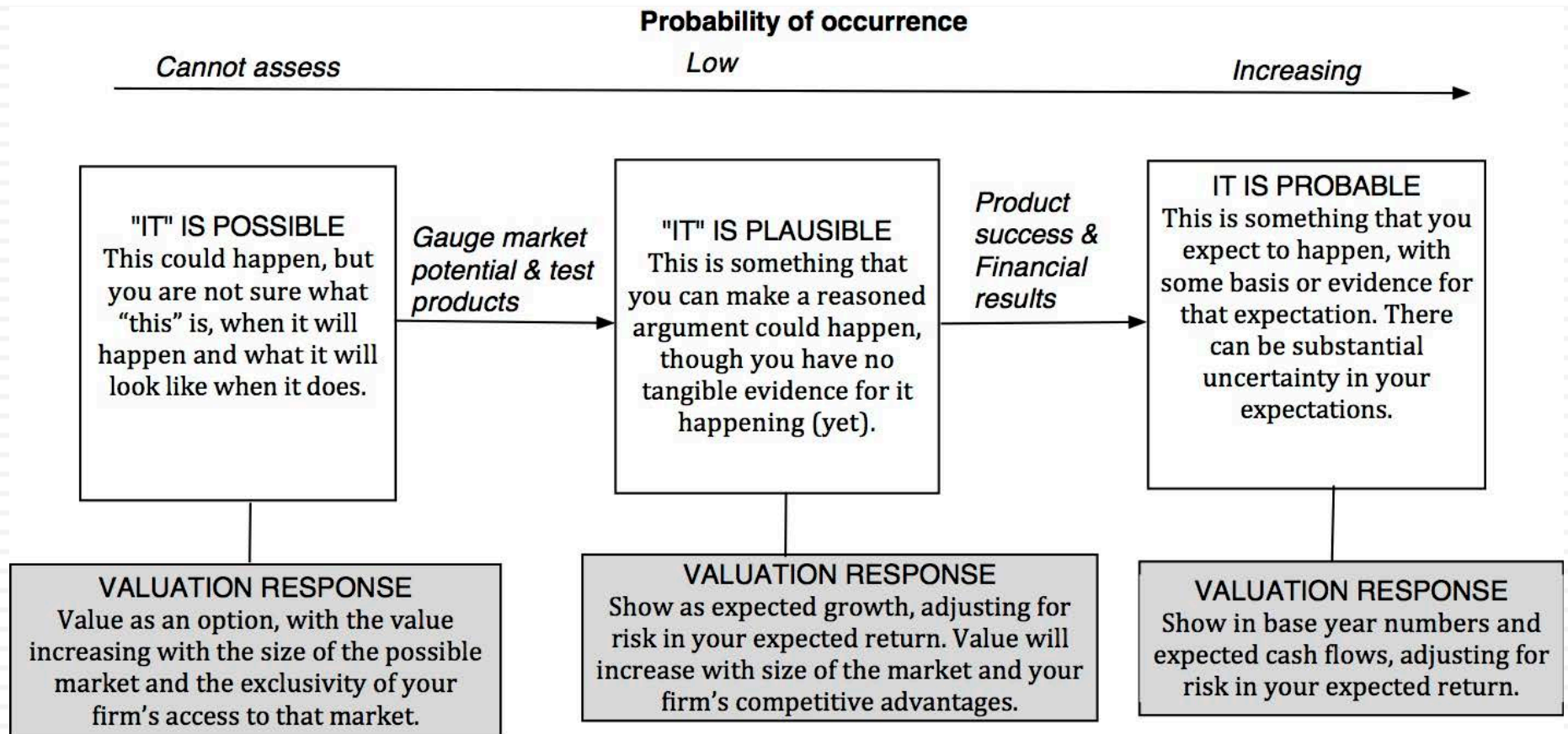
1. An urban car service business: I saw Uber primarily as a force in urban areas and only in the car service business.
2. Which would expand the business moderately (about 40% over ten years) by bringing in new users.
3. With local networking benefits: If Uber becomes large enough in any city, it will 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 Ferrari Narrative: An Exclusive Club

- Ferrari will stay an exclusive auto club, deriving its allure from its scarcity and the fact that only a few own Ferraris.
- By staying exclusive, the company gets three benefits:
  - ▣ It can continue to charge nose bleed prices for its cars and sell them with little or no advertising.
  - ▣ It does not need to invest in new assembly plants, since it does not plan to ramp up production.
  - ▣ It sells only to the super rich, who are unaffected by overall economic conditions or market crises.

# 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.

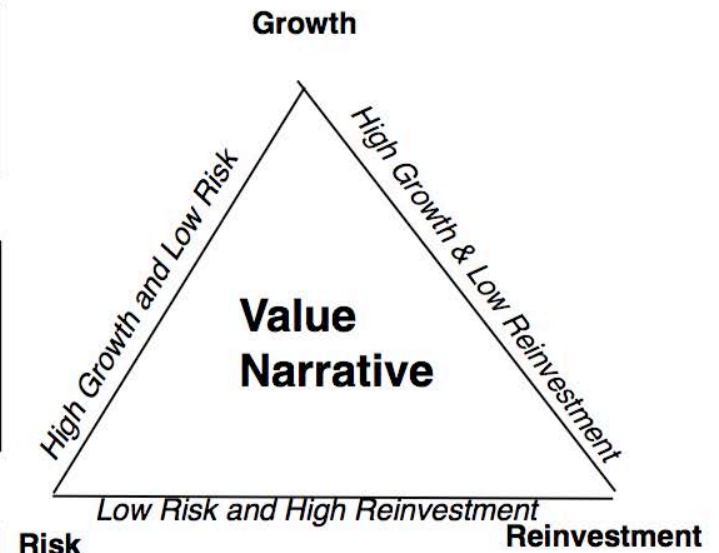
### **Profits without competition**

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.

