

FINANCING INNOVATION

A Complex Nexus of Risk & Reward

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Schematic View ...

Background

- Brief ideas of Innovation & Finance
- Finance-Growth Nexus

Financing Problems

- Some Frictions or Barriers
- Finance and Innovation in Mature Firms

Financing Innovation: Theoretical Discussion

- Financing Through Business Angels
- Financing Through Venture Capital
- Some Studies on Angel Investment and Venture Capital

Financing Innovation: Indian Context

- Angel Investment in India
- VC investment in India

A Way Ahead

- Some Implications for Future Research

Background: Innovation & Finance...

Innovation ...

- Innovation: Value Creating Fresh Idea(s)
 - Innovation = Invention + Realisation
- Multi-dimensionality: Various types of Innovation
 - Product-, Process-, Marketing- and Organisational Innovations
 - Incremental or Radical
- Broadness → Think Beyond R&D
- What matters?
 - Contribution to Competitiveness
 - Linking Static and Dynamic Analysis

"Innovation has nothing to do with how many R&D dollars you have... It's not about money. It's about the people you have, how you're led, and how much you get it."

— Mr.Innovation, the late Steve Jobs

Background: Innovation & Finance...

Finance ...

- Finance: The management of large amounts of money ...
 - Finance = Monetary Fund + Management
- Entrepreneurial Finance: Finance for Start-up or New Venture
 - Brilliant Idea → Realisation
- Balancing Fundamental/Critical Factors: **Risk** and **Reward**
 - Effective Risk Management
 - Financing Process → Effort, Potential and Painful Interventions
 - Meeting of the Minds
- Who gives you the money?
 - Family & Friend(s), Crowdfunding, Business Angel, Venture Capitalist...

Finance-Growth Nexus...

- Theoretical and Empirical literature on Finance and Growth:
 - Financial sector provides real services: It ameliorates information and transactions costs.
 - Lifting the veil between real and financial sectors.
 - Financial Arrangements → Saving rates, Investment decisions, Technological Innovation → Long-run Growth → Transformation of Financial System
 - Dynamic interactions between finance and growth.
 - Relative merits of different types of financial systems
 - Bank-based vs Securities financial systems
 - Finance → Aggregate Growth → Income Distribution → Poverty Alleviation
 - **Empirical:** Cross-country growth regressions, Times-series analyses, Panel Techniques, Detailed country studies, and Microeconomic methodologies.

Financing Problems: Some Frictions...

- Frictionless World: Positive NPV
 - Quick Realisation of Fresh/Brilliant Idea
 - Sources of Finance → ??? → Innovation
- But ... Real World is Full of Frictions
 - Imperfect Information → Transaction Costs
 - Divergence of Interest → Sub-optimality
 - Interaction → Time dimensional Issues

Financing Problems: Some Frictions...

Financing Innovation: Some Uniqueness ...

- Gap → Private Return vs Social Return
- Varieties of Uncertainty: Unknown Unknowns
 - Technological Uncertainty
 - Market Uncertainty
 - Regulatory or Institutional Uncertainty
 - Social or Political Uncertainty
 - Acceptance or Legitimacy Uncertainty
 - Managerial Uncertainty
 - Timing Uncertainty
 - Consequence Uncertainty
- Information Asymmetry → Multi-Stage Principal-Agent Problem

Financing Problems: Some Frictions...

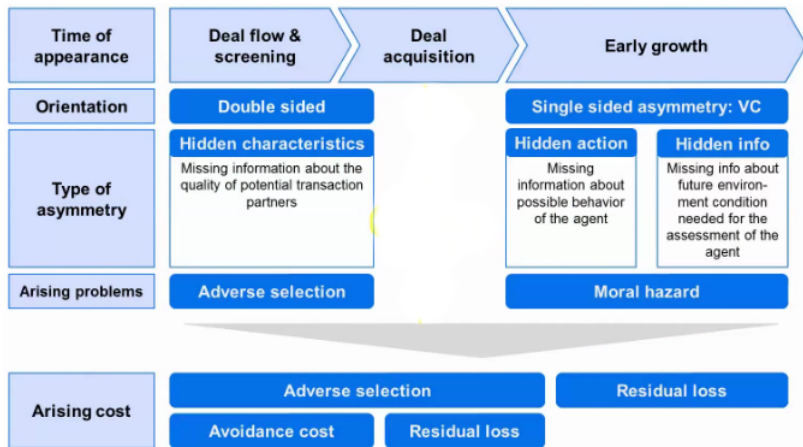


Figure 1: Nexus of Information Asymmetries

Financing Problems: Some Frictions...

