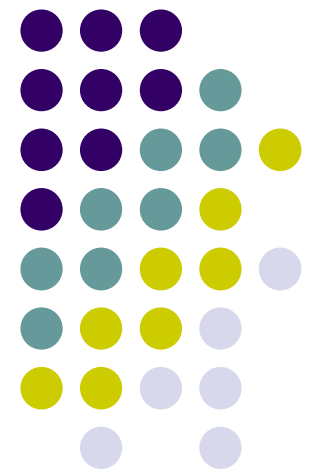


# Global mobility of skill and the competition for talent

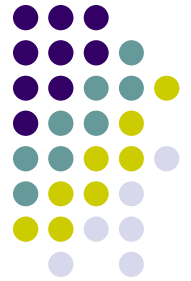
Professor AnnaLee Saxenian  
UC Berkeley School of Information  
The Atlas of Ideas: DEMOS  
January 17-18, 2007





# Beyond core and periphery

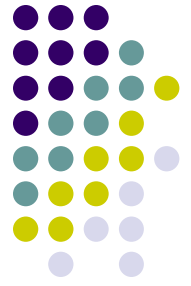
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Core-periphery model: Technology, capital, and skill reside in wealthy, developed nations (**core.**) Poor nations (**periphery**) remain suppliers of natural resources or cheap labor for corporations in core.

- New variant I: Alliance of domestic corporations and nation-state in periphery to master mass manufacturing--become “fast followers” but not innovators or leaders.
- New variant II: Major corporations from core create global supply chains to tap skill and resources in periphery--but maintain hierarchical control over production networks => **“Dependent development”**

But cannot explain the rise of indigenous innovative capabilities in once periphery, e.g. India, China



# Innovation in the periphery

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**The rise of “brain circulation” has spurred innovative upgrading in periphery**

- Taiwan & Israel, peripheral in 1970s, became centers of entrepreneurship and innovation when brain drain to Silicon Valley (SV) was reversed in the 1980s & 1990s
- “Brain circulation” between SV and Taiwan, China, and India has created new, linked clusters of skill and know-how, with development trajectories shaped both by cross-regional interactions and domestic political/ economic institutions

**=> Successful regions don't build SV in isolation, rather they connect to its professional and technical networks**

# Why now? A new global environment

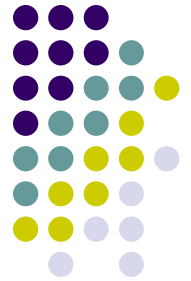
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1. Liberalization of global markets opens economies
2. Radical reductions in transportation and communication costs expand professional options for immigrants
3. Decentralization of corporate hierarchies and vertical specialization of production lower barriers to entry
4. Open supplier networks and advanced software platforms support real-time long distance collaboration

# Rethinking actors in global economy

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## **Not just global corporations**

- Cross-regional entrepreneurial networks and immigrant technical communities transfer technical, market, & business information rapidly between distant regions

## **Not just the nation-state**

- Dynamic sub-national clusters of skill and know-how in periphery--supported by aggressive local policymakers

## **Not just low-cost labor**

- Entrepreneurial experimentation and learning support upgrading and fast rising wages in emerging regions