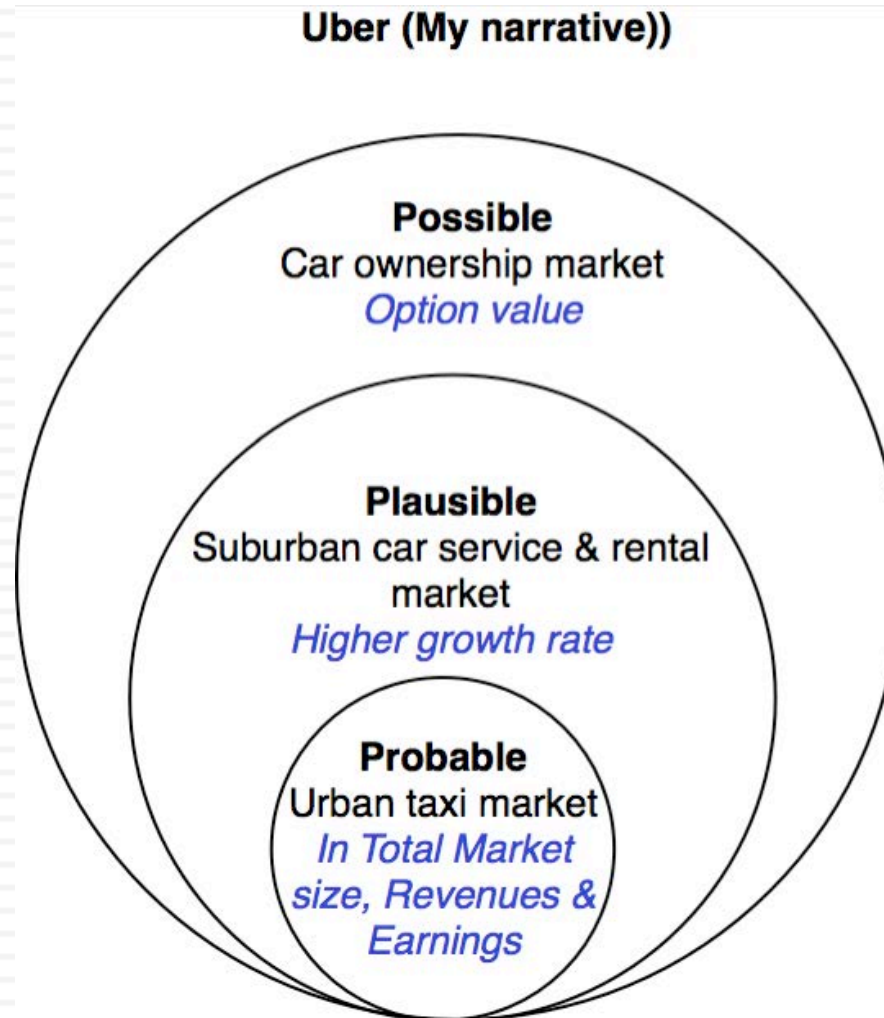
## The Improbable





# 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.



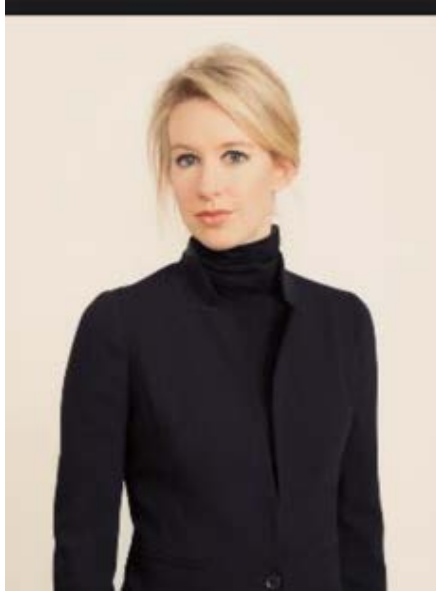
# The Runaway Story: When you want a story to be true...

- 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



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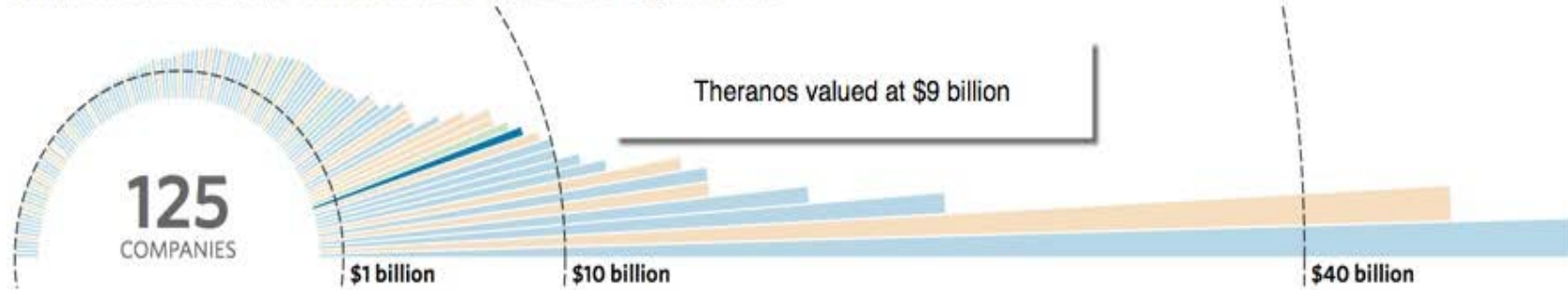
The Checks (?)

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

+

Money

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

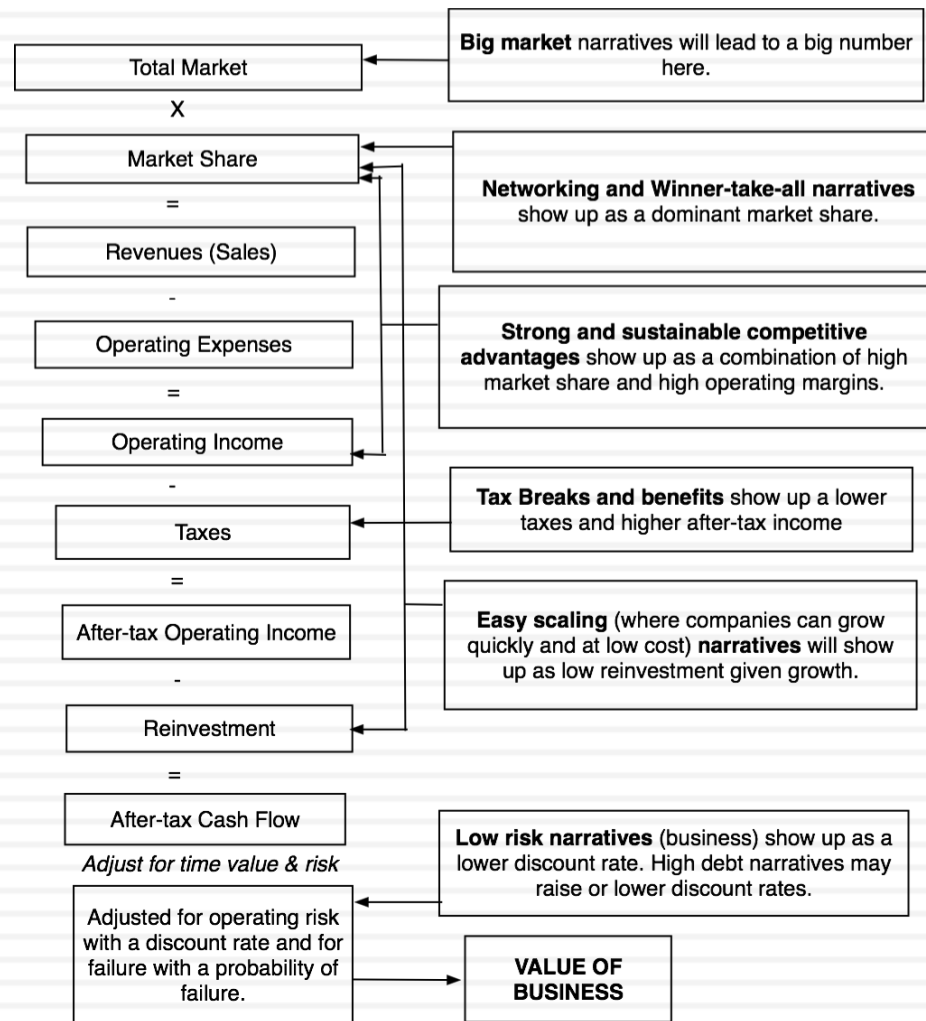


Valuations as of October 2015

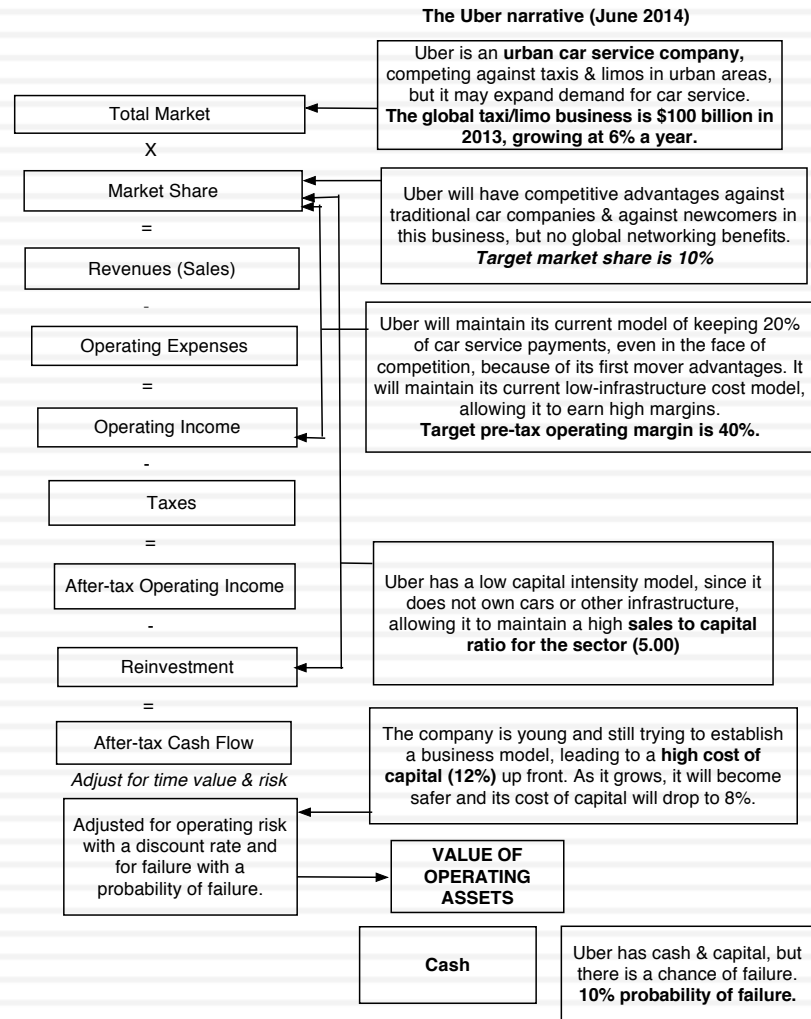
Select companies from the chart or table for more detail.



