Lecture 2

Wireless & Internet Revolution

Mustafa Ergen

Wireless revolution is a new Renaissance?

- Renaissance bring religion, free thinking for ordinary people.
- Electronics is doing the same, get everything personalize for us.
  - personal computer
  - Pocket phone
  - Hand held
  - Internet: Ordinary people access information
  - Social networking;
  - Etc.

Success

- Invention
- Innovation (invention to market)
- Planning, execution, perseverance (sustain innovation)

- Xerox: invention no innovation
- Apple: innovation no invention
- Google:
  - invention and innovation from Stanford grad
  - Execution was from Berkeley grad

Innovation statistics

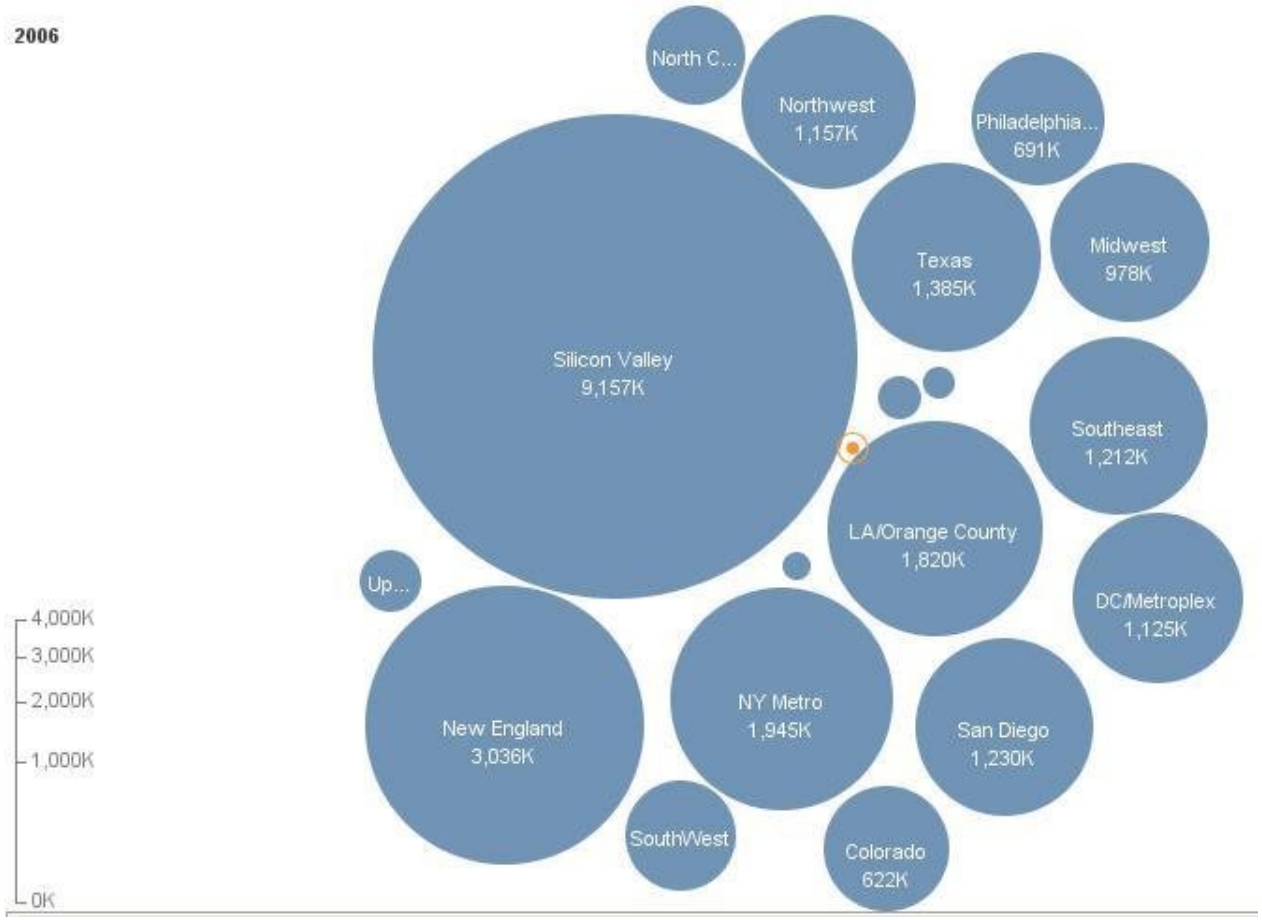
Components

- Number of Research journals
- Number of Patents
- Research funding

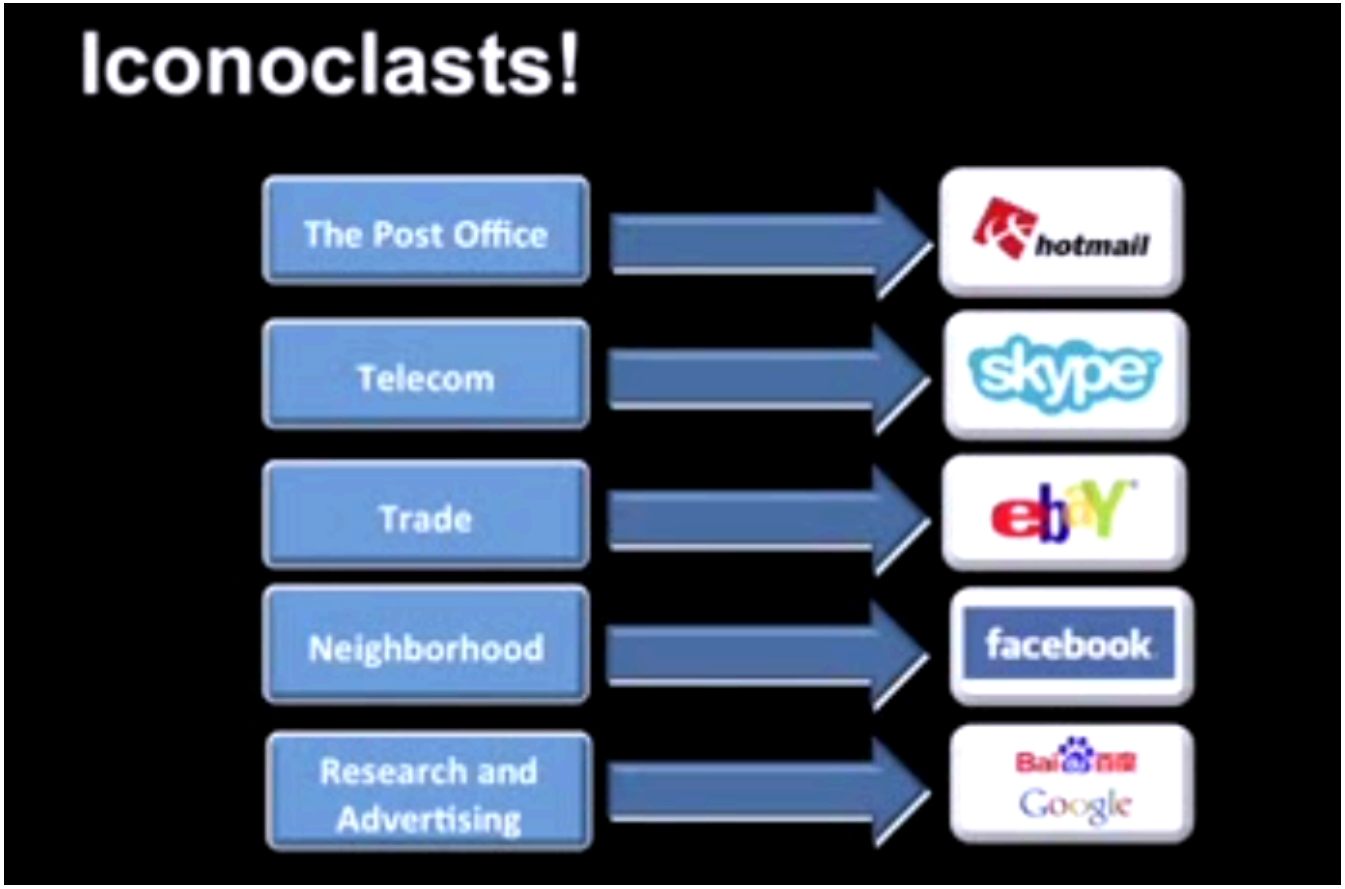
	Patent applications to the EPO			High technology patent applications to the EPO			Patents granted by the US Patent & Trademark Office		
	(number of patent applications)		(per million inhab.)	(number of patent applications)		(per million inhab.)	(number of patents granted)		(per million inhab.)
	2002	2007	2007	2002	2007	2007	1999	2004	2004
EU-27	90 462	57 725	116.5	10 964	5 684	11.5	31 172	15 775	32.3
Belgium	1 287	1 472	139.0	333	231	21.8	794	395	38.0
Bulgaria	15	29	3.8	2	:	:	10	48	6.2
Czech Republic	88	162	15.8	6	9	0.9	37	49	4.8
Denmark	935	1 057	194.1	230	110	20.2	564	246	45.5
Germany	21 903	23 929	290.7	3 823	2 098	25.5	12 799	6 874	83.3
