



Institute  
and Faculty  
of Actuaries

# Actuarial Techniques for Venture Capitalists

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# Introduction

- Background
- Actuarial Profession – Making financial sense of the future
- Can Actuaries move into new fields



# Success stories

- Roelof Botha
  - Fellow of Faculty of Actuaries
  - MBA Stanford
  - CFO of Paypal
  - Director of Youtube
  - Partner at Sequoia Capital
  - lead investments in Instagram, Evernote and Square



*“I get a thrill from watching companies thriving in the long-term, in the way that PayPal and YouTube have. I am inspired by the impact they have on the lives of hundreds of millions of people” - Roelof Botha*

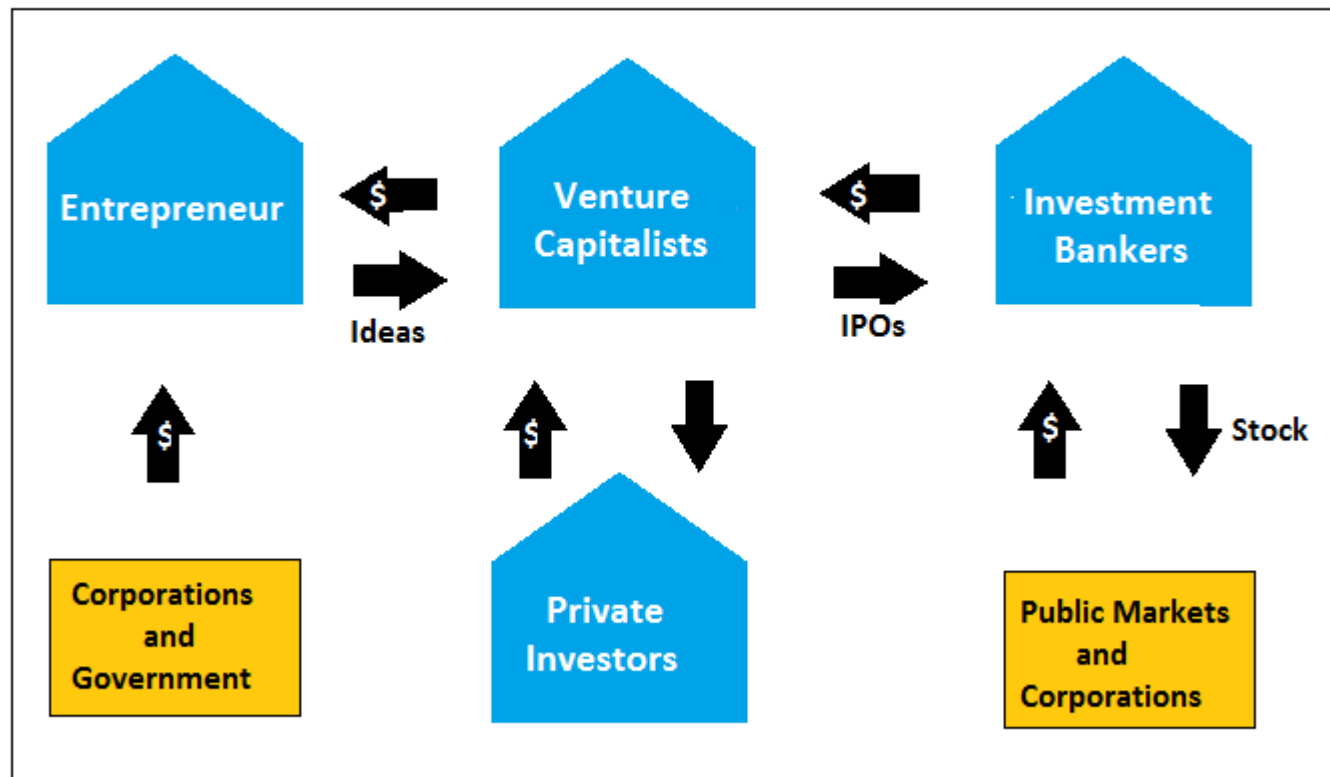
# Emerging wider fields for Actuaries

- Investments
  - Fund Managers
  - Asset Managers
  - **Venture Capital**
  - Mergers and Acquisition
- Enterprise Risk Management
  - Chief Risk Officers
  - Risk Analysts
- Climate Change
  - Quantitative Climate Scientist
  - Quantitative Biological Analyst