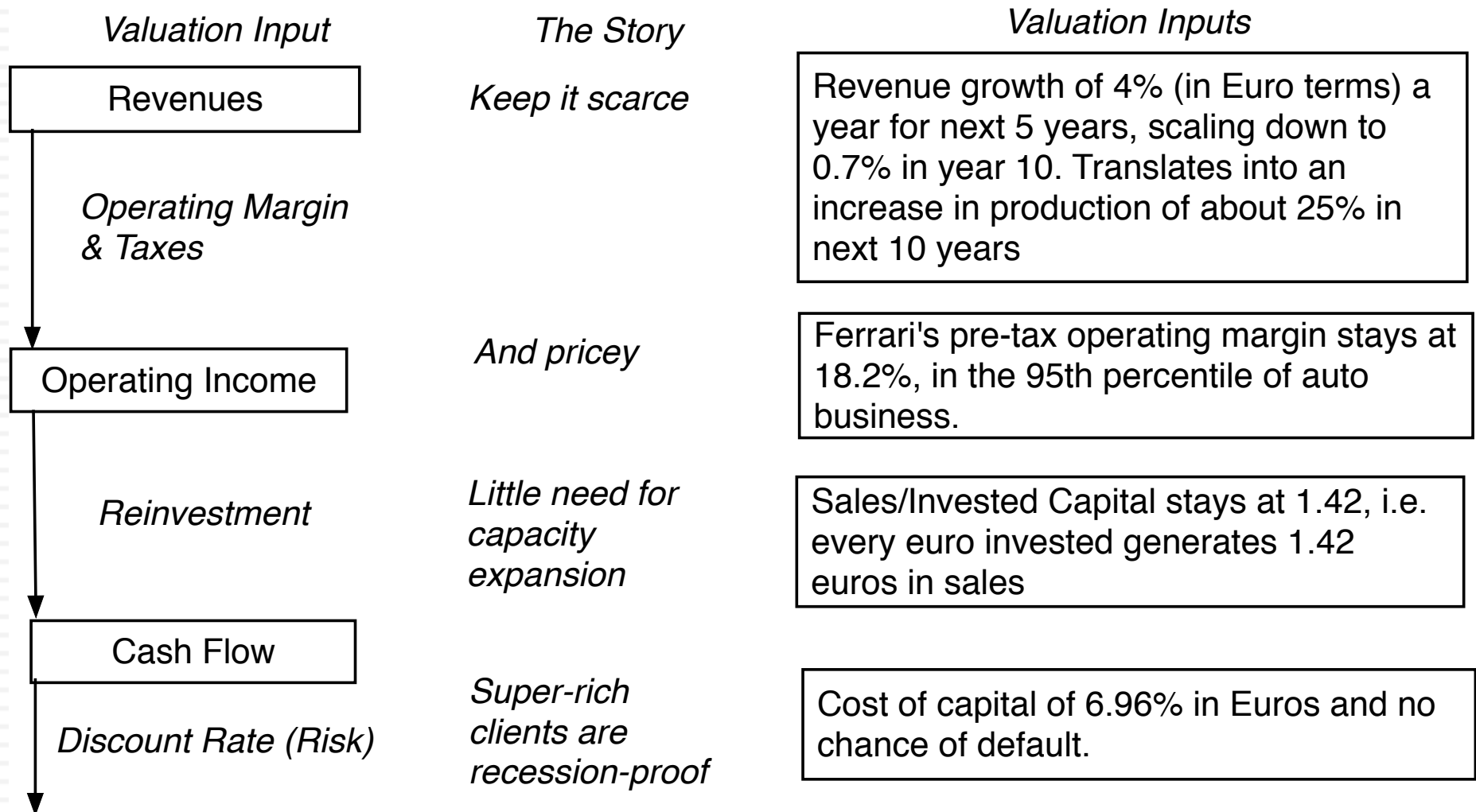
# Step 4a: Connect your narrative to key drivers of value