Estonia	6	23	17.4	1	7	5.2	5	4	2.8
Ireland	224	288	66.8	65	38	8.8	214	156	38.8
Greece	74	109	9.8	18	6	0.6	18	20	1.8
Spain	938	1 451	32.6	148	96	2.2	381	210	5.0
France	7 321	8 421	132.4	1 821	1 128	17.7	4 616	2 344	37.6
Italy	4 168	5 107	86.4	489	253	4.3	1 938	1 049	18.1
Cyprus	7	9	11.5	2	5	6.0	4	1	1.6
Latvia	6	19	8.4	2	2	1.0	2	2	0.9
Lithuania	3	8	2.4	0	2	0.7	7	19	5.5
Luxembourg	61	110	230.2	4	5	9.9	39	38	83.5
Hungary	120	173	17.2	17	19	1.9	76	39	3.9
Malta	4	8	20.5	1	:	:	3	:	:
Netherlands	3 442	3 656	223.5	1 160	348	21.3	1 535	938	57.7
Austria	1 359	1 797	217.0	216	149	18.0	640	366	44.9
Poland	81	146	3.8	12	24	0.6	31	40	1.0
Portugal	41	121	11.4	5	29	2.7	15	14	1.4
Romania	11	21	1.0	3	7	0.3	8	13	0.6
Slovenia	76	103	51.5	12	14	7.0	15	8	4.2
Slovakia	24	42	7.8	7	4	0.7	7	6	1.1
Finland	1 257	1 323	250.8	598	209	39.7	1 169	544	104.3
Sweden	2002	2719	298.4	463	331	36.4	1 796	509	56.8
United Kingdom	5 900	5 422	89.2	1 527	558	9.2	4 451	1 936	32.4
Iceland	35	28	90.6	10	3	9.8	33	25	85.2
Liechtenstein	26	31	895.4	2	1	28.4	15	13	377.2
Norway	377	515	110.0	81	16	3.5	300	149	32.7
Switzerland	2641	3 224	429.3	404	222	29.6	1 520	762	103.5
Croatia	37	32	7.2	4	2	0.5	9	10	2.3
Turkey	60	220	3.2	:	:	:	16	9	0.1
Japan	20 218	20 657	161.7	7 111	3 615	28.3	39 467	29 149	228.1
United States	31 171	31 908	105.8	10 919	3 686	12.2	103 966	80 322	273.8

Source: Eurostat (tsc00009, tsiir060, pat_ep_ntec, tsc00010, pat_us_ntot and tsiir070)