# Origins: the postwar “brain drain”

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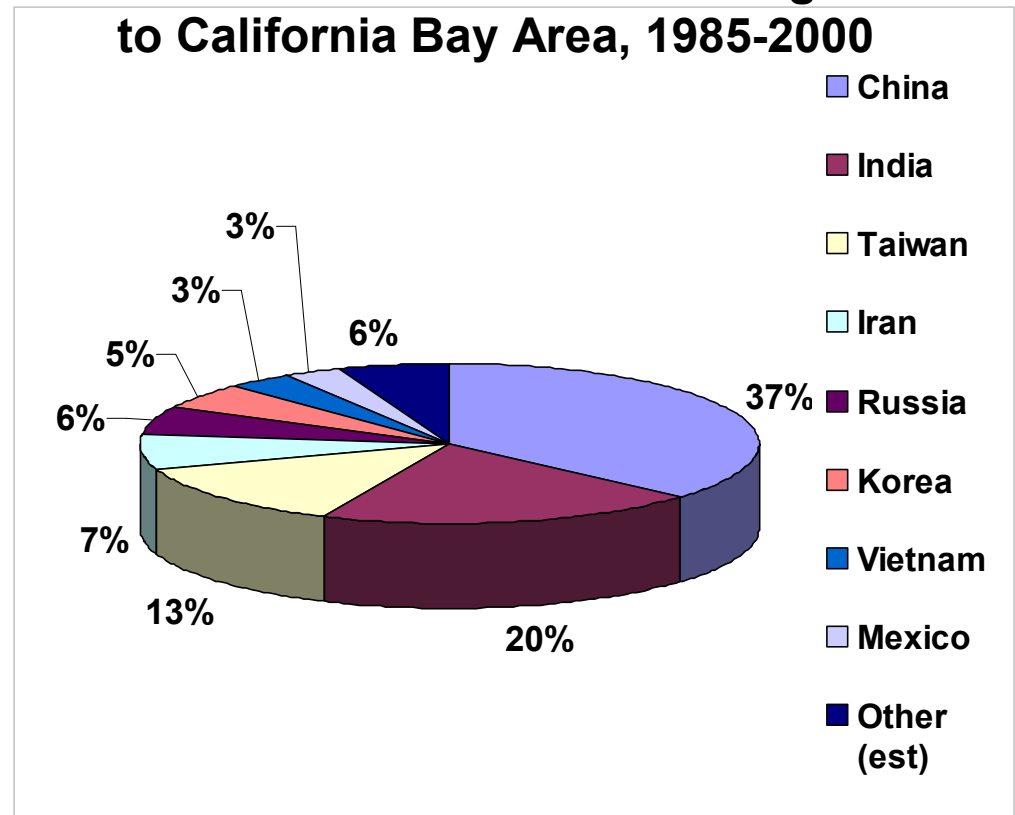
- Following WWII the best and brightest students from developing nations gained access to US education
- Most students remained in US or European host country due to professional and economic opportunities—typically not elites but middle class high achievers
- US accused of creating a vicious cycle: the brain drain made peripheral nations poorer and rich nations richer
- The analysis was not wrong – but the brain drain has created unanticipated benefits in recent decades

# Silicon Valley absorbs immigrants



- 1970-2000: Silicon Valley grew rapidly. Local firms eagerly absorbed skilled immigrants
- By 2000, 52% of Silicon Valley engineers and scientists were foreign born
- Most have master's or doctorates degrees (i.e., more educated than their native-born counterparts)
- “Silicon Valley is built on ICs” (Indians and Chinese, not integrated circuits).

**Professional and Technical Immigration to California Bay Area, 1985-2000**



n=127,855

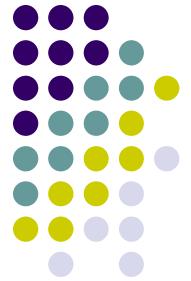
# The rise of ethnic networks

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- Immigrants build associations to support integration and professional advancement in Silicon Valley
  - Help immigrants find jobs or promotions when “glass ceilings” limited advancement within companies
  - A source of skill, relationships, and learning the Silicon Valley model of entrepreneurship and experimentation
- Although many groups had associations, Chinese associations were especially strong and numerous...

# Immigrant associations



Started in Silicon Valley, from oldest to newest....

- Chinese Institute of Engineers (**CIE-USA**)
- Chinese Software Professionals Association (CSPA)
- Silicon Valley Indian Professionals Association (SIPA)
- Monte Jade Science and Technology Association
- Chinese American Semiconductor Professionals Association
- The Indus Entrepreneur (TiE)
- Chinese Information and Networking Association (CINA)
- Korean Information Technology Network (KIN)
- Hua Yuan Science and Technology Association
- Sivan Group (Israeli)

and many more, including alumni associations .....