# The Uber Link



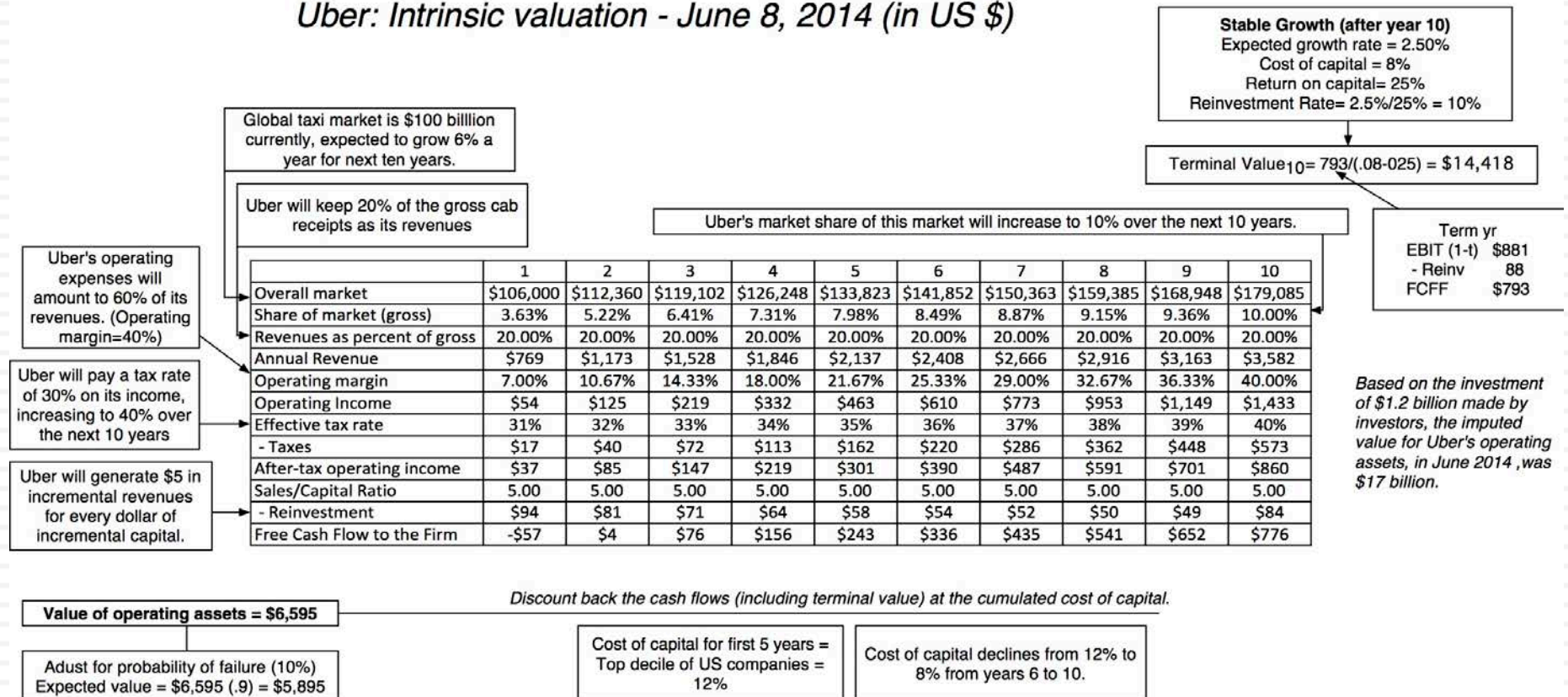
# Ferrari: From story to numbers



# Step 4b: Value the company (Uber)

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



# Ferrari: The “Exclusive Club” Value

Stay Super Exclusive: Revenue growth is low

	Base year	1	2	3	4	5	6	7	8	9	10	Terminal year
Revenue growth rate		4.00%	4.00%	4.00%	4.00%	4.00%	3.34%	2.68%	2.02%	1.36%	0.70%	0.70%
Revenues	€ 2,763	€ 2,874	€ 2,988	€ 3,108	€ 3,232	€ 3,362	€ 3,474	€ 3,567	€ 3,639	€ 3,689	€ 3,714	€ 3,740
EBIT (Operating) margin	18.20%	18.20%	18.20%	18.20%	18.20%	18.20%	18.20%	18.20%	18.20%	18.20%	18.20%	18.20%
EBIT (Operating income)	€ 503	€ 523	€ 544	€ 566	€ 588	€ 612	€ 632	€ 649	€ 662	€ 671	€ 676	€ 681
Tax rate	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%
EBIT(1-t)	€ 334	€ 348	€ 361	€ 376	€ 391	€ 407	€ 420	€ 431	€ 440	€ 446	€ 449	€ 452
- Reinvestment		€ 78	€ 81	€ 84	€ 87	€ 91	€ 79	€ 66	€ 51	€ 35	€ 18	€ 22
FCFF		€ 270	€ 281	€ 292	€ 303	€ 316	€ 341	€ 366	€ 389	€ 411	€ 431	€ 431
Cost of capital		6.96%	6.96%	6.96%	6.96%	6.96%	6.96%	6.97%	6.98%	6.99%	7.00%	7.00%
PV(FCFF)		€ 252	€ 245	€ 238	€ 232	€ 225	€ 228	€ 228	€ 227	€ 224	€ 220	
Terminal value	€ 6,835											
PV(Terminal value)	€ 3,485											
PV (CF over next 10 years)	€ 2,321											
Value of operating assets =	€ 5,806											
- Debt	€ 623											
- Minority interests	€ 13											
+ Cash	€ 1,141											
Value of equity	€ 6,311											

High Prices  
+ No selling  
cost =  
Preserve  
current  
operating  
margin

Minimal  
Reinvestment  
due to low  
growth

The super  
rich are not  
sensitive to  
economic  
downturns



# 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.

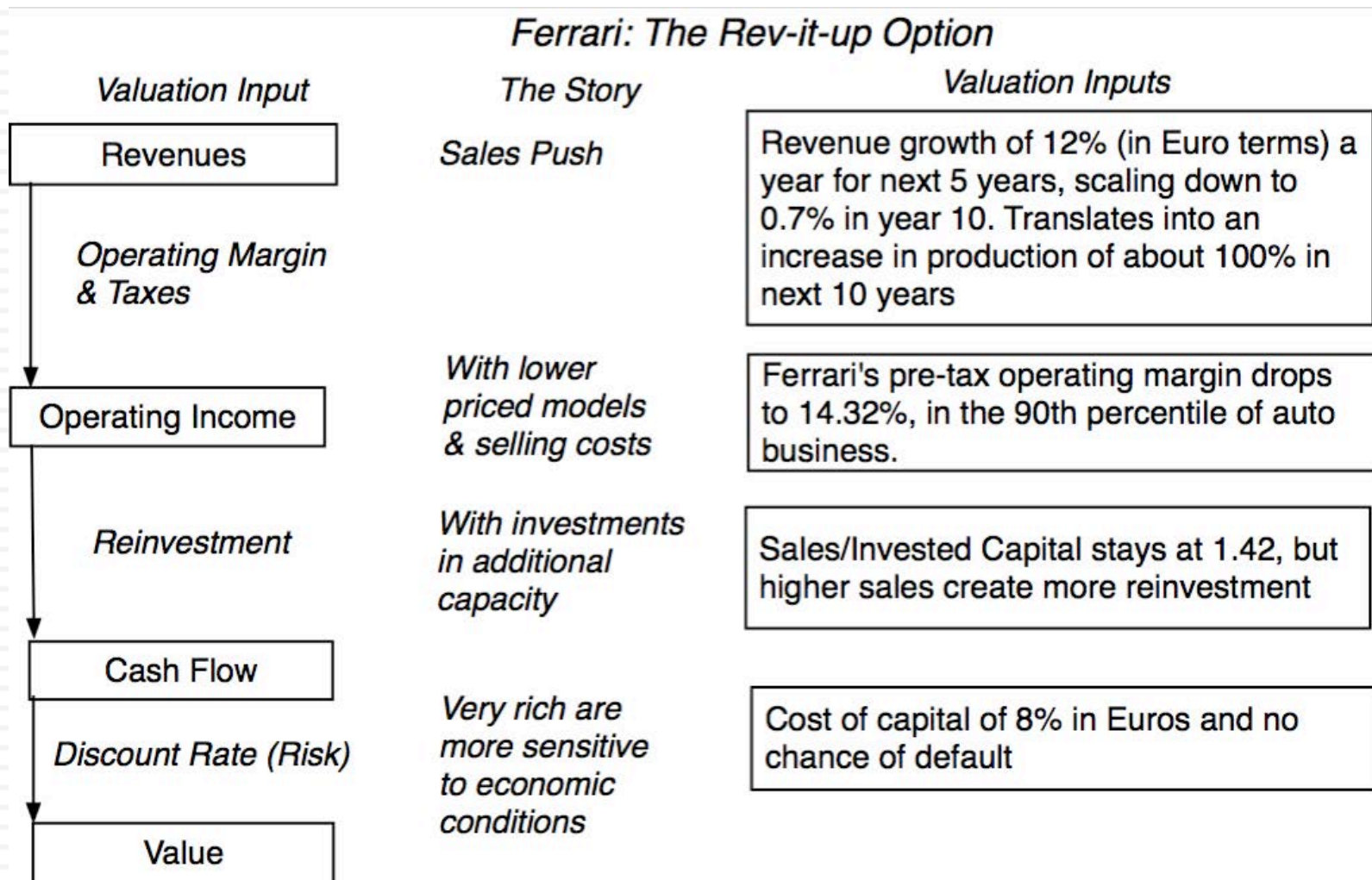
# Valuing Bill Gurley's Uber narrative

	<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 to gain a 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 to gain a 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 to get a 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

