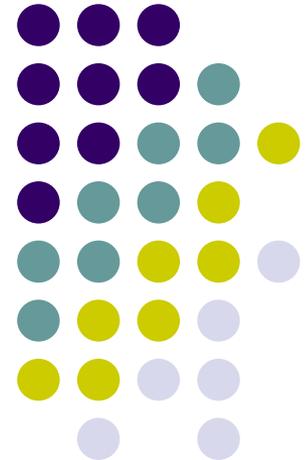


# From Brain Drain to Brain Circulation: Rethinking the Global Knowledge Economy

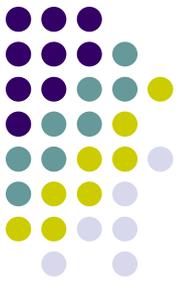
Professor AnnaLee Saxenian  
Dean, School of Information  
University of California, Berkeley  
Council of Graduate Schools Annual Meeting

December 4, 2009  
San Francisco

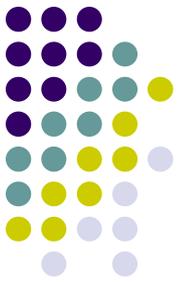


# The old global economy: core & periphery

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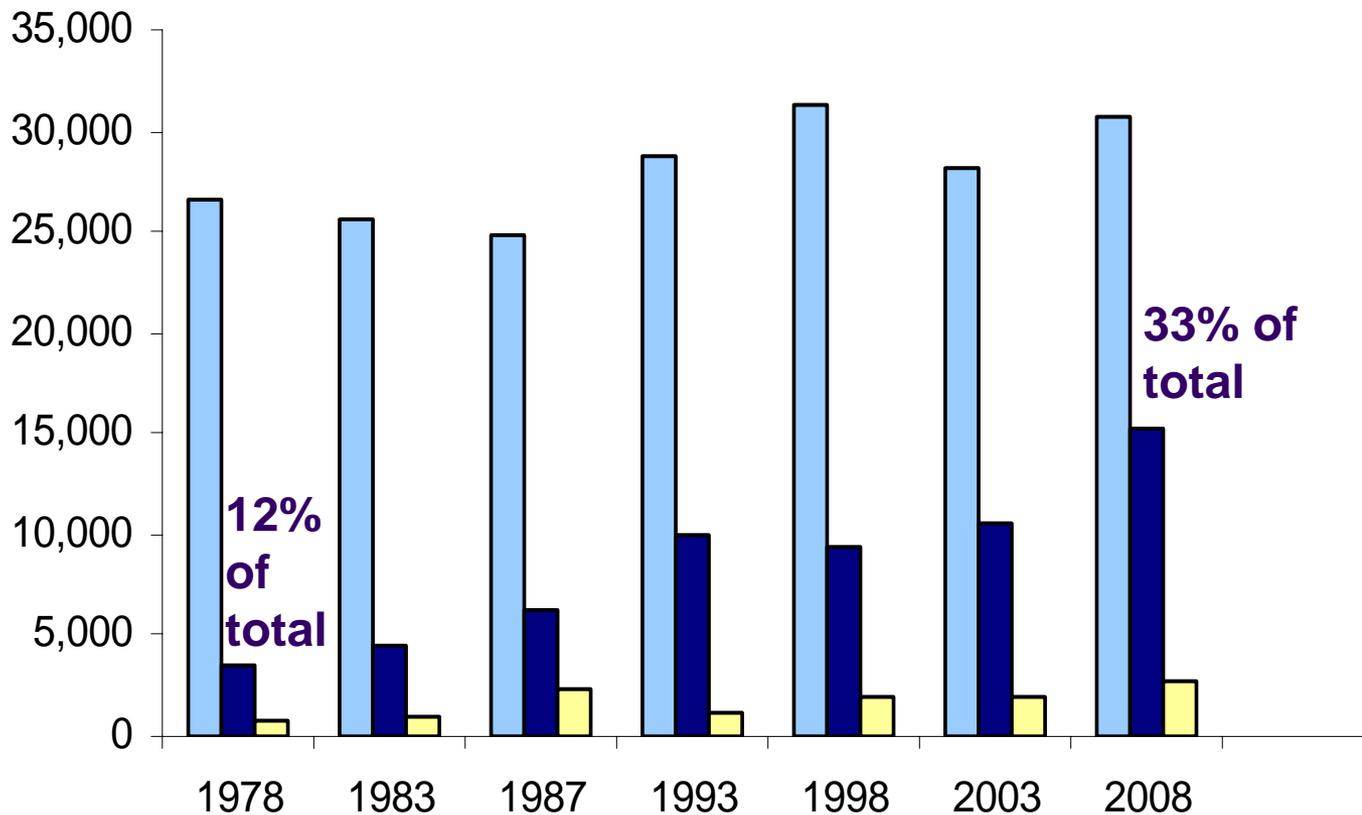