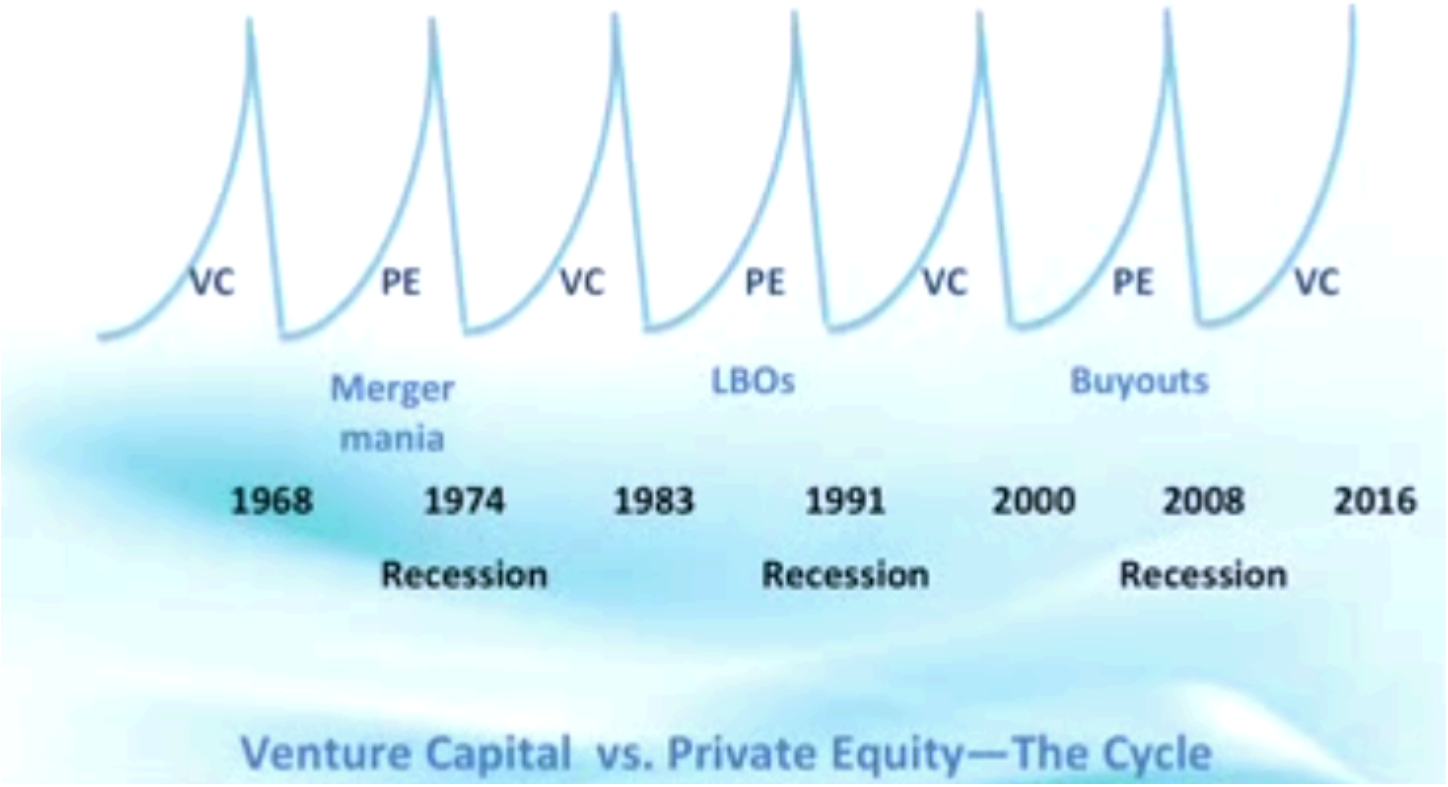
Venture Capital



Iconoclast


Iconoclasts!
The Post Office
hotmail
Telecom
skype
Trade
ebay
Neighborhood
facebook
Research and Advertising
Google

Private Equity and Venture Capital

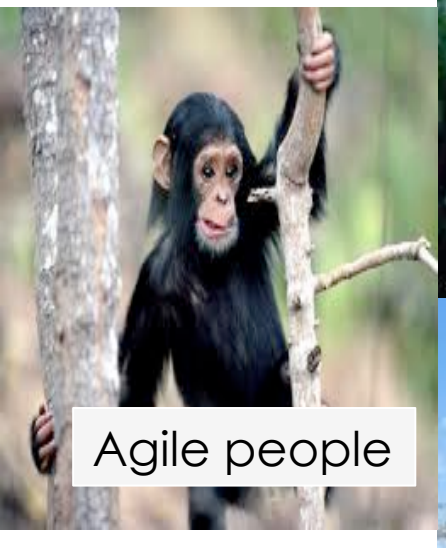


DFJ – Tim Draper

Silicon Valley – what do they have

- Venture capital : exit strategy
- Research at local universities and
  - Stanford and Berkeley
- Research funding
- 'wild' free thinkers
- Complex echo systems combination

Factors of Valley


Agile people


Mean people


Fast people


Stupid people


Slow people

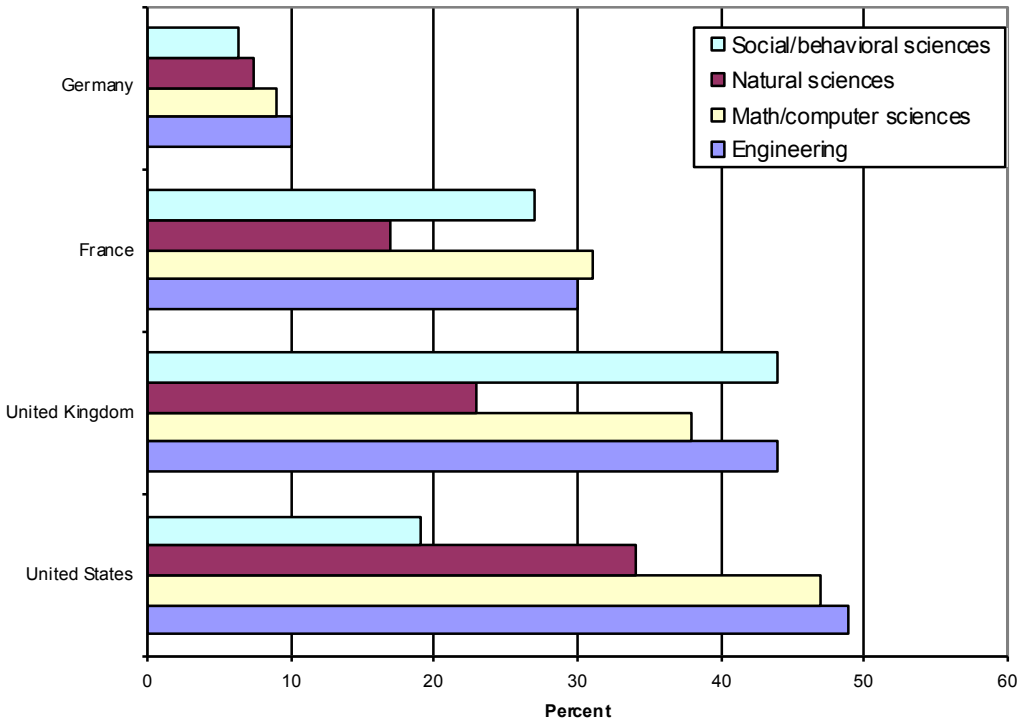
Why US?

- People and technology
- Scientific and technology education
  - Curriculum can changes by faculty not with government approval.
- Center of excellence in research
- Talent pool - ability to attract the best to the region (compare it with Europe)
- People in university and companies interested in high-risk and high-reward

Foreign Students

Figure 5.

Percent of doctoral S&E degrees earned by foreign students in selected countries, by field: 1999



NOTE: Natural sciences include physical, biological, earth, atmospheric and ocean sciences. Social sciences include sociology, psychology and other social sciences.