# The Ferrari Counter Narrative





# Ferrari: The “Rev-it-up” Alternative

Get less exclusive: Double number of cars sold over next decade

	Base year	1	2	3	4	5	6	7	8	9	10	Terminal year
Revenue growth rate		12.00%	12.00%	12.00%	12.00%	12.00%	9.74%	7.48%	5.22%	2.96%	0.70%	0.70%
Revenues	€ 2,763	€ 3,095	€ 3,466	€ 3,882	€ 4,348	€ 4,869	€ 5,344	€ 5,743	€ 6,043	€ 6,222	€ 6,266	€ 6,309
EBIT (Operating) margin	18.20%	17.81%	17.42%	17.04%	16.65%	16.26%	15.87%	15.48%	15.10%	14.71%	14.32%	14.32%
EBIT (Operating income)	€ 503	€ 551	€ 604	€ 661	€ 724	€ 792	€ 848	€ 889	€ 912	€ 915	€ 897	€ 904
Tax rate	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%	33.54%
EBIT(1-t)	€ 334	€ 366	€ 401	€ 439	€ 481	€ 526	€ 564	€ 591	€ 606	€ 608	€ 596	€ 600
- Reinvestment		€ 233	€ 261	€ 293	€ 328	€ 367	€ 334	€ 281	€ 211	€ 126	€ 31	€ 35
FCFF		€ 133	€ 140	€ 147	€ 153	€ 159	€ 230	€ 310	€ 395	€ 482	€ 566	€ 565
Cost of capital		8.00%	8.00%	8.00%	8.00%	8.00%	7.90%	7.80%	7.70%	7.60%	7.50%	7.50%
PV(FCFF)		€ 123	€ 120	€ 117	€ 113	€ 108	€ 145	€ 181	€ 215	€ 244	€ 266	
Terminal value	€ 8,315											
PV(Terminal value)	€ 3,906											
PV (CF over next 10 years)	€ 1,631											
Value of operating assets =	€ 5,537											
- Debt	€ 623											
- Minority interests	€ 13											
+ Cash	€ 1,141											
Value of equity	€ 6,042											

Lower Prices +  
Some selling  
cost = Lower  
operating  
margin

Reinvestment  
reflects  
higher sales

The very  
rich are  
more  
sensitive to  
economic  
conditions

# And the world is full of feedback.. My Ferrari afterthought!

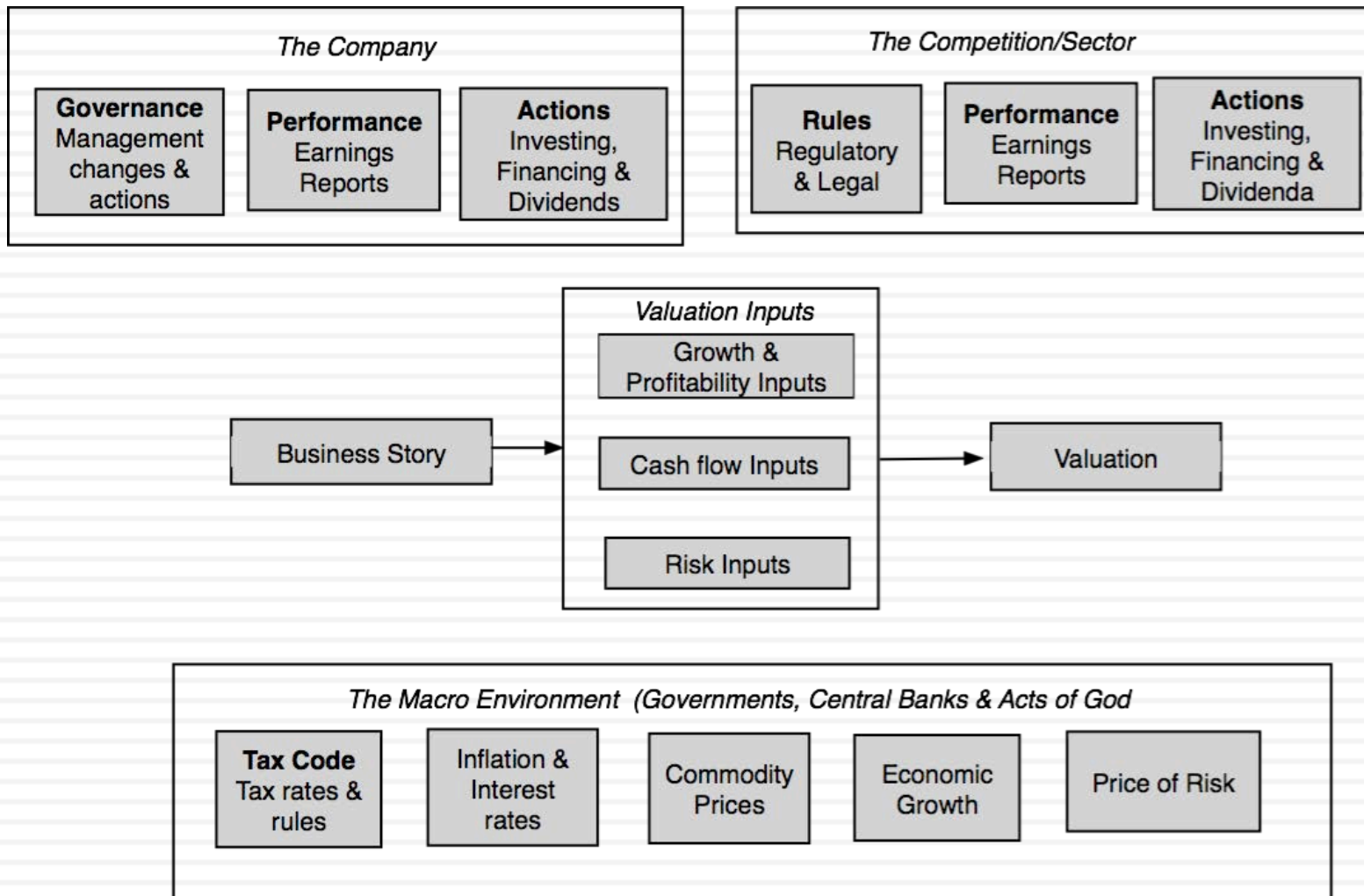


## Narrative breaks, shifts & changes

“When my information changes, I alter my conclusions. What do you do, sir?”

*Lord Keynes*

# Why narratives change



# How narratives change

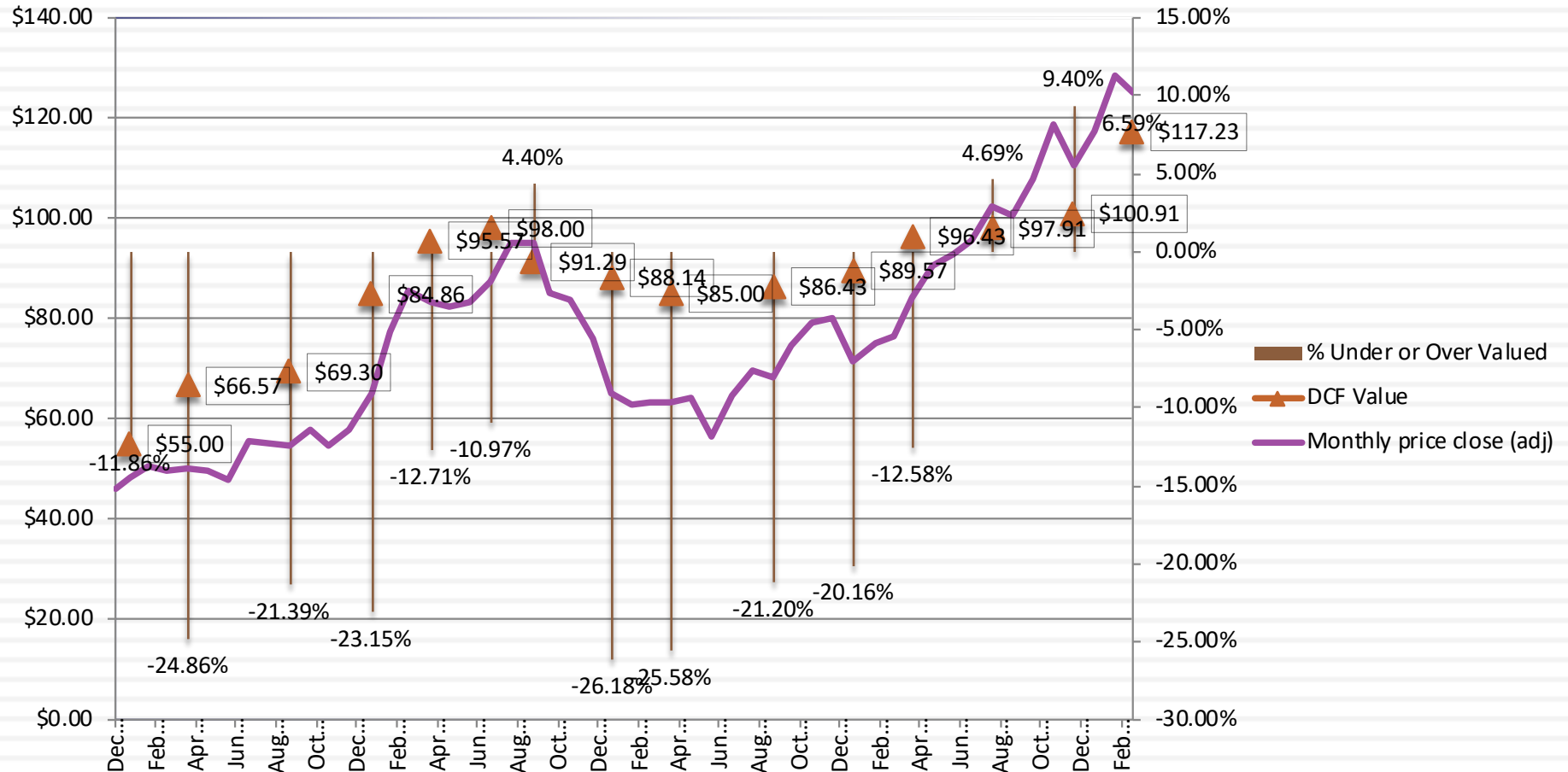
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Narrative Break/End	Narrative Shift	Narrative Change (Expansion or Contraction)
Events, external (legal, political or economic) or internal (management, competitive, default), that can cause the narrative to break or end.	Improvement or deterioration 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