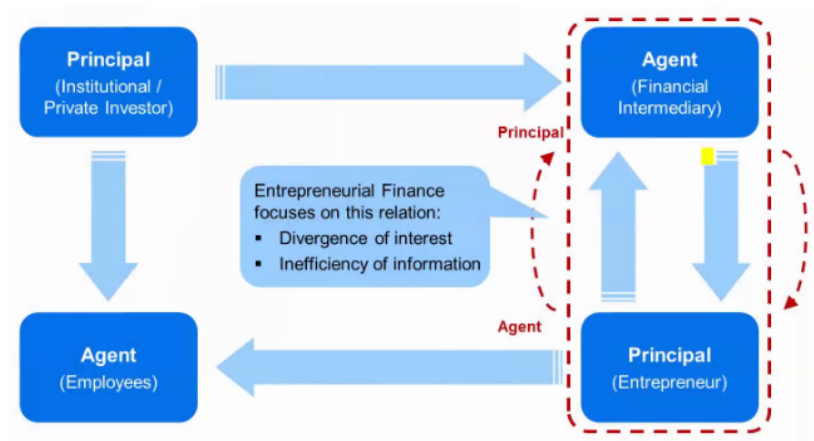


Figure 2: Multi-Stage Principal-Agent Construct

Financing Problems: Some Frictions...

Much Exclusive Uniqueness ...

- Uncertainty Mitigation: Entrepreneur as well as Financier
 - Uncertainty Aversion → Uncertainty Hedging
 - Uncertainty Hedging → Innovation Waves

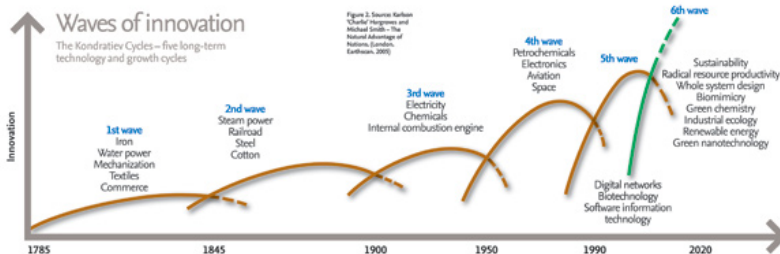


Figure 3: Waves of innovation: The Kondratiev Cycles

Finance & Innovation in Mature Firms...

- Changes in the equity market → Effect on R&D
- External Finance: Publicly traded firms vs Privately held firms
- More experimental, radical innovation → Incremental & sustaining innovation
 - Think about cumulative citations
- Surprising importance of bank finance in innovation
 - Think about some demerits of private and public equities
- Banking Deregulation → Innovation by young, private firms
- Role of Internal Capital Markets and Employment Contracts
- Legal and Institutional Environment and Innovation

Financing Innovation: Theoretical Discussion...

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Business Lifeline ...

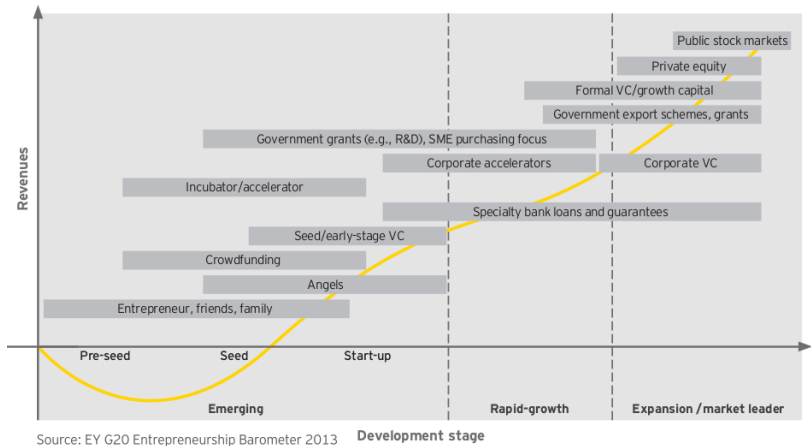


Figure 4: Startup Financing Process

Financing Through Business Angels...

- Business Angels ... Who?