SOURCE: National Science Board, *Science and Engineering Indicators 2002*. Arlington, VA: 2002 (NSB-02-

Economic Model

- Flexibility in the economic model
  - Silicon Valley: Hire and fire at will
  - Europe (hire but no fire) – France hire never fire.
  - Turkey (hire, ?) fill in the blanks
  - XXXX (hire, no fire since he fires you by votes)

US universities

- Essential in the development of the economic model both directly and indirectly
- Curriciala are constantly changed and adopted world-wide appeal
- Goal of US university system is to have equal impact at home and abroad.
- Responses to new economic conditions are immediate

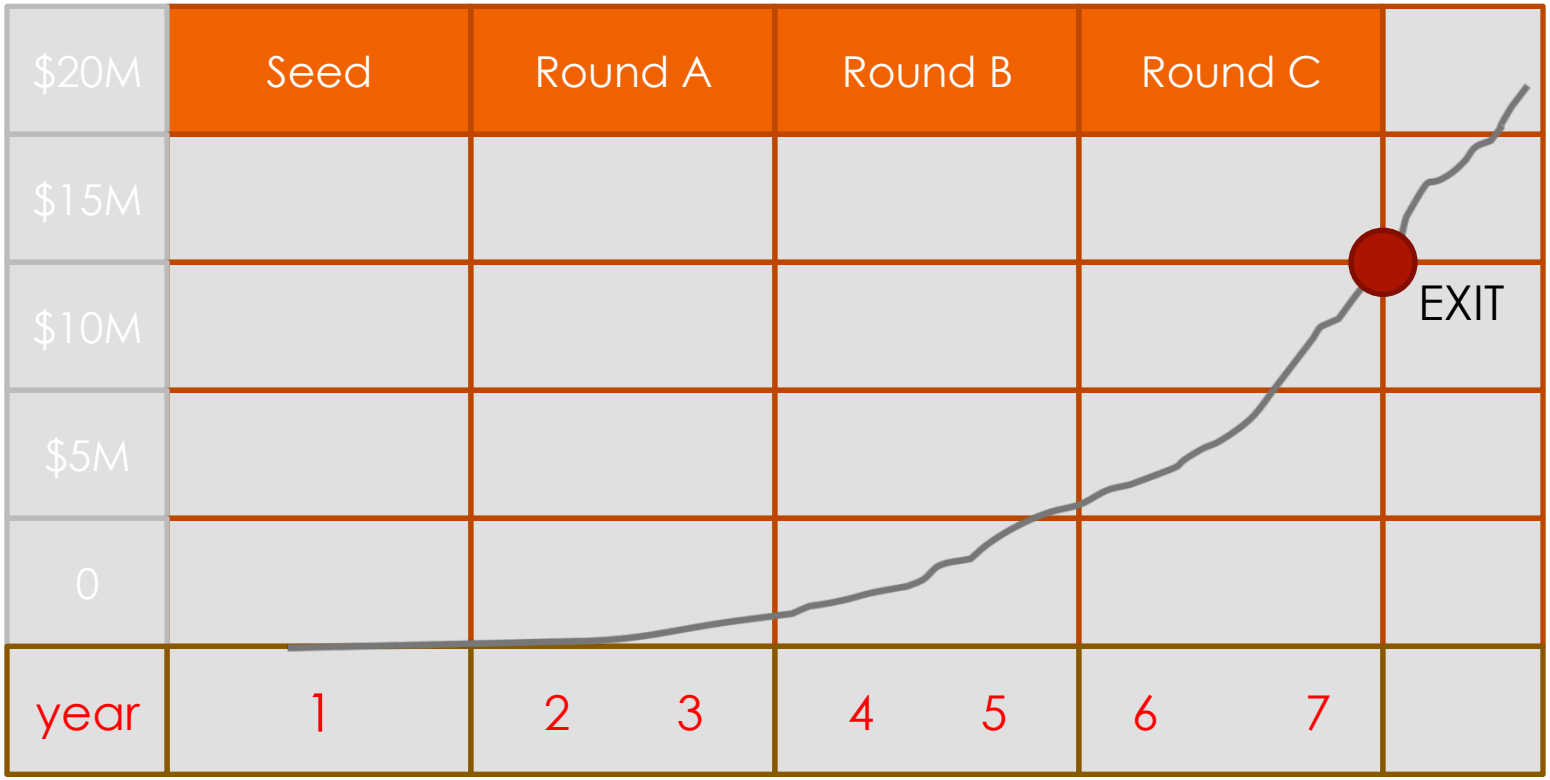
Attributes of Startup enterprise

- Do not be " me too"
- Discrete and defendable market niche
- A differentiated technology that has a sustainable competitive advantage
- Adaptable executive teams
- An investment group that brings marketing and operational expertise

  - Bank lend but VC gives as share
  - Good VC – don't leave the company stays to the last point. Graylock/ mdv/ benchmark/ mayfield
  - Bad VC - close and startover. sequia