# Sometimes your story does not change..

Apple, Price and Value - 2010 to 2015



# And sometimes it does.. Facebook's Evolution

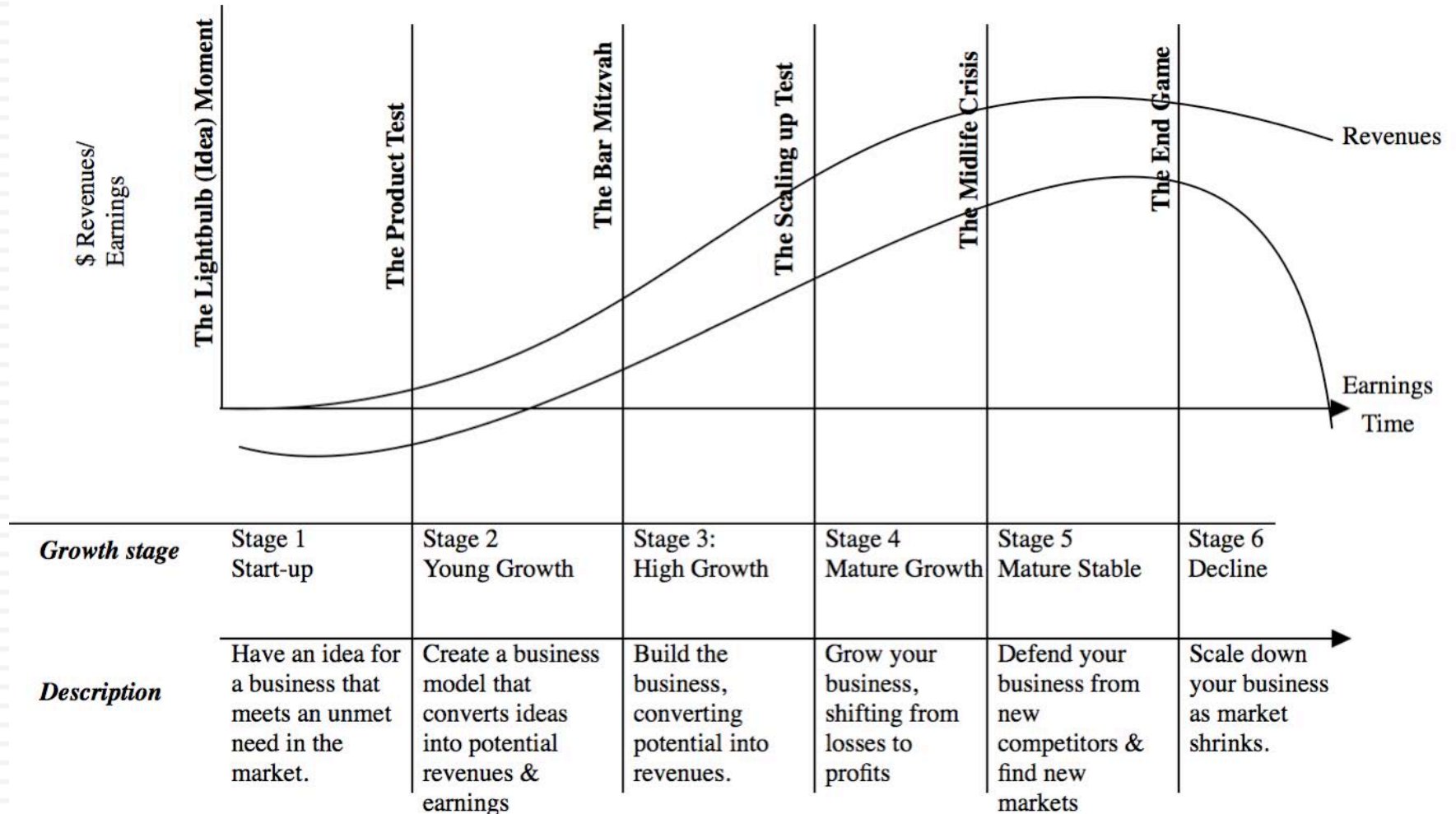
Report Date	Active Users	Mobile Active Users	% of revenue from Mobile	Net Income	Capital	T12m Sales/Capital
7/26/12	955	543	NR	(\$157)	\$3,515	1.23
10/23/12	1010	604	NR	(\$59)	\$4,252	1.09
1/30/13	1060	680	23.00%	\$64	\$4,120	1.24
5/1/13	1100	751	30.00%	\$219	\$4,272	1.28
7/24/13	1150	819	41.00%	(\$152)	\$3,948	1.55
10/30/13	1190	874	49.00%	\$425	\$4,007	1.71
1/29/14	1230	945	53.00%	\$523	\$4,258	1.85
4/23/14	1280	1010	59.00%	\$642	\$4,299	2.07
7/23/14	1320	1070	62.00%	\$791	\$4,543	2.20