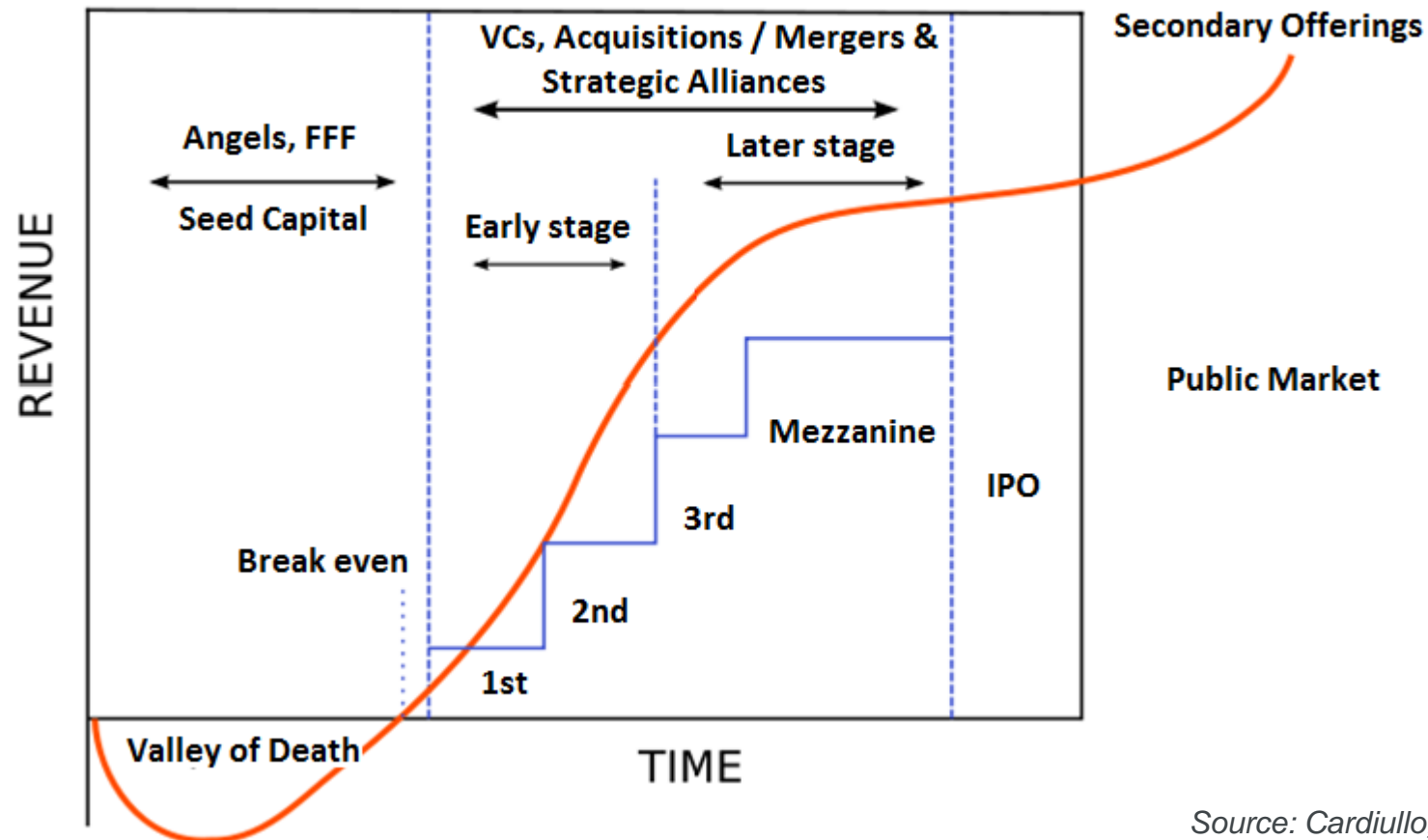
# Venture Capital Industry

## How the Venture Capital Industry Works



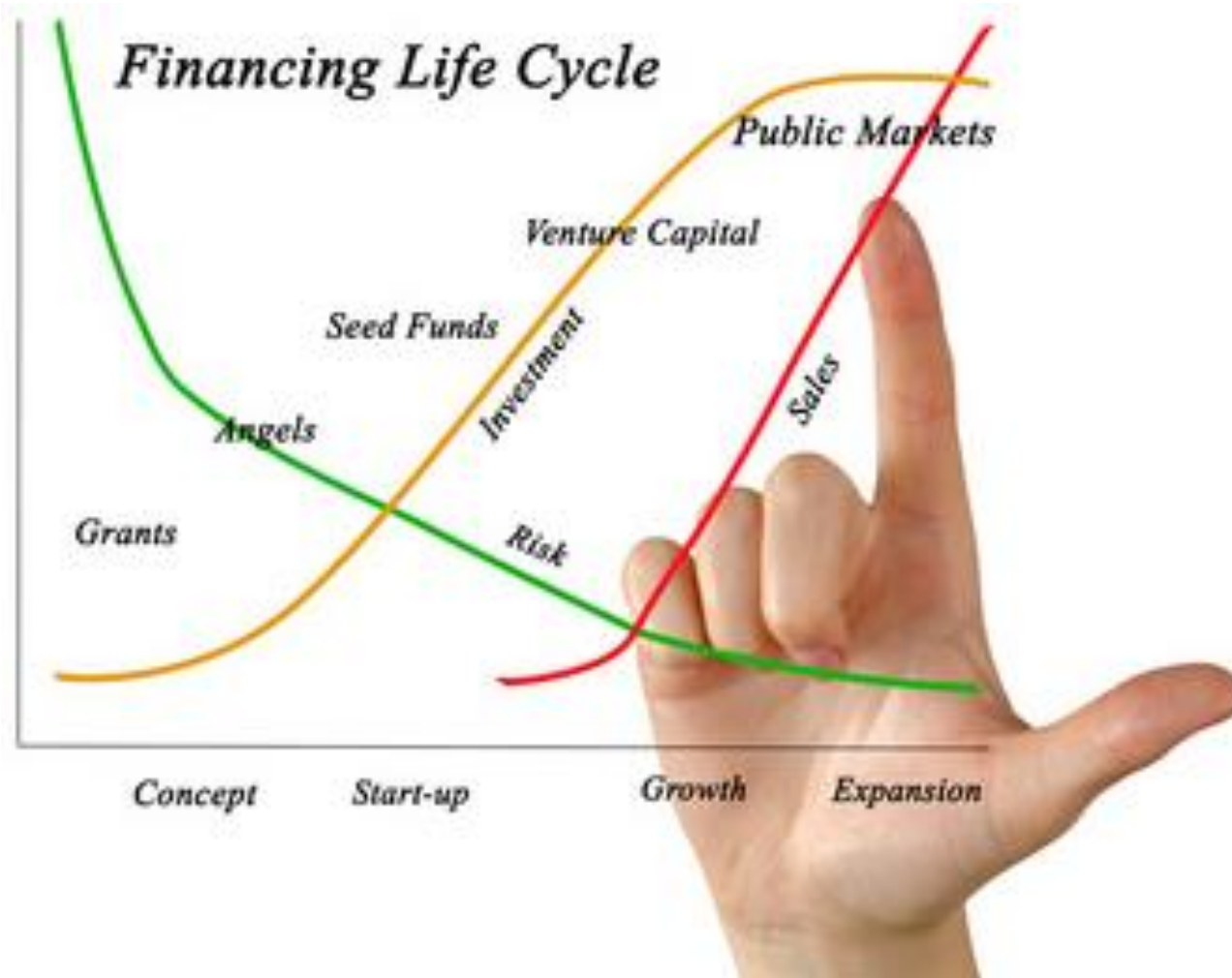
# Understanding Venture Capital Industry