EAD startup

- EXIT: Initial Public Offering or Acquisition



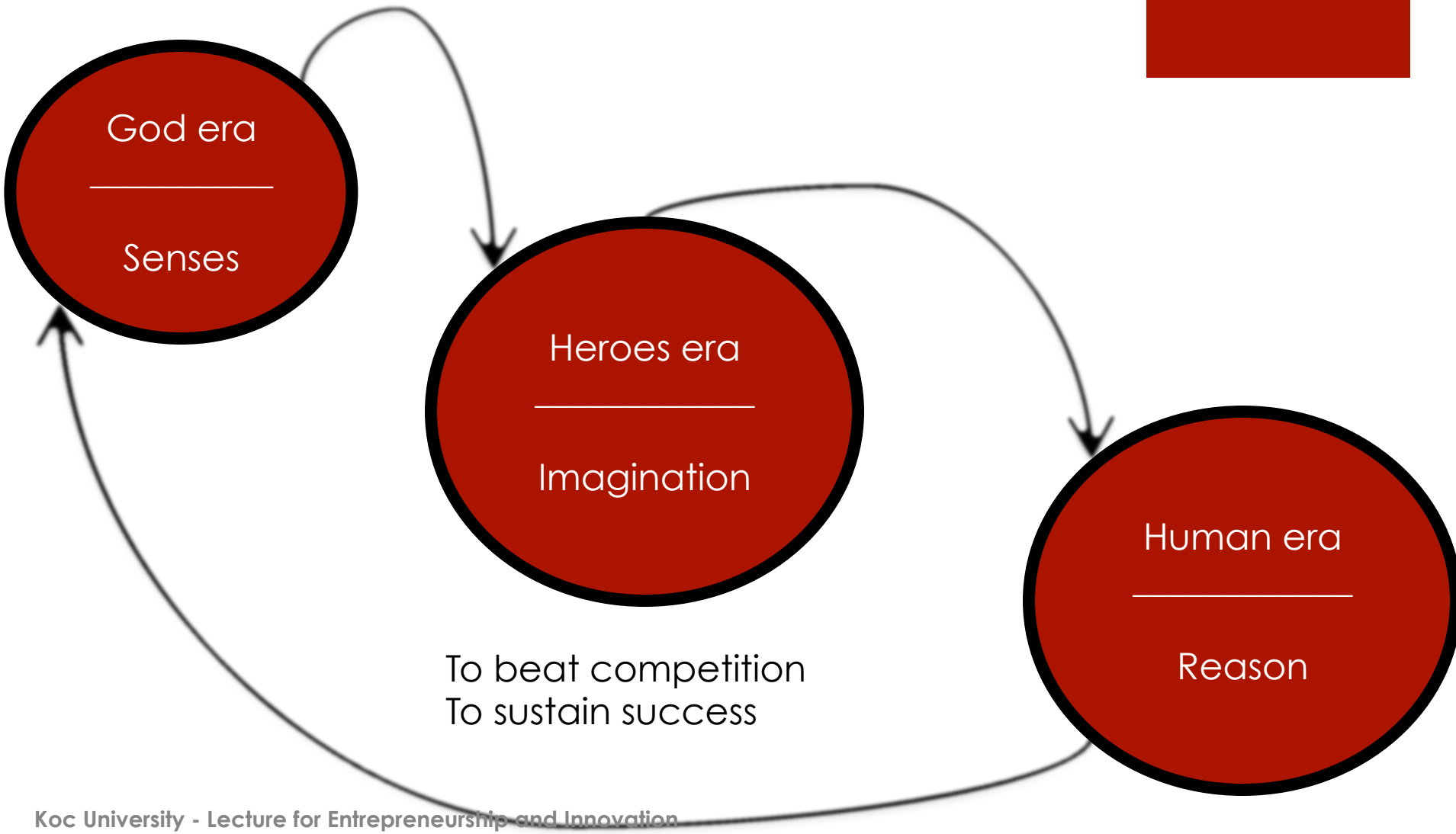
Return on Investment

	Companies	Return on Investment	Exit	Market Value
Seed Round	100	negative	N/A	$0M
Round A	50	3:1	Asset value	$2-10M
Round B	20	10:1	Asset value Of company sold	$50-100M
Round C	10	30:1	Company sold	$100-200M
IPO	5	+50:1	Public	+$250M

Local Ecosystem

- I know of no successful region that has not leveraged the local characteristic and culture
- The 'trick' is to change and evolve without destroying identity and roots
  - Entrepreneurship based on conservative life style
  - Entrepreneurship based on entertaining life style
- Rearing the transformation rarely (if ever/ succeeds) in creating long-lasting values.

Entrepreneurship



Going public

- Partnership program
- Success three quarters
  - IPO
    - Chose the underwriter
      - Goldman Sachs/ Alex brown
      - Road shows
      - Beauty contest
      - Appetite
      - Blackout period
      - Google did not use the bankers went IPO with Dutch auction.

Scalability

- Become big
  - Big fish eat small fish
  - If you cannot eat, be eaten.

Startup vs Small Business

- Small Business (KOBI) Prevalent in Europe
- Not small but not big
- No tendency to become big
- Become BIG – AS BIG AS YOU CAN
  - Hire professional,
  - Get more investment
  - Give your stocks
  - Do not become family (mi familia) oriented
  - Either invest or buy in
- SMALL COMPANY is bad for ecosystem
  - No growth

Business plan

- Business plan is demonstrating a theorem.
- What is your hypothesis
- What is your theory
- Execution is proof of the theory
  - What is your market
  - WHAT IS THE SIZE OF YOUR MARKET
  - Who are your competitors
  - How do you revolutionize the market
  - What are your assumption

Growth

- Predictability
- And growth
- Linearity build value
- Invest – build P&L suffers
  - Earnings spearhead goes down
- Why buy companies
  - They cannot invest on research
  - Is a way of investing
    - Dilutive deal – her technology vital never happens
    - Lucrative deal – your technology – never happens

Profit and Loss Statement (P&L)

- A financial statement that summarizes the revenues, costs and expenses incurred during a specific period of time - usually a fiscal quarter or year.
- These records provide information that shows the ability of a company to generate profit by increasing revenue and reducing costs.
- The balance sheet, income statement and statement of cash flows are the most important financial statements produced by a company. While each is important in its own right, they are meant to be analyzed together.

Monopols –great research

- Bell labs
- Xerox
  - 80 percent of innovation came from
- Why guilt?
  - We have to give back
- IBM - when they are monopol

Road to success

- Simplicity and Elegance
- Keep an eye on the ball
  - Implementation deviates from Specification
- Build on solid foundation

Next generation

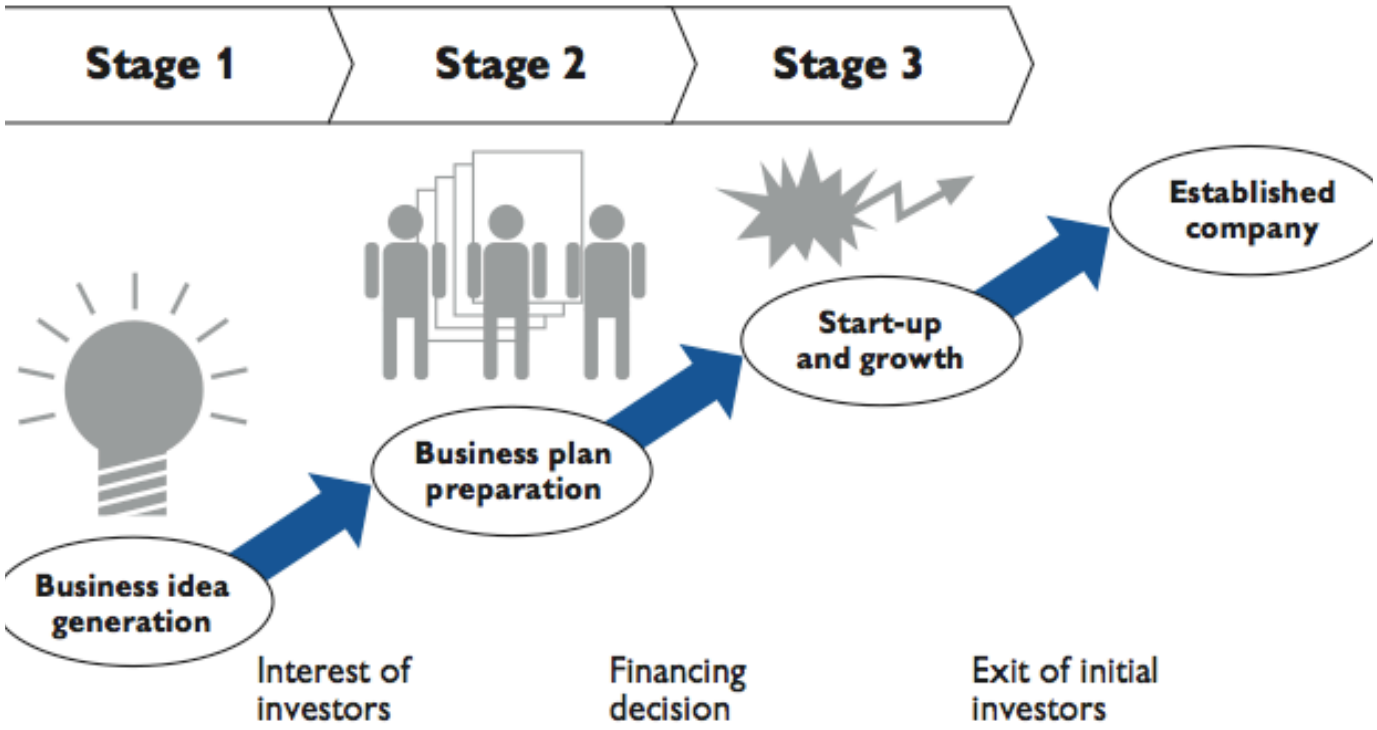
- Enzyme
- Proteins
- DNA strands
- Synthetic Biology