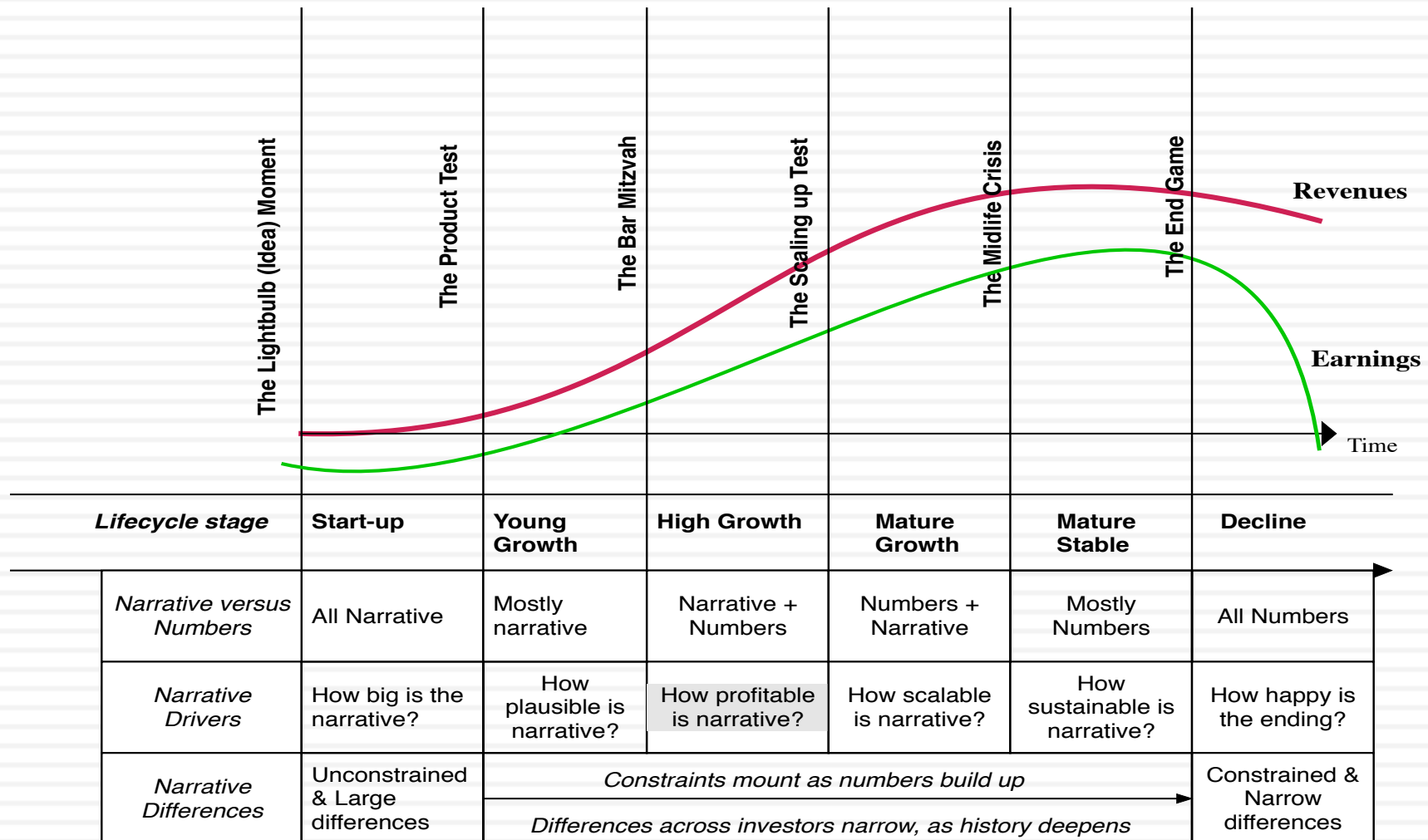
# Managers: Narrative or Numbers?

“Management is, above all, a practice where art, science, and craft meet”