## Stages of Investment Capital requirements



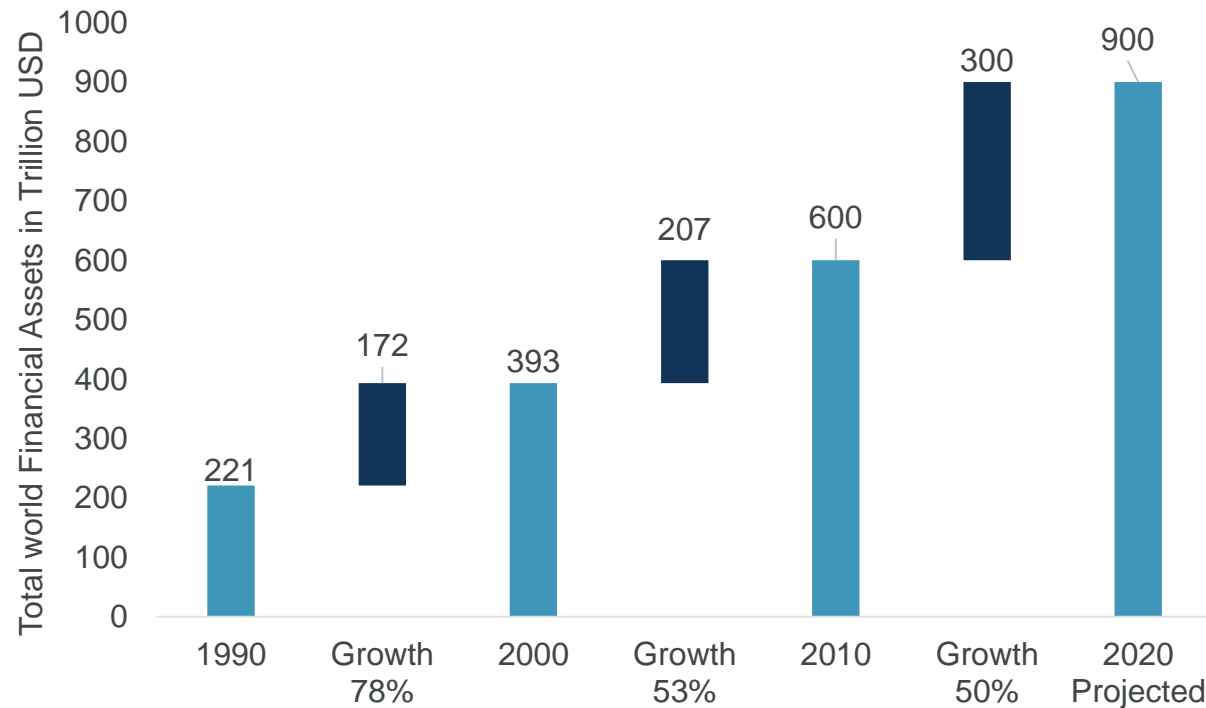
Source: Cardullo, 1999

# Understanding Venture Capital Life Cycle



# Venture Capital Industry

Total World Financial Asset in Trillion USD

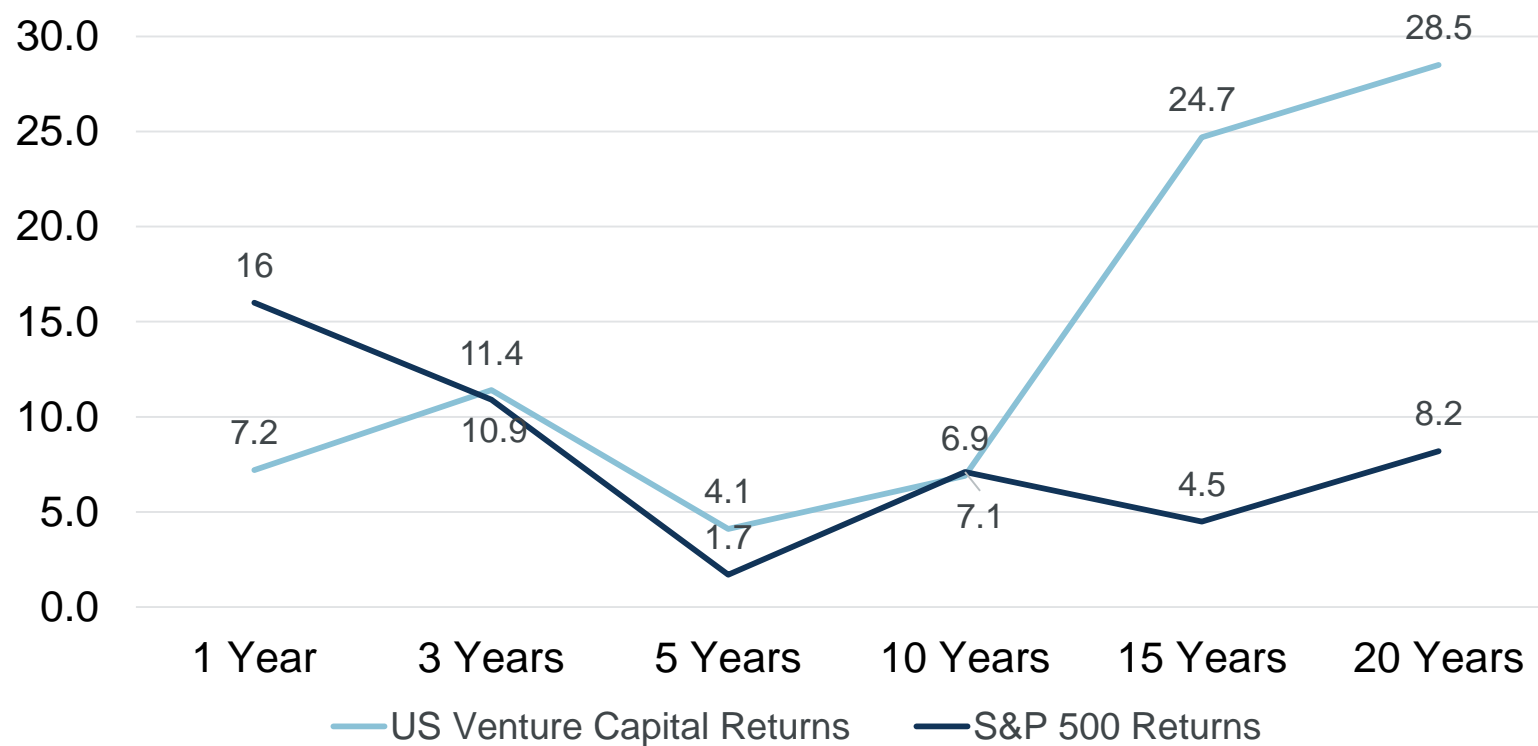