Venture capital is different than

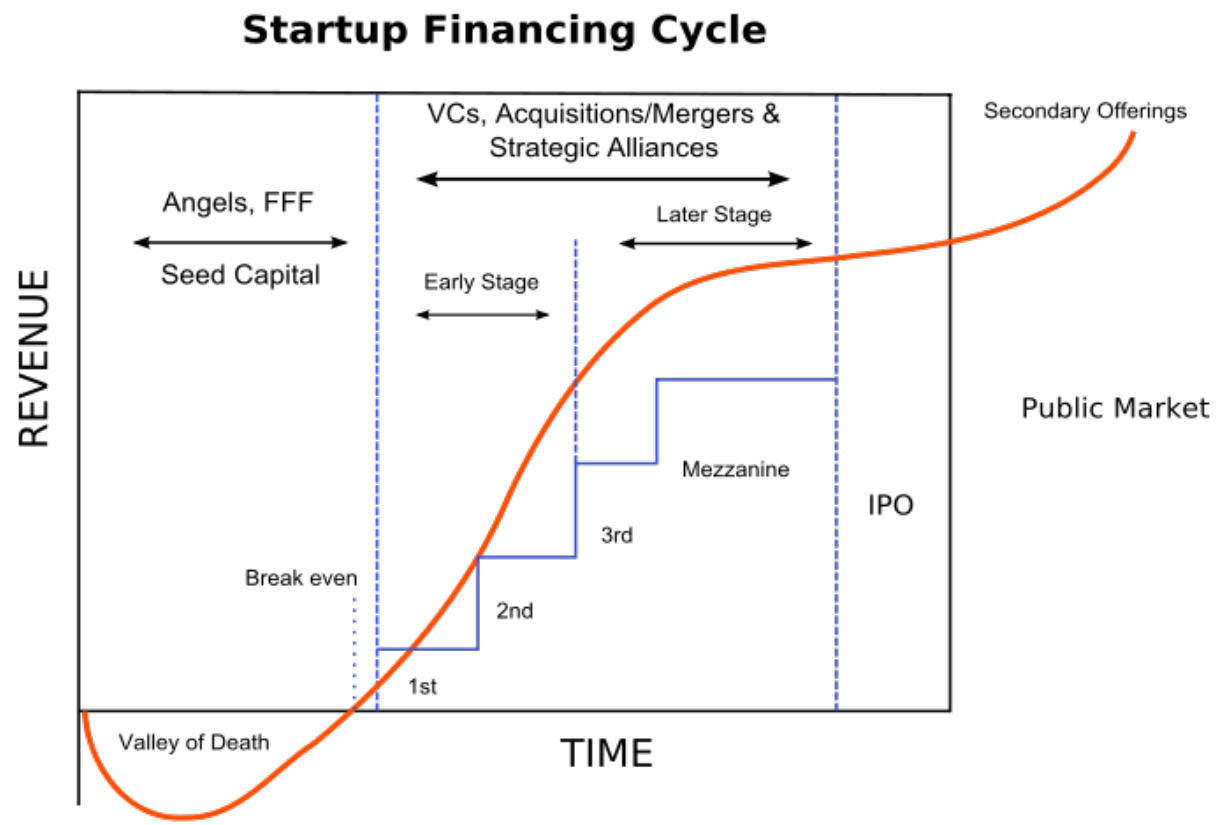
- Hedge funds
- Private equity
  - Good for badly managed companies