- Wealthy individuals – Own Money and Expertise → Financing Start-up Companies
- Provide Equity or Quasi-Equity Funding
- Success: Capital gain at Exit

- Business Angels → Funding, Return, Additional Supports

- Business Angels are Private Investors, but not all Private Investors are Business Angels
- Four Varieties: Selective Caretakers, Part-time Angels, Portfolio Investors, Full-time Angel Investors
- Non-Network vs Network

- Business of Angels: The Solution → The Moment → The Team

Financing Through Venture Capital...

① What is Venture Capital?

- Formal Financing after Angel Investment
- Scaled Up Version in Financing Innovation
- Solely Monetary Motives

② Three Varieties of Venture Capital

- Pure Investment Company
- Corporate Investment Company
- Publicly Funded Investment Company

③ Investment Process of Venture Capital Firm

- Cyclical Form: Sound Market → Upward trend → Downward trend
- Time interval is Uncertain

Financing Through Venture Capital...

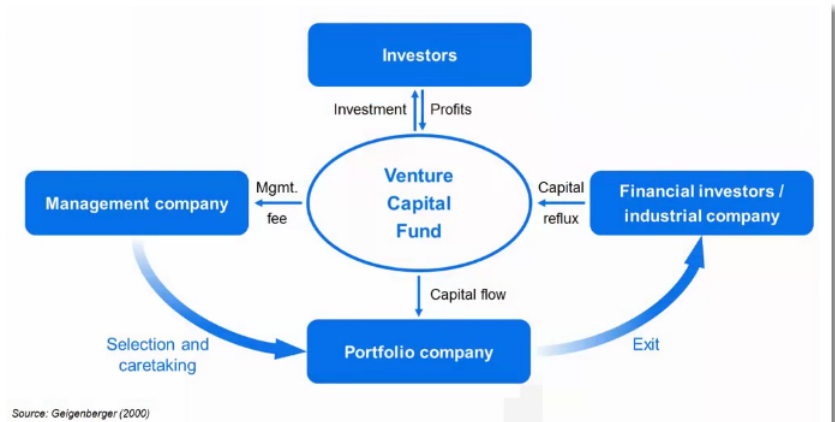


Figure 5: Structure of Investment Through Venture Capital

Angel Investment and Venture Capital: Some Studies...



- Angel Investment and Venture Capital
 - Only Provision of Funding???
 - A Complete Package → Monitoring, Management, Network
 - Mitigation of Frictions or Barriers
- Effectiveness of Angel Investment
 - Kerr, Lerner, and Schoar (2014)
- Effectiveness of Venture Capital
 - Chemmanur, Krishnan, and Nandy (2011)
 - Goldfarb et al. (2009)
- Effectiveness of Private Equity
 - Popov and Roosenboom (2009)

Financing Innovation: Indian Context...




- The Scope & Development of Financing Innovation

- **Past:** Socioeconomic Issues → Credit Constraints → Collateral Problem → Narrow and Gloomy
- **Present:** Crowdfunding, Angels, VCs, Private Equity → Take-off

- Angel Investment in India

- Developing Stage: Long Way to Go 
- Concentration of Financing Opportunities 
- Overseas Angel Investments
- Network versus Non-Network
- Success: Raising VC

Financing Innovation: Indian Context...

- VC investment in India
 - Fourth in the Global VC ranking 
 - Late-Stage Financing → Angels for Early-Stage 
 - Exit → Challenging → Low IPOs and M&A 
- Consider the Socio-economic & Institutional Perspective
 - Firm and Economy Level Assessments
 - Business Confidence or Attractiveness
 - Business or Financial community and Politicians
- The Venture Capital and Private Equity Attractiveness Index
 - Effective Strength: Tested
 - Composed of Six Dimensions with Sub-Dimensions
 - Indian Economy: Excellent in Economic activity & Capital market

Financing Innovation: Indian Context...

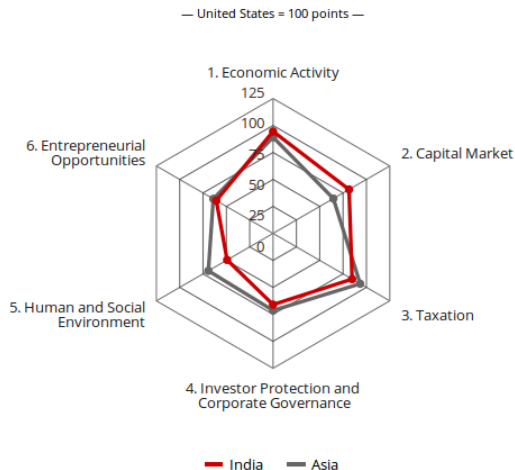


Figure 6: Key Driver Performance in Radar Chart

Financing Innovation: Indian Context...