Source: International Monetary Fund



# Venture Capital Industry

**S&P 500 vs US Venture Capital Index Returns for year Ending Dec 31, 2015**



Source: NINventure Funds

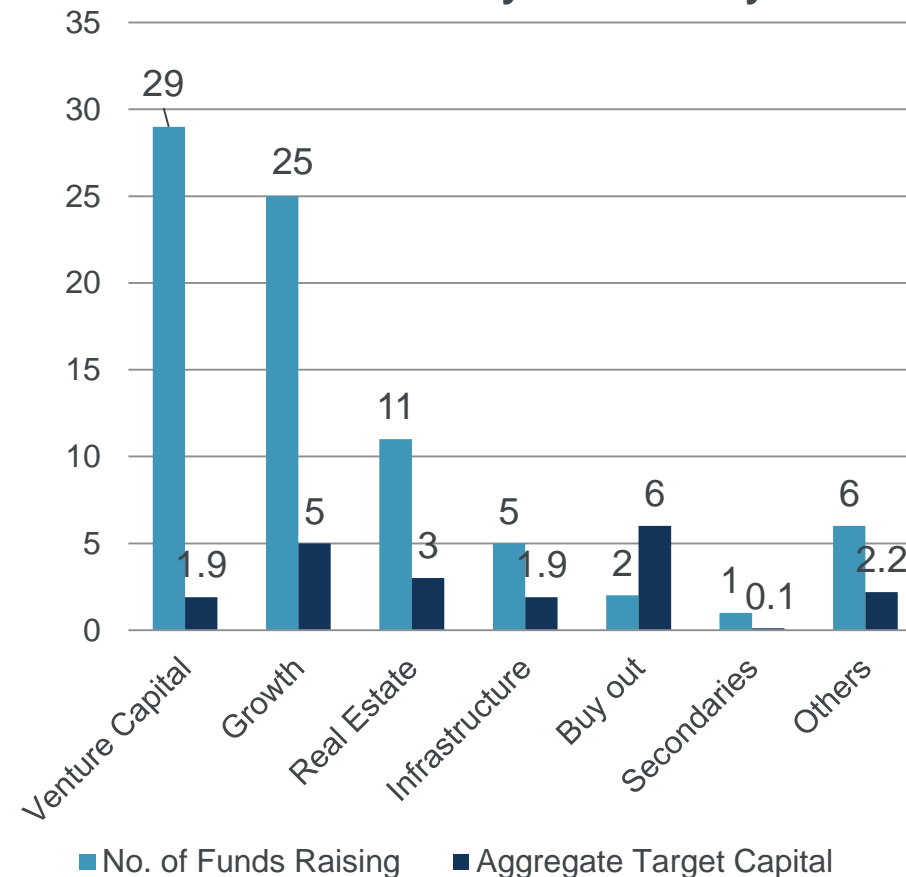
# Venture Capital Industry (ASEAN)