# Immigrant impact on Silicon Valley

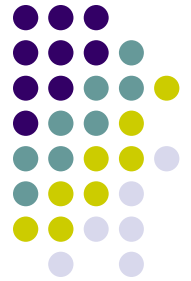
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1. Indian and Chinese started ~27% of technology companies in Silicon Valley, 1980 -2000
  - 4,146 companies
  - 122,386 jobs
  - \$37 billion sales
2. High profile successes build confidence and reputation in home countries
  - Hotmail's Sabeer Bathia
  - Yahoo's Jerry Yang
  - Netscreen's Li Gong and Ken Xie
3. Immigrant associations build initial connections to home countries via former classmates, policymakers

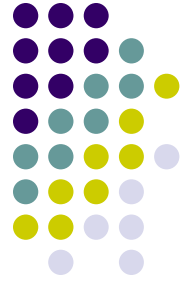
# The new Argonauts set sail

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Silicon Valley's immigrants seek wealth and professional success in their home countries--like Jason and the Argonauts of Greek mythology who faced great hardship in search of the golden fleece





# The new Argonauts in action

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The new Argonauts exploit their linguistic and cultural capabilities and institutional know-how to identify and tap under-utilized resources and/or potential markets in their home countries:

## Seeking the “golden fleece”

- Israelis tap military technology and skill base
- Taiwanese seek low-cost manufacturing talent
- Indians tap underemployed programming skill
- Chinese seek to serve large domestic market

# The new Argonauts' contributions

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1. Business: Set up development centers, start new firms, advise and/or invest in local firms, enhance local competition, build local and cross-regional partnerships and alliances
2. Corporate governance: Focus on transparency, minimization of hierarchy, merit-based advance, and venture capital-based entrepreneurship to countries dominated by state or family-run firms
3. Institutions: Lobby/collaborate with policymakers to identify and remove obstacles to local development (transform educational or research institutions, capital markets, regulation, etc.)



# What is Argonauts' experience?

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## Some returnees

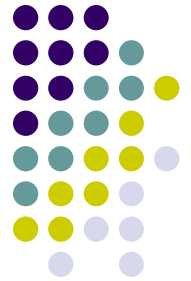
- Start successful new firms and become role models, advise or invest in next generation of start-ups
- Fail as entrepreneurs, but continue experimenting with start-ups or move to established firms

## Others

- Work for established companies or start-ups, playing managerial and/or bridging role (build alliances, etc.)
- Become researchers, educators, or professional service providers: legal, financial, consulting, etc get
- Return to US, discouraged by difficulties adapting after living abroad- limited opportunities, resentment, etc.

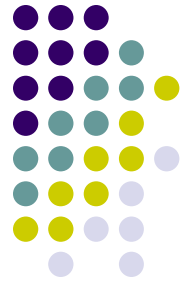
# Origins of Taiwan's technology cluster

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- 1970s: Taiwanese policymakers work with Overseas Chinese to define policy of technology leapfrogging
- 1980s: Creation of technology infrastructure: alumni & professional associations advise upgrading/ expansion of universities, develop strategy for public/private R&D agencies ERSO/ITRI, creation of venture capital
- Consciously create environment that attracts Overseas Chinese from SV to relocate to start technology firms
- 1987: Stock market booms, entrepreneurship takes off: approx 10,000 specialized firms in IT industry