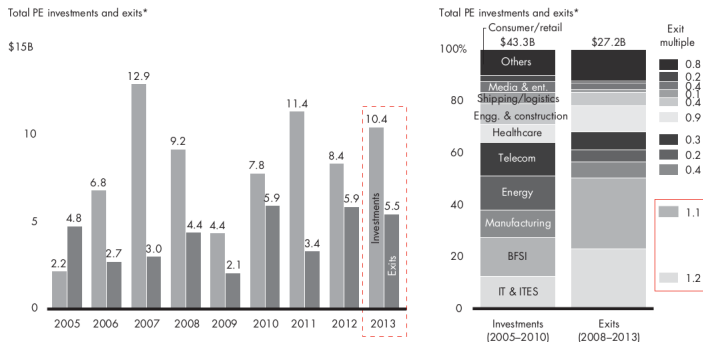


Figure 7: Good Trend of Indian PE Investment

A Way Ahead: Some Implications...

- Difficult to Show the Effectiveness of Nurturing Innovation
 - Costly & Limited Data
- Multi-Dimensionality: Determining Innovation
 - Think about the Global Innovation Index Figure 13
 - Based on 81 Indicators
- Important Role of Corporate Venture Capital
 - Strategic Goals
- Sectoral Bias: Failure of Different Financing
 - Still Frictions???
- Think about Good Governance
 - Vibrant Gujarat Summit 2015

THANK YOU ...

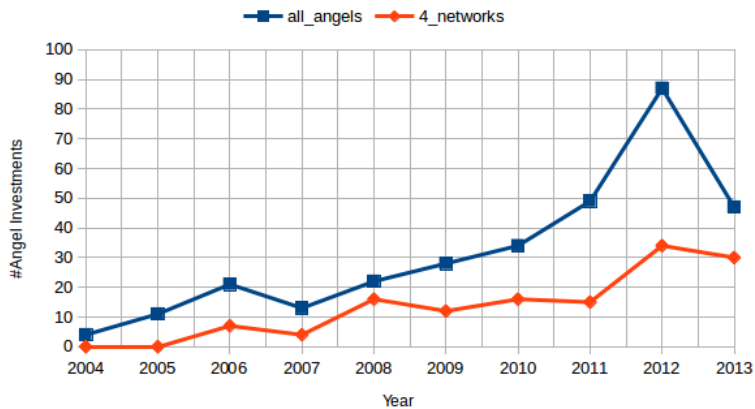


Figure 8: Yearwise Distribution of Angel Investments

Source: G. Sabarinathan (2014)

◀ Angel Investment in India

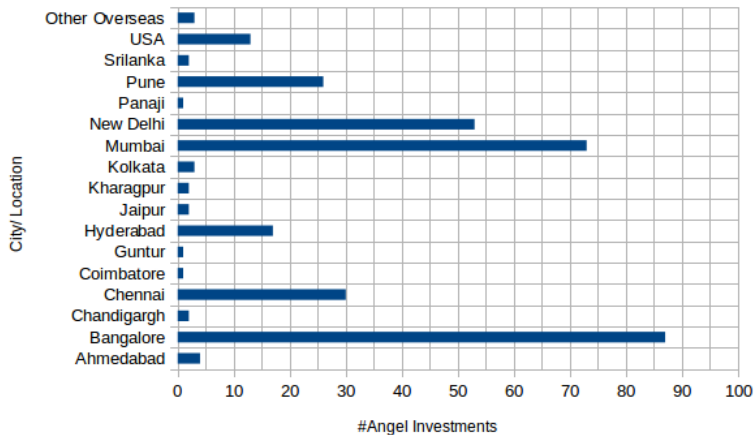


Figure 9: Spatial Distribution of Angel Investments

Source: G. Sabarinathan (2014)