- Following WWII the best and brightest students from around the world gained access to US higher education
- Most, especially from poor nations, remained in US due to superior professional and economic opportunities
- US accused of creating a vicious cycle: the brain drain made developing nations poorer and rich nations richer
- **Core-periphery model:** Technology, capital, and skill reside in wealthy, developed nations (**the core**). Poor nations (**periphery**) remain underdeveloped suppliers of natural resources or cheap labor for corporations based in core. Uneven or dependent development.



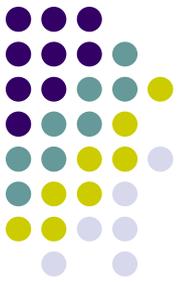
# The brain drain: US doctorate recipients

■ U.S. citizen and permanent resident ■ Temporary visa holder ■ Unknown

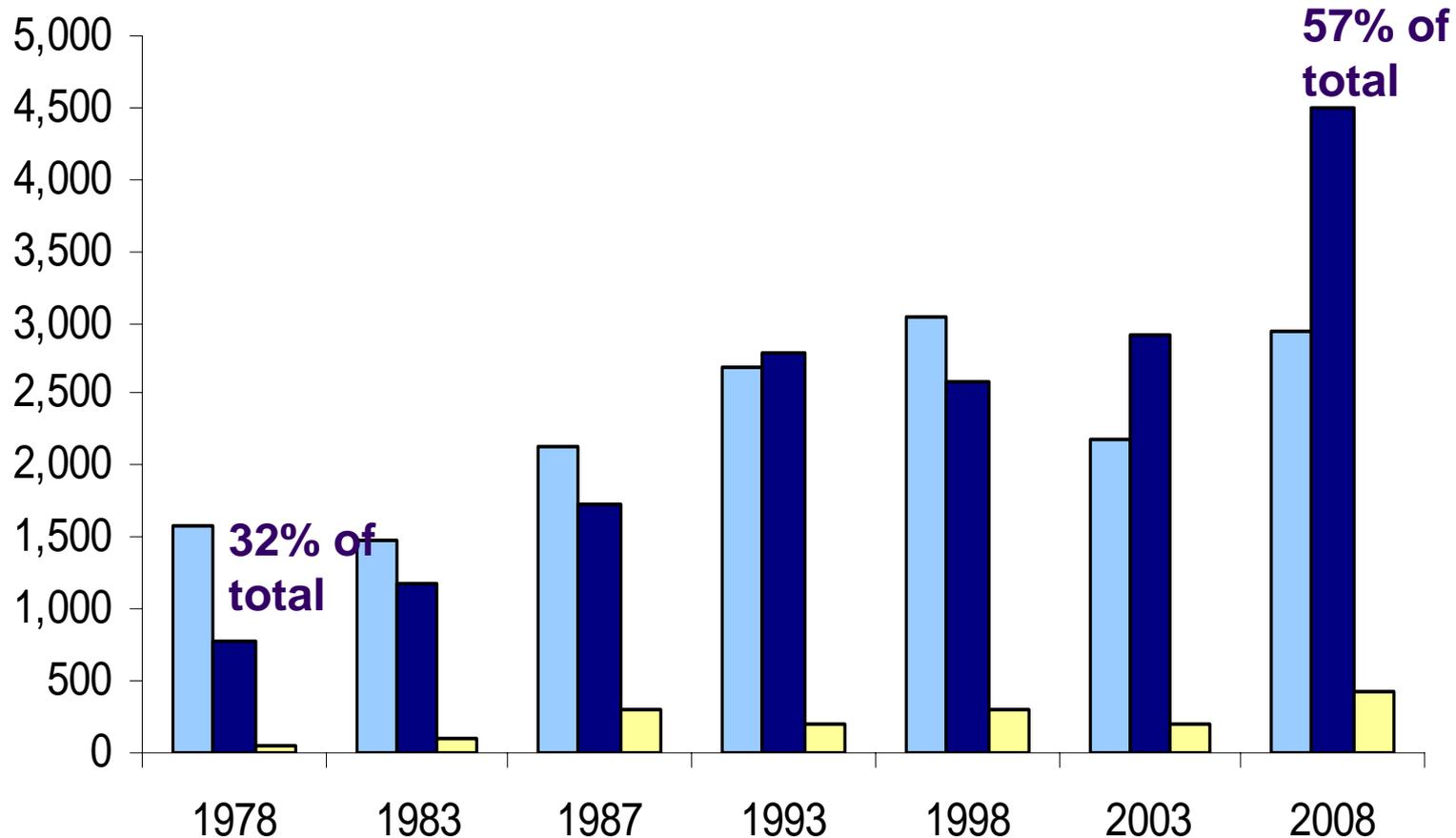


Source: National Science Foundation, SRS. 2009

# The brain drain: engineering doctorates

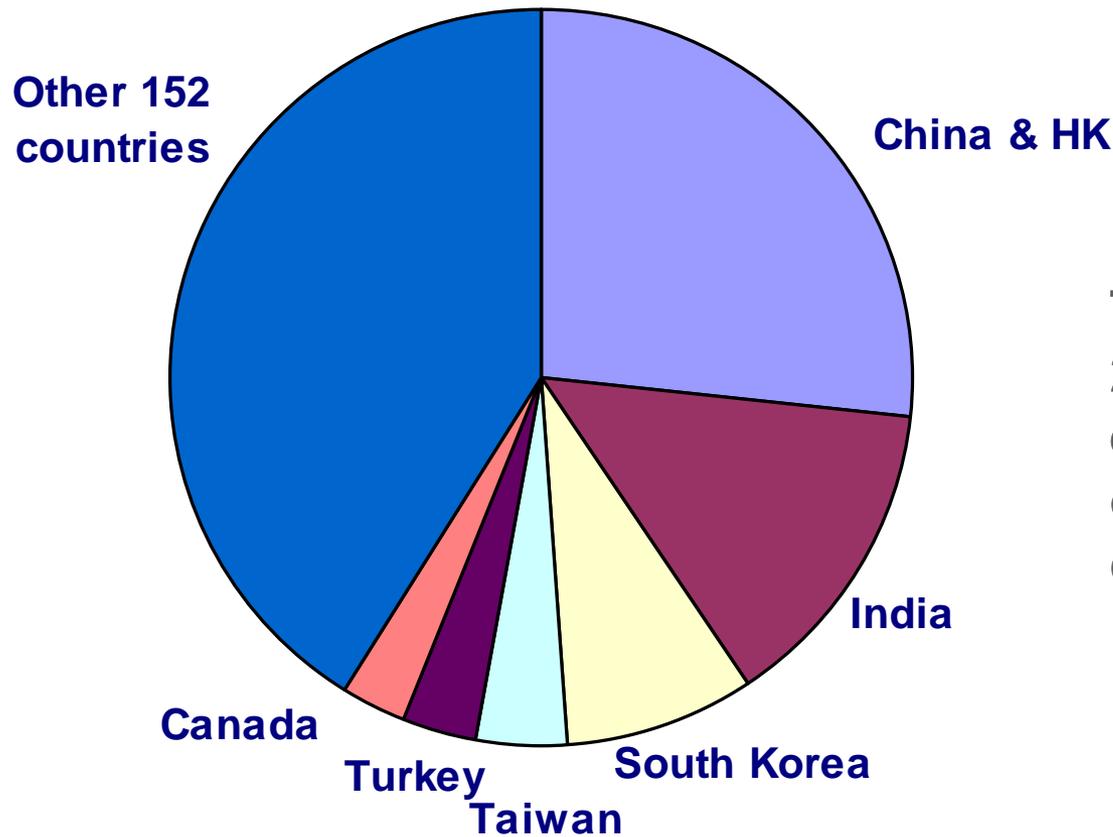
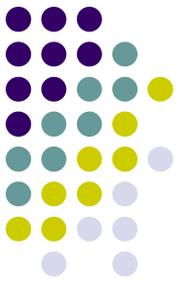