## Five Largest ASEAN Based PE Fund Managers

| Firm                   | Location  | Funds (USD m) |
|------------------------|-----------|---------------|
| Navis Capital Partners | Malaysia  | 1,503         |
| Axiom Asia Pvt Capital | Singapore | 921           |
| L Capital Asia         | Singapore | 573           |
| TAEL partners          | Singapore | 555           |
| Northstar Group        | Singapore | 512           |

Source: Preqin Fund Manager

## ASEAN PE funds currently in Market by Fund Type



Source: Preqin Fund Manager

# Venture Capital Industry (ASEAN)

## Five Largest Venture Capital Deal\*\* in ASEAN, 2014-2015 YTD ( As at Dec 2015)

| Portfolio Company          | Stage       | Deal Date | Deal Size<br>USD m | Investors | Location  | Industry |
|----------------------------|-------------|-----------|--------------------|-----------|-----------|----------|
| Grab Taxi Holdings Ple Ltd | Series E    | Aug-15    | 350                |           | Malaysia  | Telecoms |
| Grab Taxi Holdings Ple Ltd | Series D    | Dec-14    | 250                |           | Singapore | Telecoms |
| Lazada                     | Unspecified | Nov-14    | 249                |           | Singapore | Internet |
| Property Guru              | Series C    | Jun-15    | 130                |           | Singapore | Internet |
| Tokopedia                  | Unspecified | Oct-14    | 100                |           | Singapore | Internet |

*Source: Preqin Venture Deals Analyst*

*\*\* Figures exclude add-ons, grants, mergers, secondary stock purchases and venture debt*

# Risk and Challenges faced by the VCs

## Risk and Challenges

- Product Risk
- Market adoption risk
- Market size and timing risk
- Financing risk
- Execution risk
- Management team risk
- Business model risk
- Technology risk
- EXIT risk



**Need Qualified Professionals to Manage VC RISK**

# Problem with Human Judgement Alone !!!

Your **BRAIN** has power to change the direction of this train. Just **THINK** and this train runs in opposite direction.

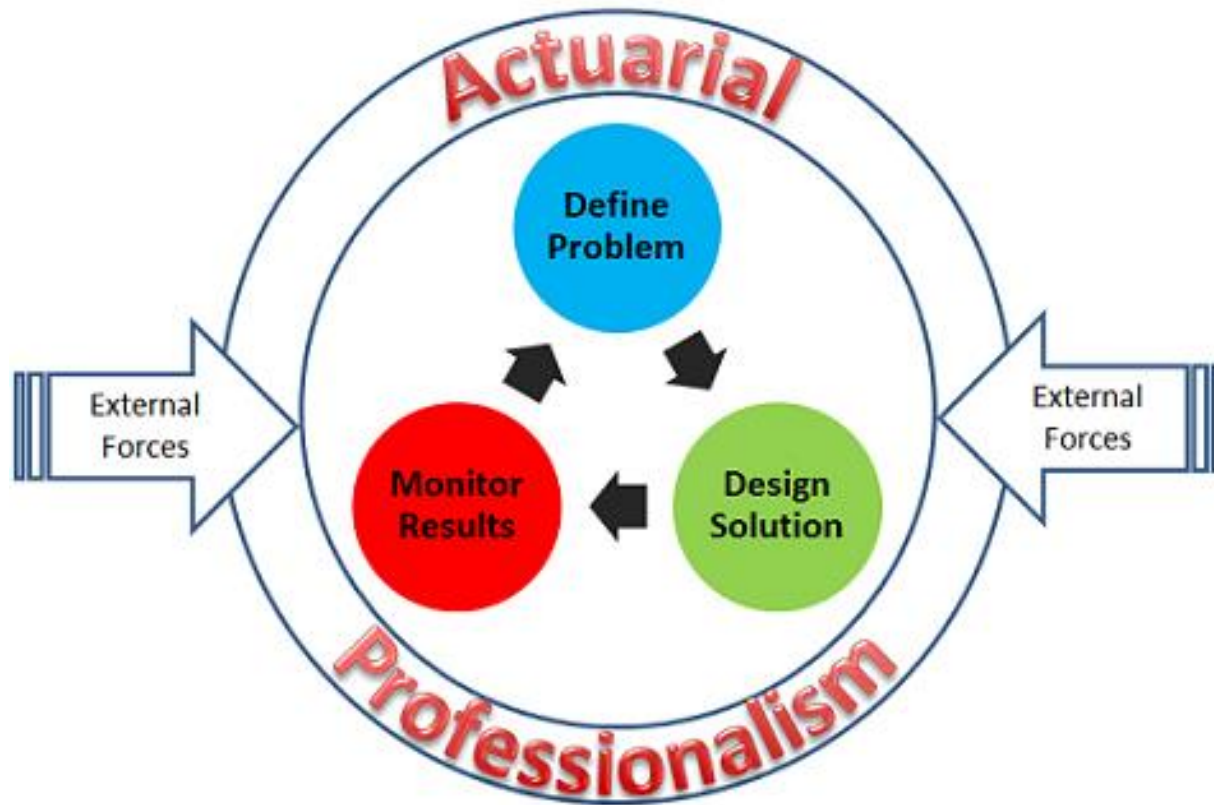


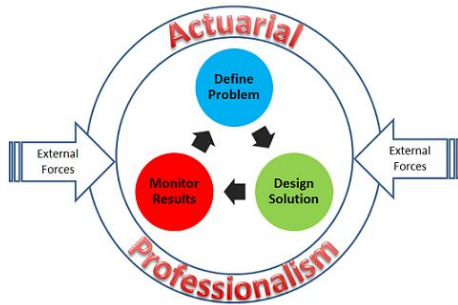
# Actuarial Modelling Techniques in Investment Decision Making