# Hsinchu Science Park: Silicon Valley sibling



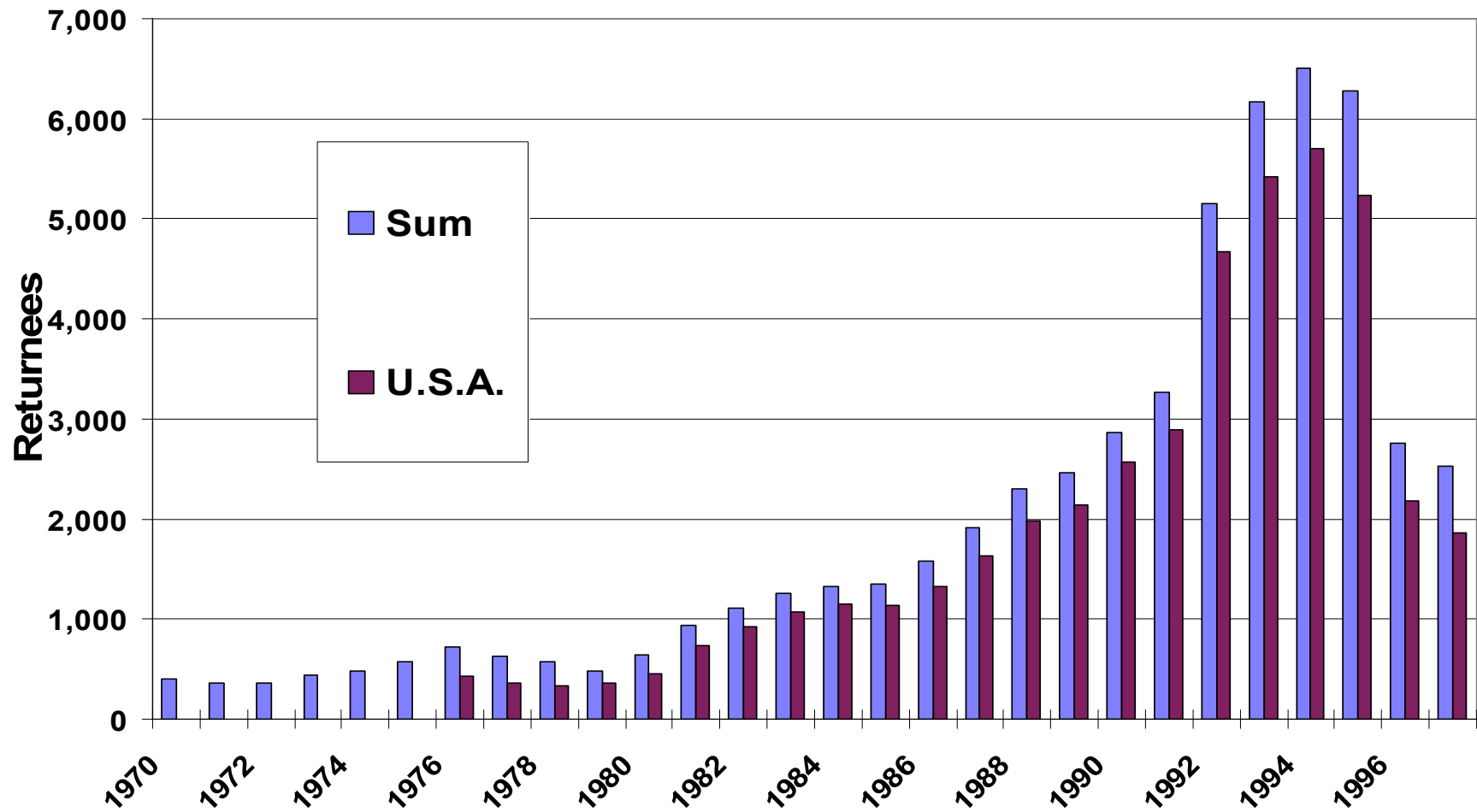
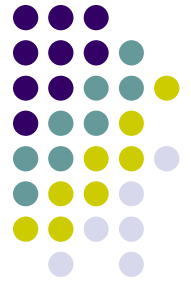
# Silicon Valley-Hsinchu connection

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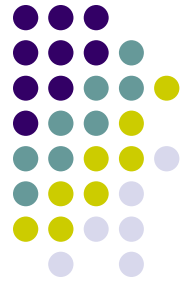


- Investors and networked firms support cross-regional collaborations and co-production
- Over time, incremental innovation and upgrading of PC, IC, and systems manufacturing: from OEM to ODM (to OBM)
- Hsinchu matures from sibling to partner
  - Perfects flexible, low cost, high quality IT manufacturing
- Silicon Valley moves up value chain
  - Pioneer of new product definition, architecture, technology

# Returnees to Taiwan, 1970-1997



# Taiwan's IC foundries: a new model



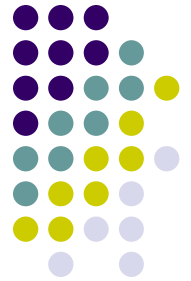
# The Hsinchu-Shanghai connection

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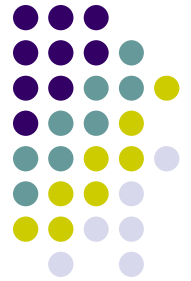
- Taiwan's electronic systems manufacturers expand across straits to Yangtze River Delta for lower cost labor
- Cross-regional investment in large scale IC manufacturing in Shanghai (SMIC, Grace, etc.)
- Shanghai area boasts complete IT supply chain but dominated by foreign investment and technology
- Hsinchu moves up value chain to specialize in global logistics and design, even new brands (OBM)