□ U.S. citizen and permanent resident ■ Temporary visa holder □ Unknown



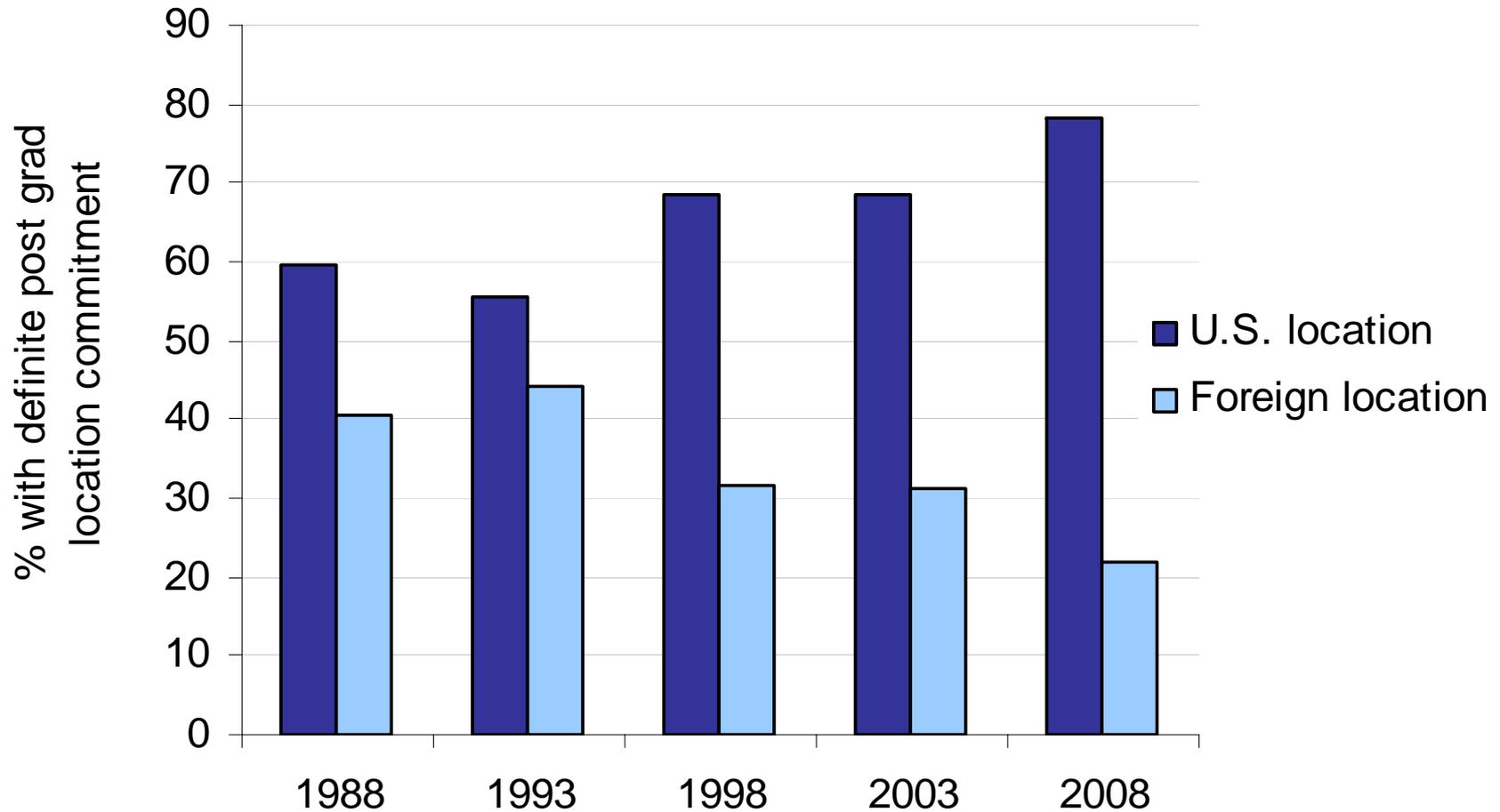
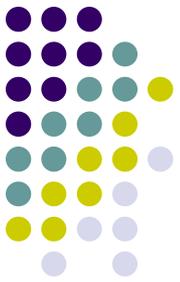
Source: National Science Foundation, SRS. 2009