**Zacharakis and Meyer (2000) suggested applying actuarial decision models to improve venture capital investment decisions**

*“An actuarial model optimally combines decision cues (relevant information) to derive an answer. Thus actuarial models decompose decisions into component parts. Just as an insurance actuary statistically derives the payoff risk associated with different groups of people (i.e. age, gender, etc.), actuarial models can assess the probability of certain outcomes based upon information available to the decision.”*

# Actuarial Control Cycle in Venture Capital Framework





# Define the problem – How to increase RAROC



**Reduce Risk of Failure**

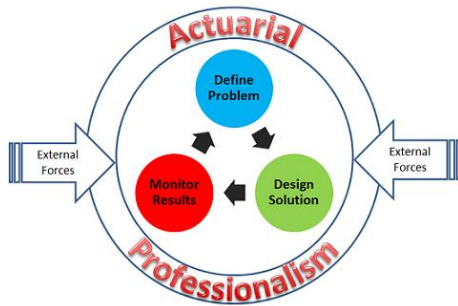


**Increase Return & Valuation**



**Get the right Exit**





# Develop Solution – Measure Risk

**Total Risk = Systematic risk (Beta) + Unsystematic risk (Alpha)**

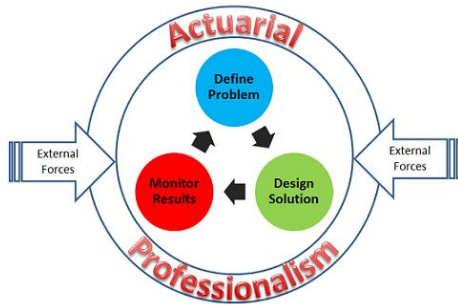
*(External Uncertainty)*

- Interest rate risk
- Foreign exchange risk
- Market risk
- Inflation risk
- Political risk
- Event risk

*(Internal Uncertainty)*

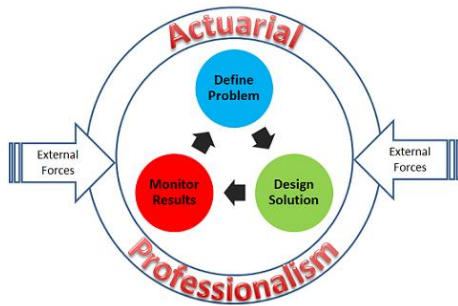
- Default risk
- Management risk
- Business risk
- Financial risk
- Liquidity risk
- Holding period risk
- Agency risk

- **Systematic Risk** – *Mitigate, Diversify Portfolio*
- **Unsystematic Risk** – *Measuring, Monitoring and Controlling*



# Develop Solution – Increase return

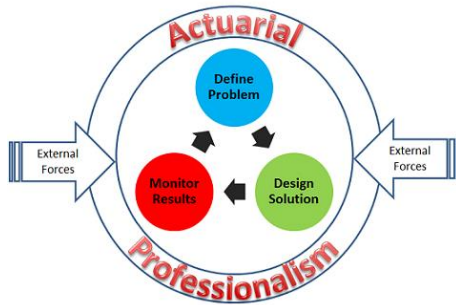
| Traditional Valuation Techniques  | Actuarial Valuation Techniques   |
|---|--|
| <p><i>Approach</i></p> <ul style="list-style-type: none"> <li>• Discounted Cash Flow</li> <li>• Market Multiple</li> <li>• Cost Based Approach</li> </ul> | <p><i>Approach</i></p> <ul style="list-style-type: none"> <li>• Bayesian Modelling Techniques</li> <li>• <b>Real Options Analysis</b></li> </ul> |
| <p><i>Factors Considered</i></p> <ul style="list-style-type: none"> <li>• Deterministic variables</li> <li>• Current known / Market based</li> </ul>      | <p><i>Factors Represent</i></p> <ul style="list-style-type: none"> <li>• Stochastic Variable</li> <li>• Asymmetric scenarios</li> </ul>          |



# Develop Solution – Increase Valuation through Real Options

**Expanded NPV = passive NPV (traditional method)**  
**+**  
**Option Premium (ROV) (Flexibility value + Strategic value)**

- Option to defer investment
- Option to abandon staged investment
- Option to expand or contract
- Option to switch use
- Corporate growth options



# Develop Solution – Real options in companies

## Financial Services

Credit Suisse First Boston, Morgan Stanley

## Real Estate

Beazer Homes

## Energy

Anadarko, Chevron, Cinergy, ConEdison, Conoco, Constellation Power, Dynergy, El Paso, Enron, Lakeland Electric, Ontario Power Generation, Texaco, Wisconsin Public Service Corporation

## Consumer & Industrial Products

DuPont, LLBean, Procter & Gamble

## Transportation

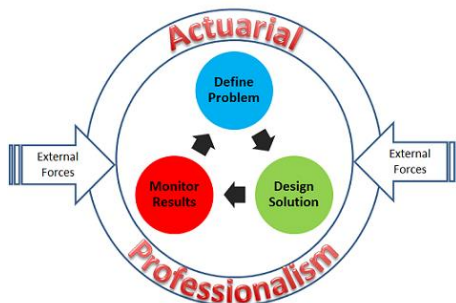
Airbus, Boeing, British Airways, Canadian Pacific, General Motors