◀ Angel Investment in India

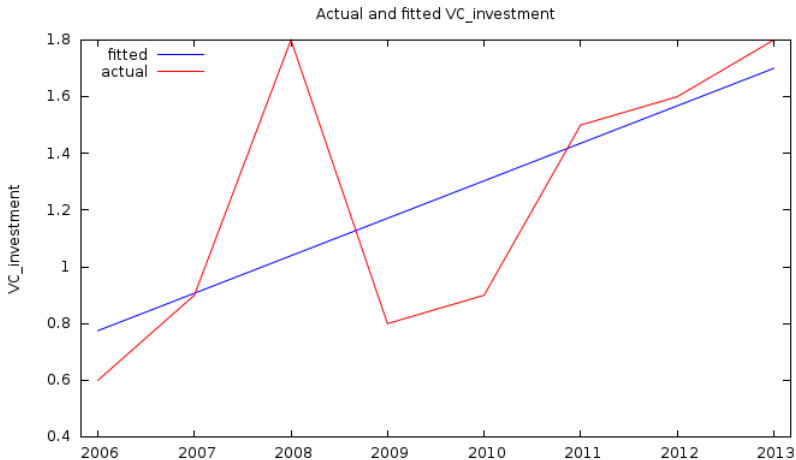


Figure 10: Indian Annual VC Investment 2006-13 (US\$b)

Source: Dow Jones VentureSource, 2014

VC Investment in India

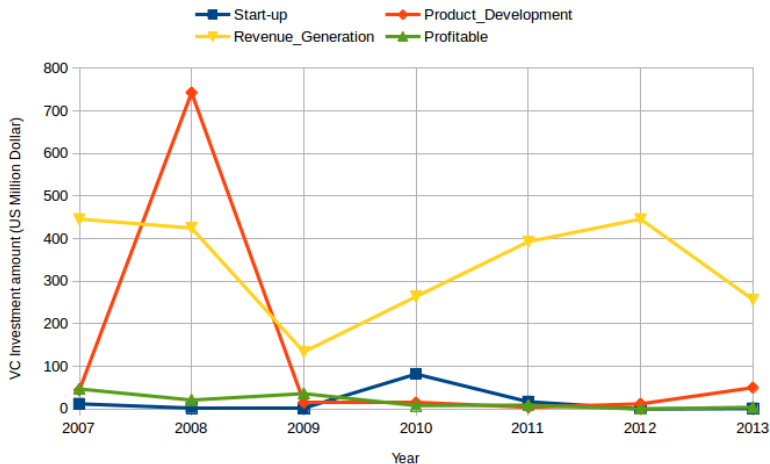


Figure 11: VC financing in different stages of development

	2010	2011	2012	2013
Invested capital (US\$b)	0.9	1.5	1.6	1.8
Invested rounds	116	180	227	222
Median round size (US\$m)	7.25	5.15	3.97	4.00
Number of VC-backed IPOs	6	2	2	1
Dollars raised (US\$m)	532.5	46.4	19.5	10.9
Median time to exit (years)	4.3	N/S	N/S	N/S
Number of VC-backed M&As	16	6	16	13
Median M&A valuations (US\$m)	27.0	N/S	18.4	46.5
Median time to M&A (years)	3.5	4.1	4.0	2.6

Source: Dow Jones VentureSource, 2014

Figure 12: VC Summary Statistics of India

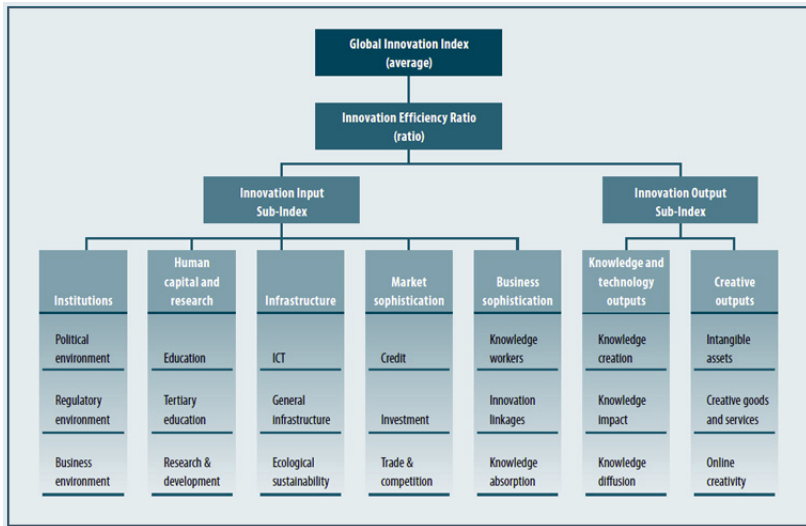


Figure 13: Structure of Global Innovation Index