# Visa-holding doctoral recipients, 2008

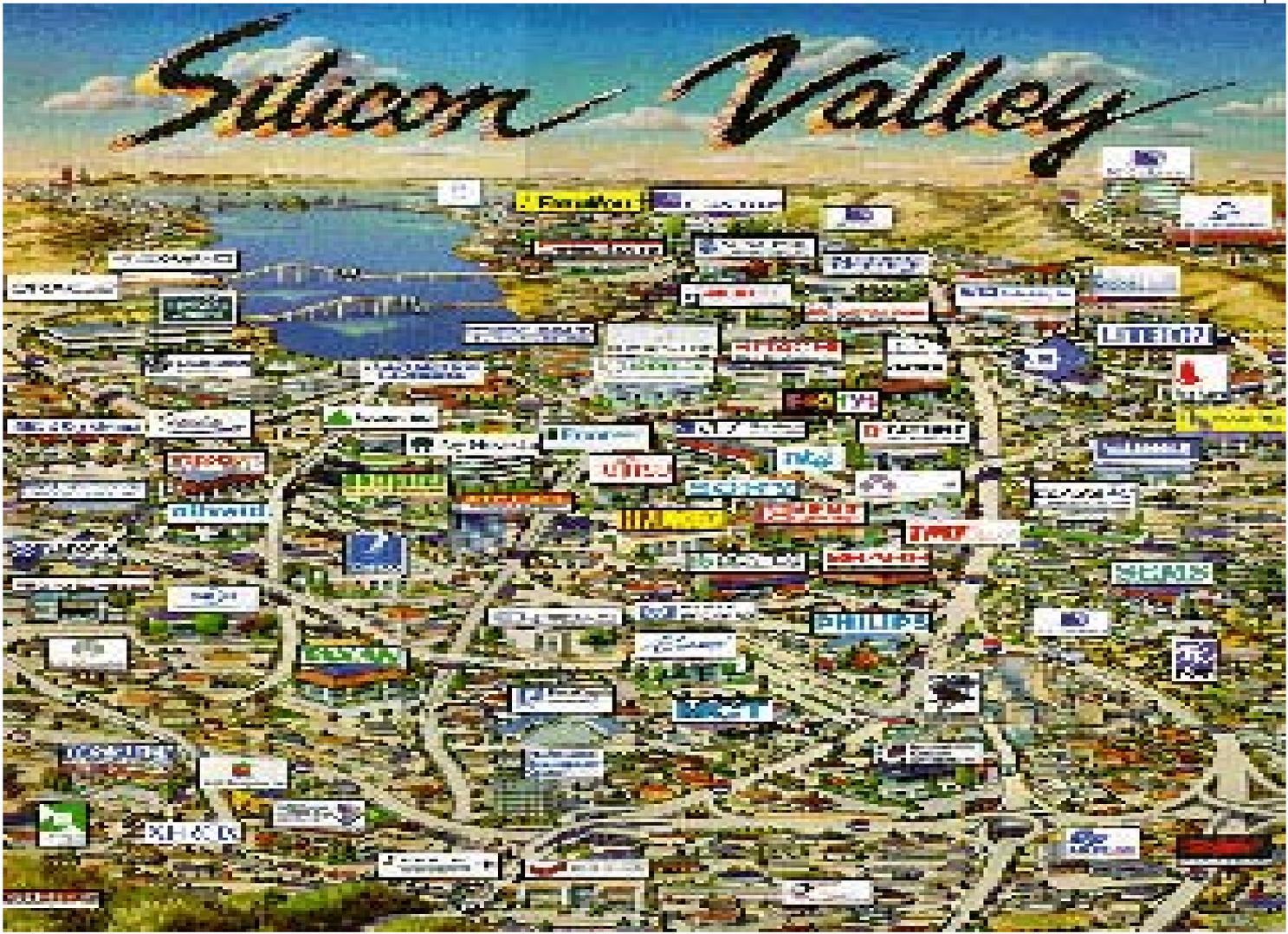


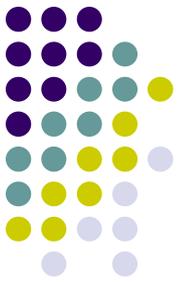
**Top 6 countries =  
21% of all doctorate  
earners and > 60%  
of visa-holding  
doctorate recipients**