## High Tech & Infocom

Hewlett Packard, Intel, Rockwell, Sprint, Ultratech

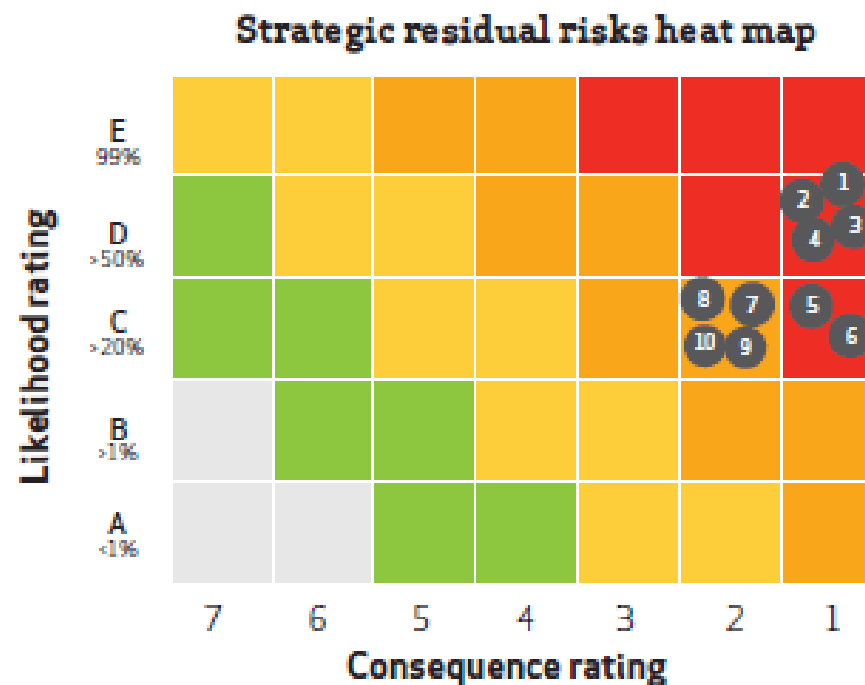
## Life Sciences

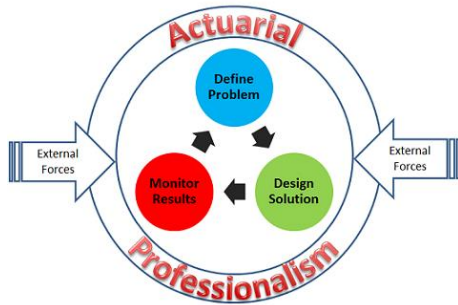
Amgen, Genentech, Genzyme



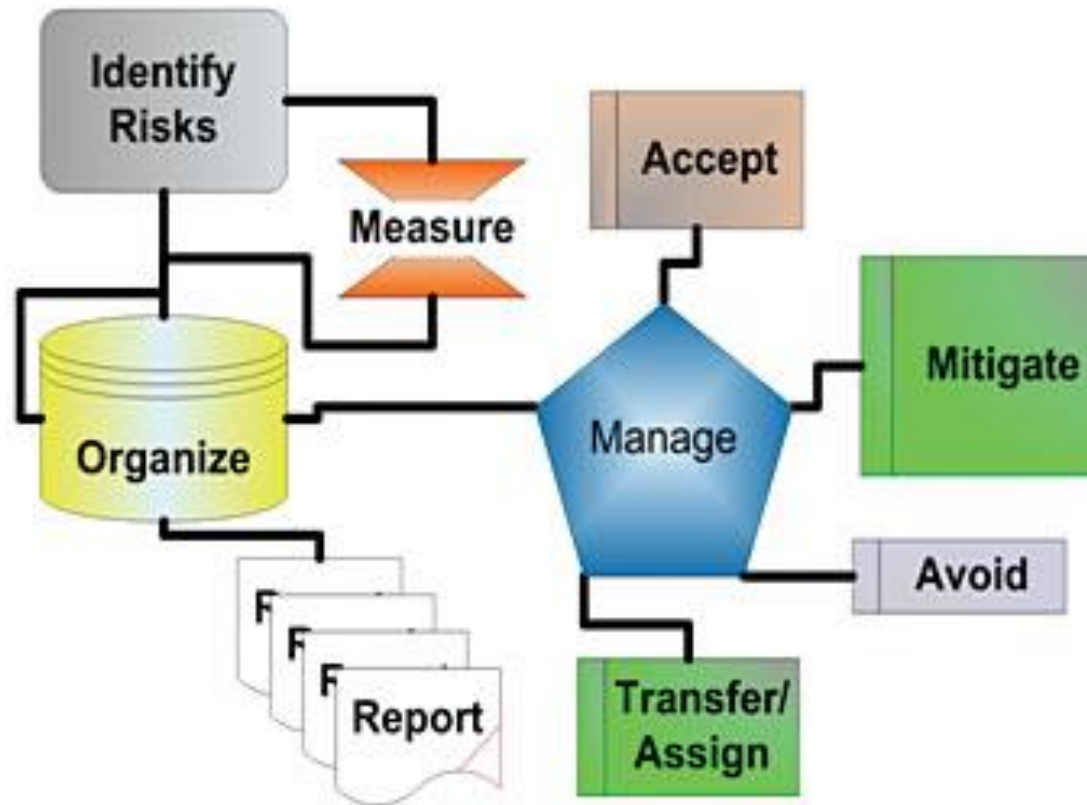
# Monitor the Results – Risk Reporting

- Priority I risk – Transnet Group Chief Executive and Board level
- Priority II risk – Operating divisions' Chief Executive's level
- Priority III risk – General Managers' level
- Priority IV risk – Managers' level
- Priority V risk – Employees' level