Summary: START

Stages

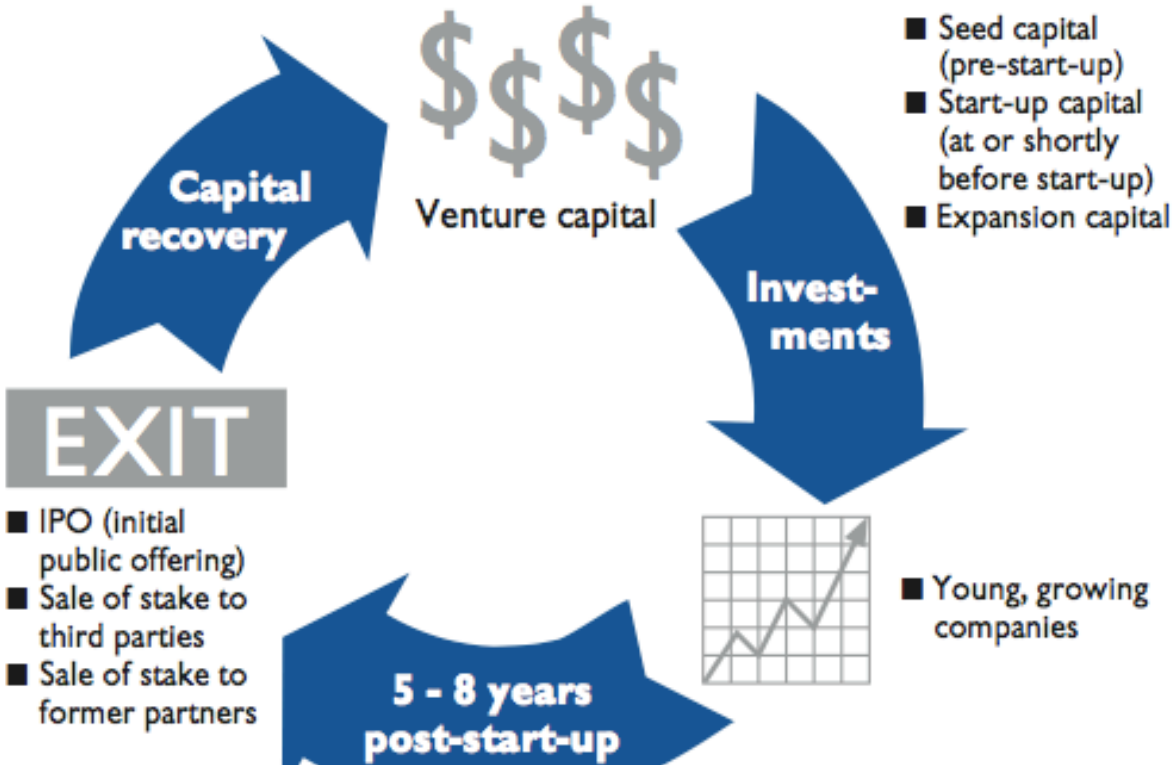


Summary: GROW



Summary: EXIT

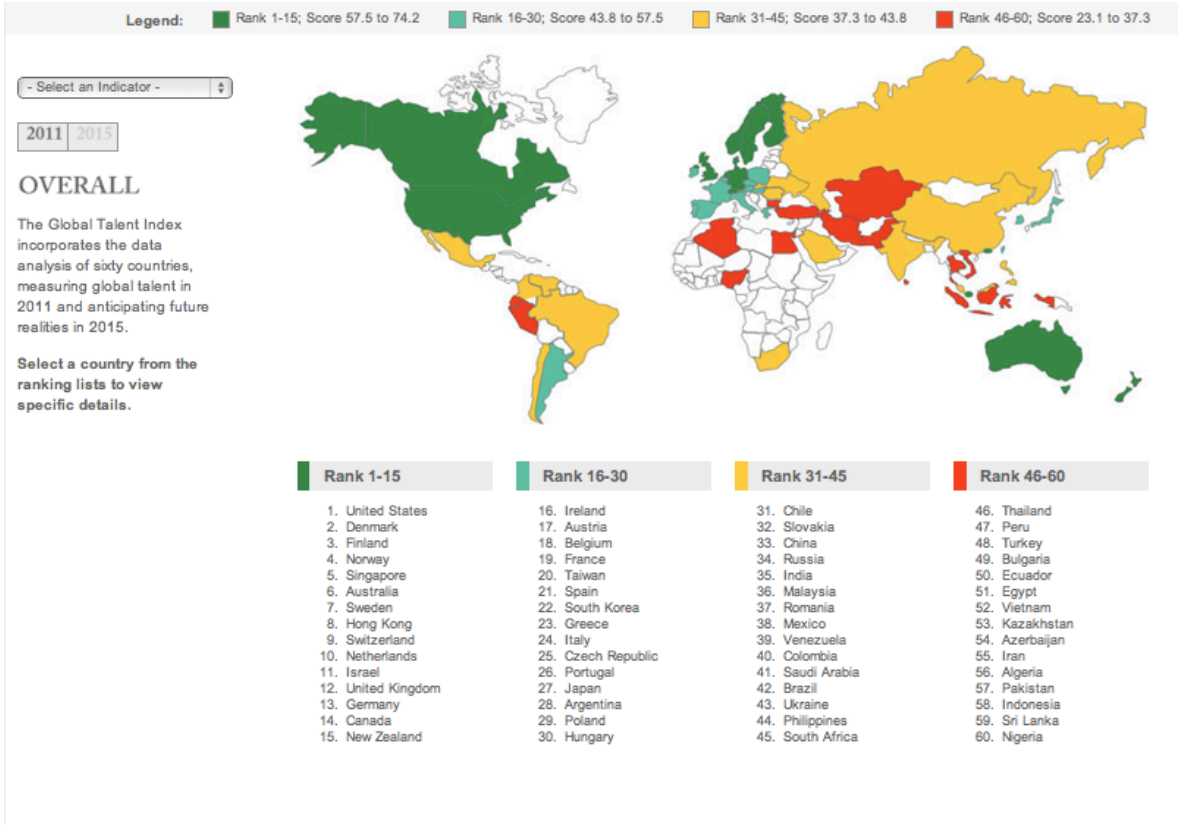
Life Cycle



Why can't we and how can we?

- Capital is there but no venture capitalist
- Best managers and Programmers are not there
- Take risk – not there
- Experienced people
- Family oriented structure
- Regulations and rules
- Hire and fire at will
- Don't make mass stay where you are – let's make mass
- Stock options
  - Restricted stocks/ hold stocks before exercise
- Taxation

Talent Index



Diversity

- Significant contribution to the U.S. economy made by immigrant entrepreneurs and foreign-born professionals, scientists, and engineers.
- Entrepreneurship in cutting edge venture-backed companies, reveals that since 1990, immigrants have started 1 in 4 (25 percent) U.S. venture-backed public companies.
- This impressive proportion helps demonstrate the significant advantage the United States gains in maintaining an open legal immigration system.

Immigrant-founded

- The current market capitalization of publicly traded immigrant-founded ventured-backed companies in the United States exceeds $500 billion, adding significant value to the American economy.
- This is an example of the enormous wealth-creating abilities of immigrant entrepreneurs.
- Today, immigrant-founded U.S. publicly traded companies employ approximately 220,000 people in the United States and over 400,000 worldwide.
- Immigrants started over 40 percent of the venture-backed U.S. public companies in technology manufacturing today.

Immigrant-founded

PERCENTAGE OF IMMIGRANT-FOUNDED VENTURE-BACKED PUBLIC COMPANIES BY YEAR ESTABLISHED

YEAR FOUNDED	IMMIGRANT-FOUNDED	NATIVE-FOUNDED	TOTAL	IMMIGRANT-FOUNDED % OF ALL U.S. VENTURE-BACKED PUBLIC COMPANIES
Prior to 1980	8	115	123	7%
1980-1989	48	198	246	20%
1990-2005	88	268	356	25%