# Visa-holding doctorate earners stay to work in US -- at least initially

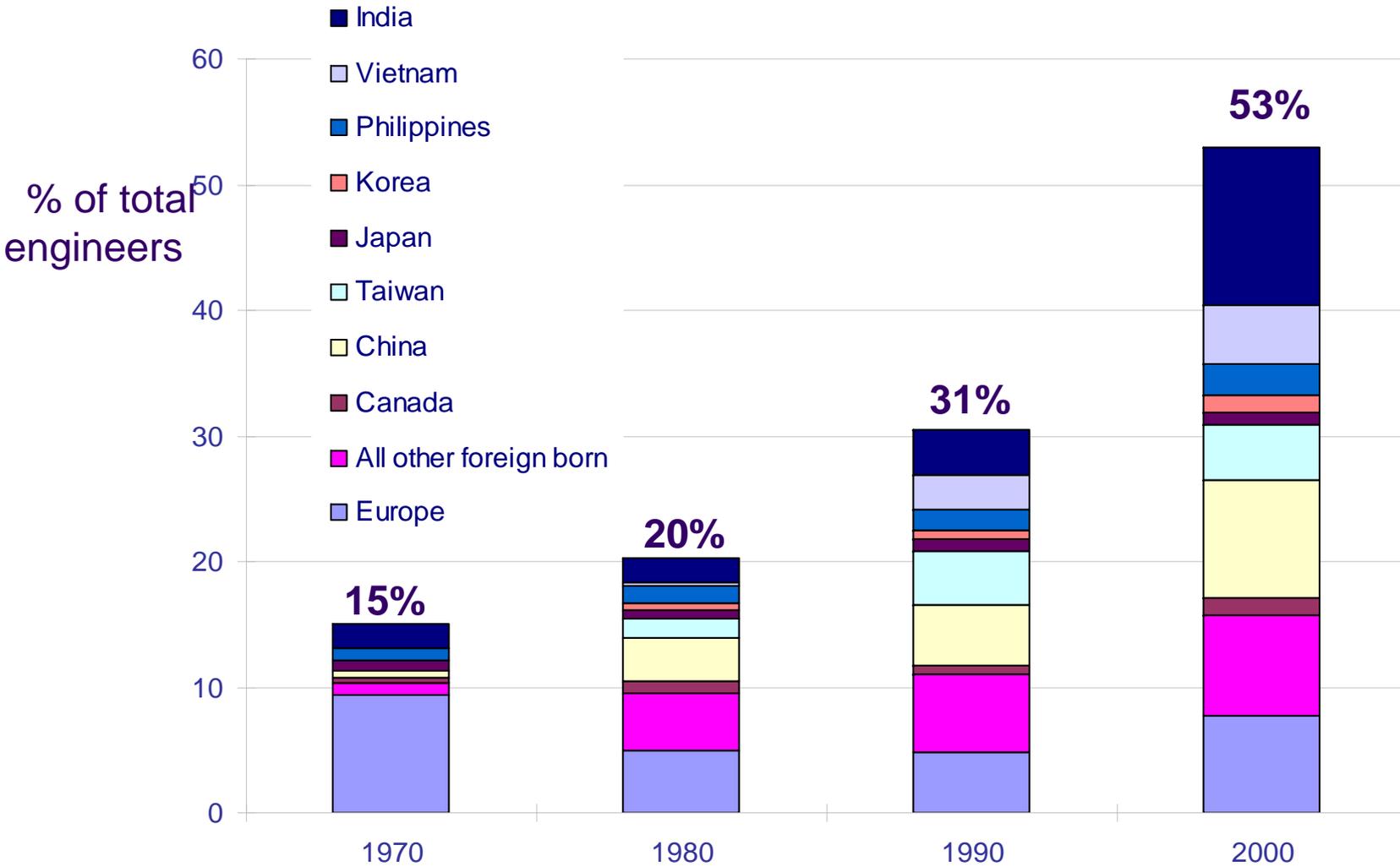


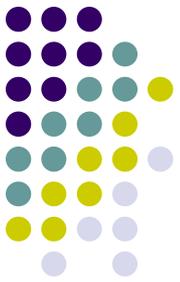
# The view from Silicon Valley





# Foreign-born engineers in SV workforce





# Immigrant professional networks

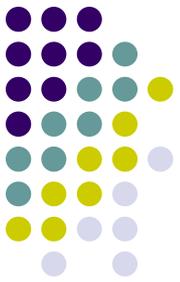
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- Immigrants build self-help networks to aid integration and professional advancement in Silicon Valley
  - Help seeking jobs or promotions when “glass ceilings” limit advancement within companies
  - Professional and technical associations offer advice, relationships and learning the Silicon Valley model
- Chinese and Indian networks especially strong ...