# Introducing the corporate life cycle

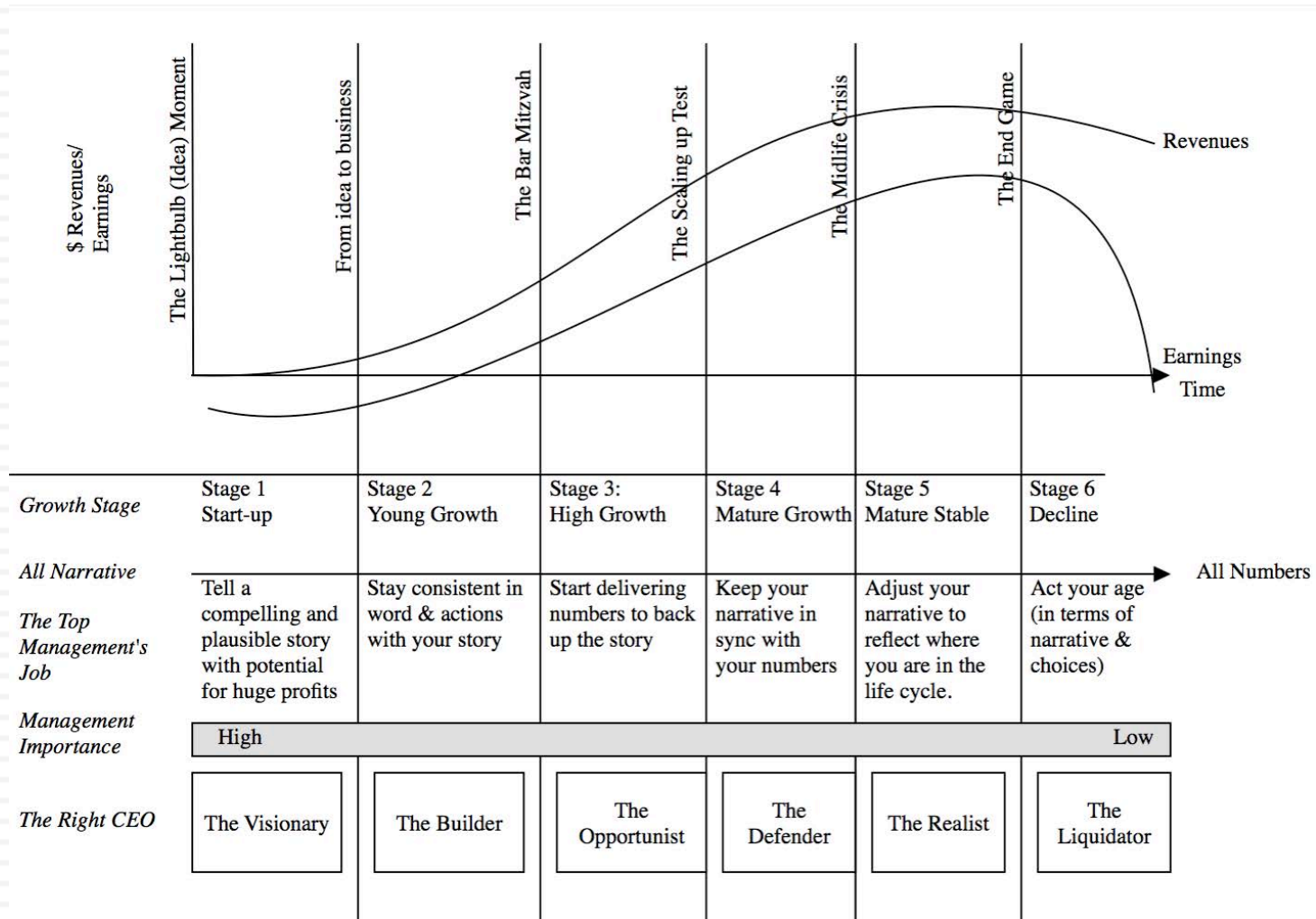


# Connecting to narratives..

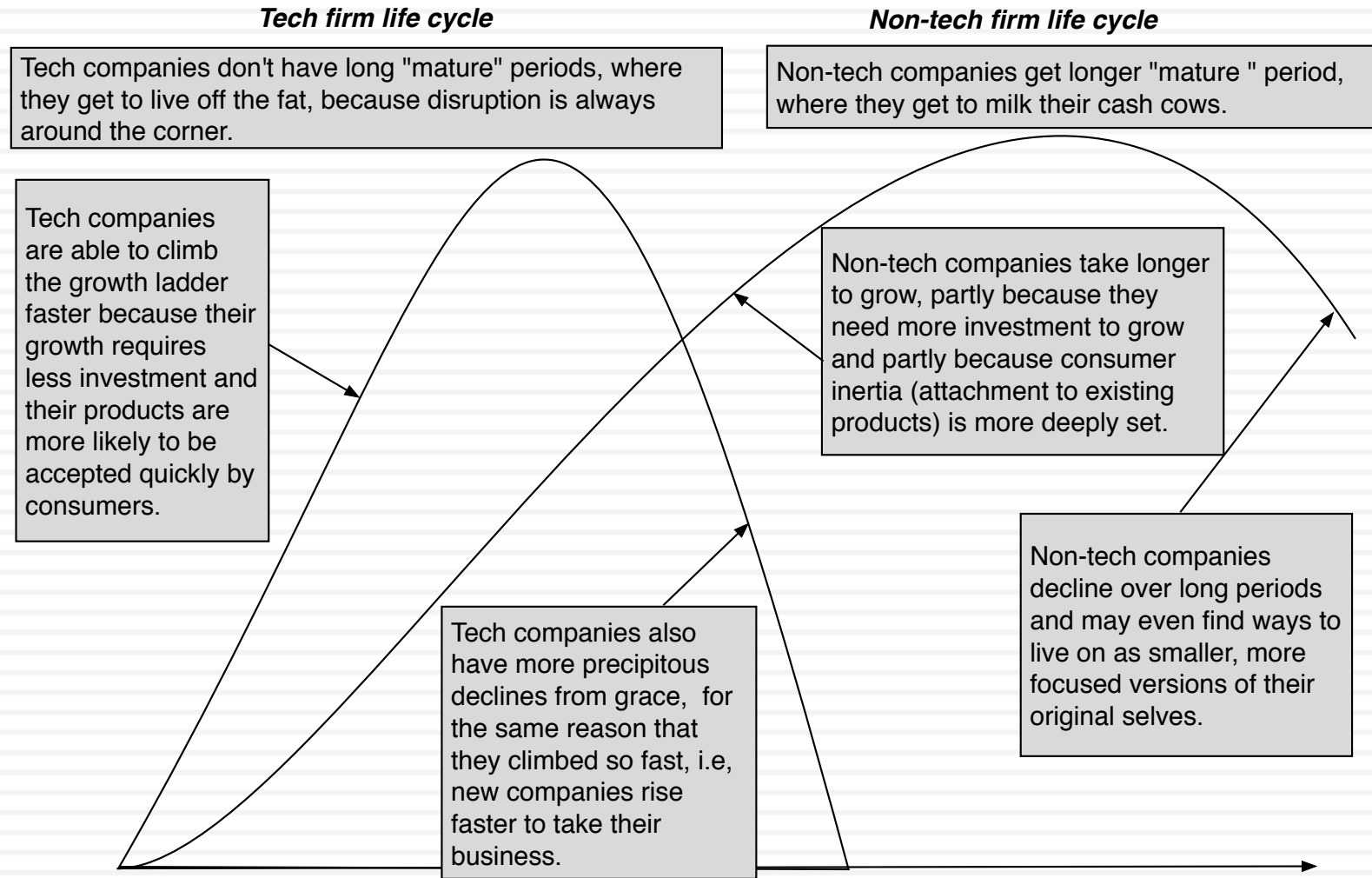




# The Managerial Challenge



# The Compressed Life Cycle?



# The Consequences


- When life cycles were long, stretching over decades, time and aging allowed for smoother transitions, since CEOs aged with their companies, and moved on.
- As life cycles shorten, managers are far more likely to find their companies changing under them so quickly that they can no longer adapt.
  - To be a long tenured CEO, you will either need to be versatile and/or be able to delegate the work that you cannot do to people you empower and trust.
  - If these transitions are not well managed, there will be far more turnover in top management and activist investing will flourish.



# Investors: Narrative or Numbers?

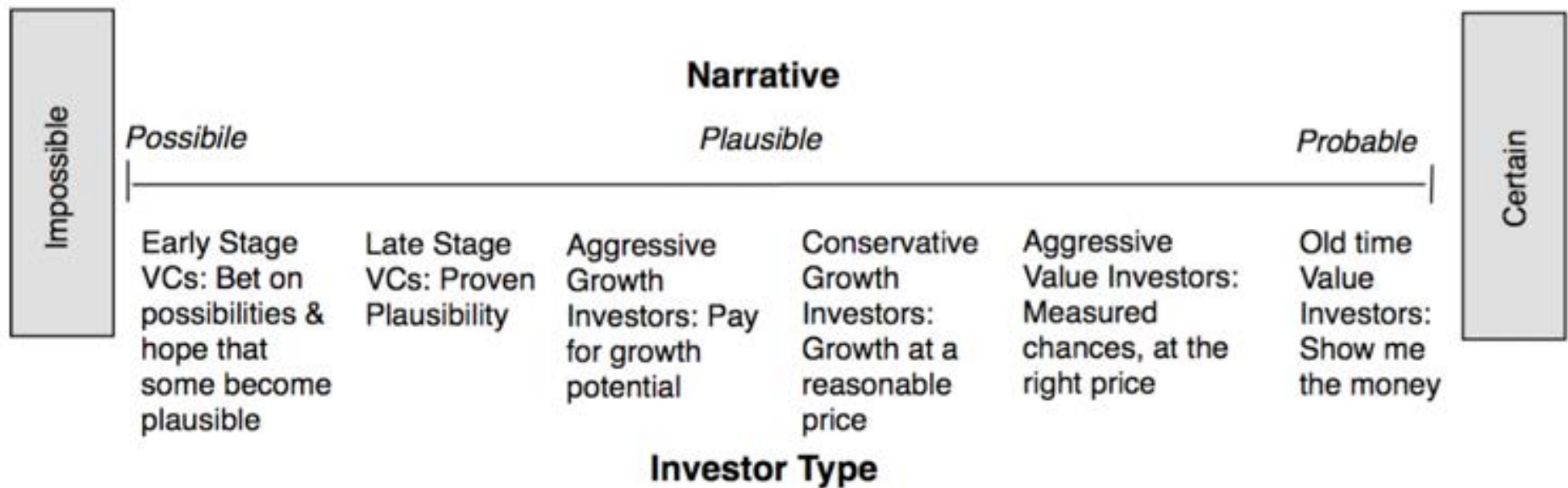
“Show me the money”

# The Investor Challenge

<i>Growth stage</i>	<i>Stage 1 Start-up</i>	<i>Stage 2 Young Growth</i>	<i>Stage 3: High Growth</i>	<i>Stage 4 &amp; 5 Mature Stable</i>	<i>Stage 6 Decline</i>
<i>Key Questions</i>	Is there a market for the product or service? How big is that market? Will you survive?	Do people use your product or service? How much do they like it?	Will people pay for the product or service? Can you scale up, i.e., grow as you get bigger?	Can you make money of the product and service and sustain profitability in the face of competition?	What will you get if you sell your assets? How do you plan to return cash flows to your investors?
<i>Pricing Metrics &amp; Measures</i>	Market size, Cash on hand, Access to capital	Number of users, User intensity (EV/User)	User engagement with model, Revenues (EV/Sales)	Earnings levels and growth (PE, EV/EBIT)	Cash flows, Payout & Debt servicing (PBV, EV/EBITDA)
<i>Narrative vs Numbers</i>	Mostly or all narrative	More narrative than numbers	Mix of narrative & numbers	More numbers than narrative	Mostly or all numbers
<i>Value Drivers</i>	Total market size, Market Share & Target Margin	Revenue Growth (and its drivers)	Revenue Growth & Reinvestment	Operating margins and Return on capital	Dividends/Cash Returns & Debt ratios
<i>Dangers</i>	<i>Macro delusions</i> , where companies are collectively overpriced, given market size.	<i>Value distractions</i> , with focus on wrong revenue drivers.	<i>Growth illusions</i> , with failure to factor in the cost of growth.	<i>Disruption Denial</i> , with failure to see threats to sustainable profits.	<i>Liquidation leakage</i> , with unrealistic assumptions about what others will pay for liquidated assets.
<i>Transitions</i>					
	<i>Potential to Product</i>	<i>Product to Revenues</i>	<i>Revenues to Profits</i>	<i>Profits to Cash flows</i>	



# Investment Philosophies & Narratives



# There is no one pathway to investing nirvana..

- Successful Value investors
  - ▣ Work primarily with numbers (financial ratios, pricing metrics)
  - ▣ Will tend to invest in mature companies with stable and clear stories
- Successful Growth investors
  - ▣ Make their investments primarily based upon stories
  - ▣ Will tend to invest in companies with big and expansive stories that pass the plausibility test.
- Both sides will view the other side as deluded, but they will both be better at what they do, if they can work on their weak sides.



# The End

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