# Silicon Shanghai



# Shanghai-Silicon Valley connection

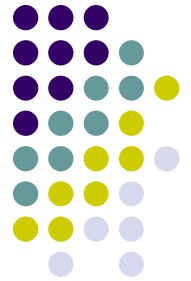
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- Silicon Valley's IC suppliers and professional services (venture capital, legal, banking) move to Shanghai
- Returnee and cross-regional firms emerge such as Newave, UTStarcom, WebEx, Linktone, and Verisilicon
- To date new technology startups have had limited success and seen only modest reinvestment
  - Capital markets and venture capital industry immature
  - Shortages of managerial, marketing and experienced technical talent
  - Limited interaction with established domestic IT firms

# Bangalore-Silicon Valley connection

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- India in 1980s and 90s provides low-cost low value added software coding and maintenance services
  - Infosys, TCS, Wipro serve US corporations, onsite
  - Silicon Valley-based Indian managers pioneer MNC development centers in Bangalore
- Indian firms and MNCs improve quality and complexity of services, no longer just low cost (CMM SEI leaders)
- Cross-regional venture capital and start-ups pioneer IC design, consulting, and internet services
- Poor infrastructure, limited skill base, and enclave development may limit potential for upgrading

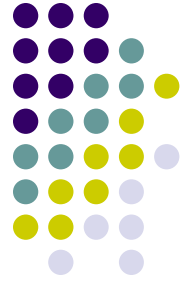
# Bangalore: a software services partner

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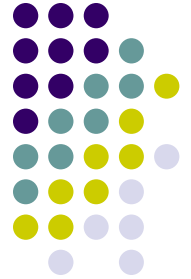


# The new Argonauts and IT networks

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- The new Argonauts have led capability building, cross-regional collaboration, and upgrading of IT supply chain
  - Silicon Valley remains a pioneer of new product definition, architectures, leading edge technologies
  - Taiwan specializes in global logistics and design
  - Shanghai center of low cost, high quality IT systems manufacturing
  - Bangalore leads low cost, high quality software and services
- As collaborations mature regions deepen capabilities and innovative capacity, benefiting entire IT supply chain



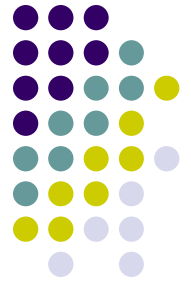
# Long term scenario

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- Brain circulation replaces brain drain in global economy
- Global network of specialized, high wage regional economies replaces core-periphery development
- Open systems allow co-design and mutual upgrading and innovation across the value chain
- New regional partners have potential to contribute to creation of entirely new products, industries and markets
- Potential for more widely distributed and sustained growth of global economy
- New pattern creates challenge of enclave development and uneven development within national economies
- Global shortages of talent for for-seeable future

# How to compete for scarce talent (I)?

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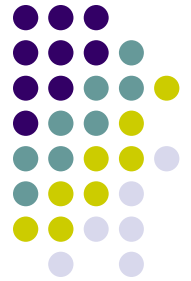


## First, create it:

- Invest in high quality basic education for **all**: encourage critical inquiry, creativity, teamwork
- Improve higher education: support cross-disciplinary research, communication skills
- Make a commitment to continuing education
- Insure support for temporarily displaced talent: e.g. portable health insurance, unemployment

# How to compete for scarce talent (II)?

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## ...then, aggressively develop it to retain it:

- Locate in cluster, where workers can refresh talent quickly, be “where the action is”
- Support learning, not just training: provide continuing challenges and opportunities to improve performance
- Decentralize and provide significant autonomy to units for entrepreneurial activity
- Motivate workers by building relationships that allow them to learn from outside as well as internal community
- Create talent marketplace so individuals can seek new challenges within firm – rather than outside it!