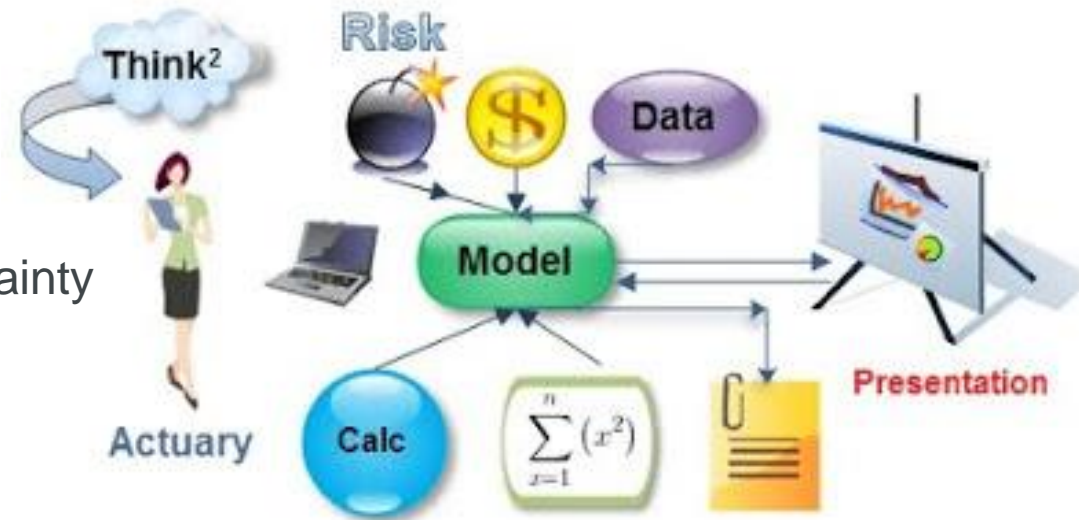


# Monitor the Results – Risk Reporting



# Uniqueness of Actuarial Skills ++

- Strong mathematical skills
- Good modelling skills
- Good understanding of ERM
- Ability to quantify and deal with uncertainty
- Professionalism



## *Additional skills actuaries should know*

- Understanding new sector quickly
- Business plan writing and evaluation
- Understanding and developing novel valuation methods – Real option analysis

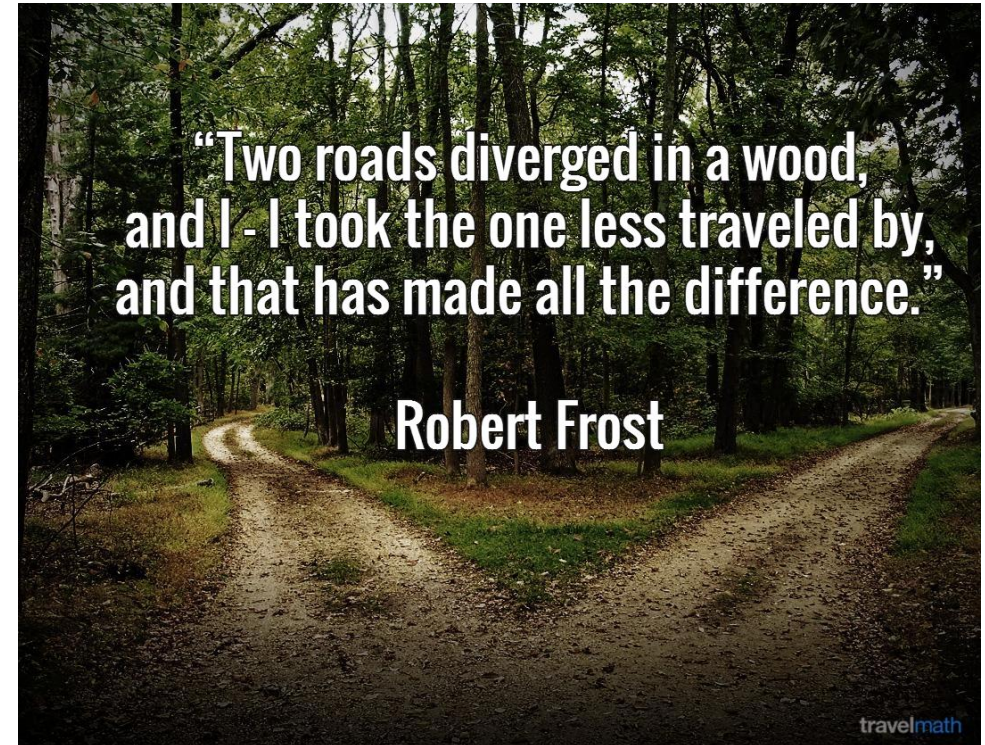
# Challenges for Actuaries to enter VC industry

- Mind Set
- High paying insurance sector
- Lack of clear cut path
- Lack of enough actuarial talent
- Initial struggle to establish
- No clear CPD
- Regulators Unaware of Key Actuarial applications
- Competition from other professionals – CA, MBA, CFA



# The way forward – *New Roads for Actuaries*

- New Strategic opportunities for actuaries in Venture Capital Industry
- Islamic Venture Capital Management – new emerging field for actuaries
- Novel risks in new ventures –  
***Opportunity for Actuaries***





**Questions**



**Comments**



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