Source: Analysis of publicly traded companies from Thomson Financial database

Examples

COMPANY	IMMIGRANT-BORN FOUNDER OR CO-FOUNDER	COUNTRY OF BIRTH	EMPLOYEES (FY 2005)	INDUSTRY
Intel Corporation	Andy Grove	Hungary	99,900	Semiconductor and Related Device Manufacturing
Solectron Corporation	Winston Chen	Taiwan	53,000	Bare Printed Circuit Board Manufacturing
Sanmina-SCI Corporation	Jure Sola Milan Mandaric	Bosnia Croatia	48,621	Bare Printed Circuit Board Manufacturing
Sun Microsystems, Inc.	Andreas Bechtolsheim Vinod Khosla	Germany India	31,000	Electronic Computer Manufacturing
eBay Inc.	Pierre Omidyar	France	12,600	Electronic Auctions
Yahoo! Inc.	Jerry Yang	Taiwan	9,800	Web Search Portals
Life Time Fitness, Inc.	Bahram Akradi	Iran	9,500	Fitness and Recreational Sports Centers
Tetra Tech, Inc.	Henri Hodara	France	7,200	Engineering Services
UTStarcom, Inc.	Ying Wu	China	6,300	Telephone Apparatus Manufacturing
Google Inc.	Sergey Brin	Russia	5,680	Web Search Portals
Kanbay International, Inc.	Raymond J. Spencer Dileep Nath John Patterson	Australia India Canada	5,242	Computer Systems Design Services
Cadence Design Systems, Inc.	Alberto Sangiovanni-Vincentelli	Italy	5,000	Software Publishers
Juniper Networks, Inc.	Pradeep Sindhu	India	4,145	Telephone Apparatus Manufacturing
Watson Pharmaceuticals, Inc.	Allen Chao	Taiwan	3,844	Pharmaceutical Preparation Manufacturing
Parametric Technology Corporation	Samuel Geisberg	Russia	3,751	Software Publishers
Pediatrix Medical Group, Inc.	Roger Medel	Cuba	3,013	Offices of Physicians (except Mental Health Specialists)
NVIDIA Corporation	Jen-Hsun Huang	Taiwan	2,737	Semiconductor and Related Device Manufacturing
Salton, Inc.	Lewis Salton	Poland	2,466	Electric Housewares and Household Fan Manufacturing
Lam Research Corporation	David Lam	China	2,200	Semiconductor Machinery Manufacturing
WebEx Communications, Inc.	Subrah S. Iyar	India	2,091	Software Publishers

Employment reflects 2005 worldwide total
Sources: Company 10-K filings and Hoover's

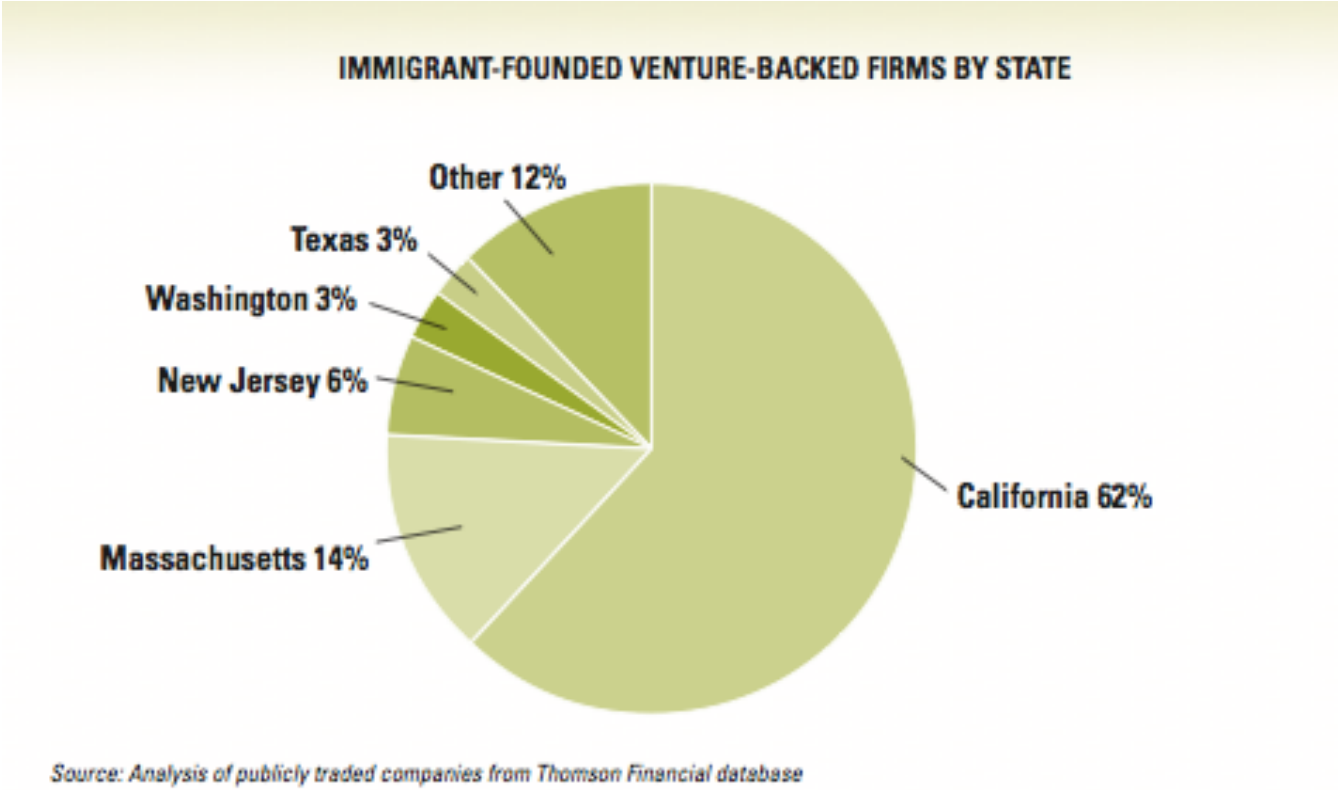
Industry

IMMIGRANT-FOUNDED VENTURE-BACKED U.S. PUBLIC COMPANIES BY INDUSTRY

INDUSTRY	NUMBER OF COMPANIES	EMPLOYMENT	% OF IMMIGRANT-FOUNDED FIRMS BY INDUSTRY
High-Tech Manufacturing	60	282,442	42%
Information Technology	34	48,794	24%
Life Sciences	30	18,660	21%
Professional, Scientific, and Technical Services	6	17,317	4%
Other Services	5	14,919	3%
Other Manufacturing	5	13,177	3%
Finance and Insurance	2	8,872	1%
E-Commerce	2	234	1%
Total	144	404,415	100%

Employment reflects 2005 worldwide total
Sources: Company 10-K filings and Hoover's

By state


IMMIGRANT-FOUNDED VENTURE-BACKED FIRMS BY STATE
Other 12%
Texas 3%
Washington 3%
New Jersey 6%
California 62%
Massachusetts 14%
Source: Analysis of publicly traded companies from Thomson Financial database

References

- Notes of A. L. S.-Vincentelli
- American Made by Stuart Anderson, Michela Platzer