**Indian and Chinese started ~27% of technology companies in Silicon Valley, 1980 -2000: 4,146 companies, 122,386 jobs and \$37 billion sales**

# The new global knowledge economy

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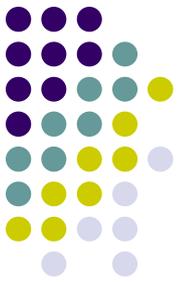


## The rise of “brain circulation” is altering developmental opportunities in the periphery

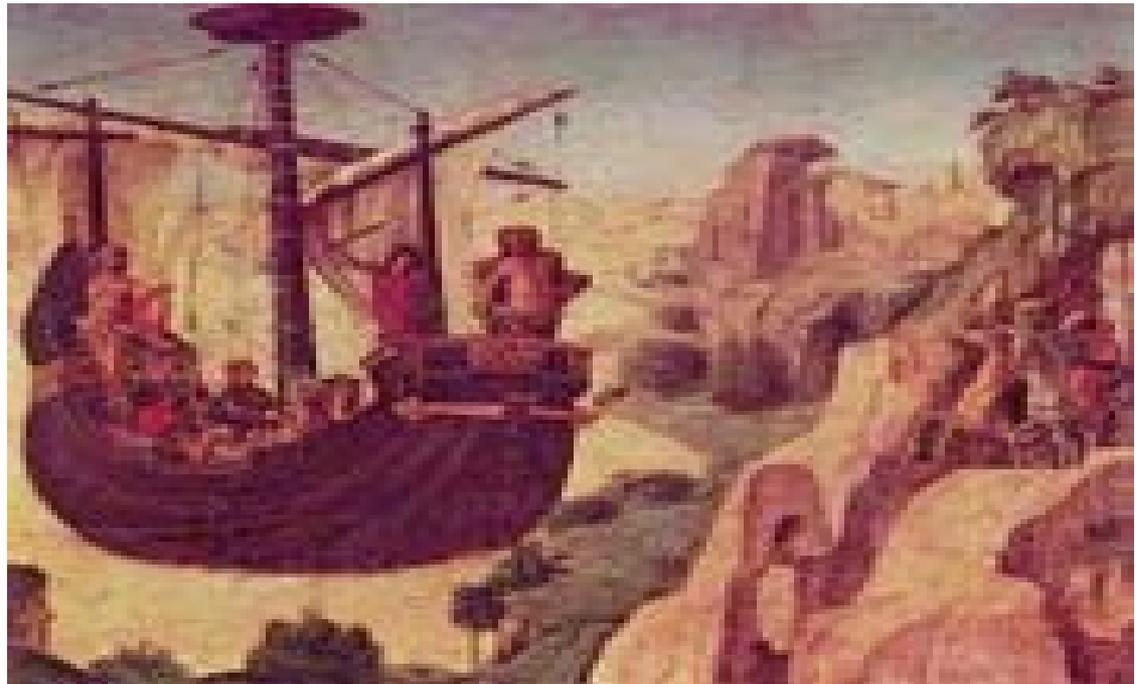
- Taiwan and Israel, peripheral in 1970s, became centers of entrepreneurship and innovation when “brain drain” was reversed 1980s and 1990s
- The rise of dynamic hubs of technology in China and India in past decade demonstrate the transformative impacts of brain circulation

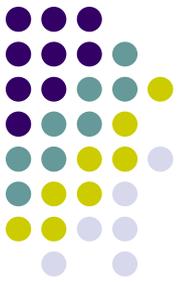
# The new Argonauts set sail

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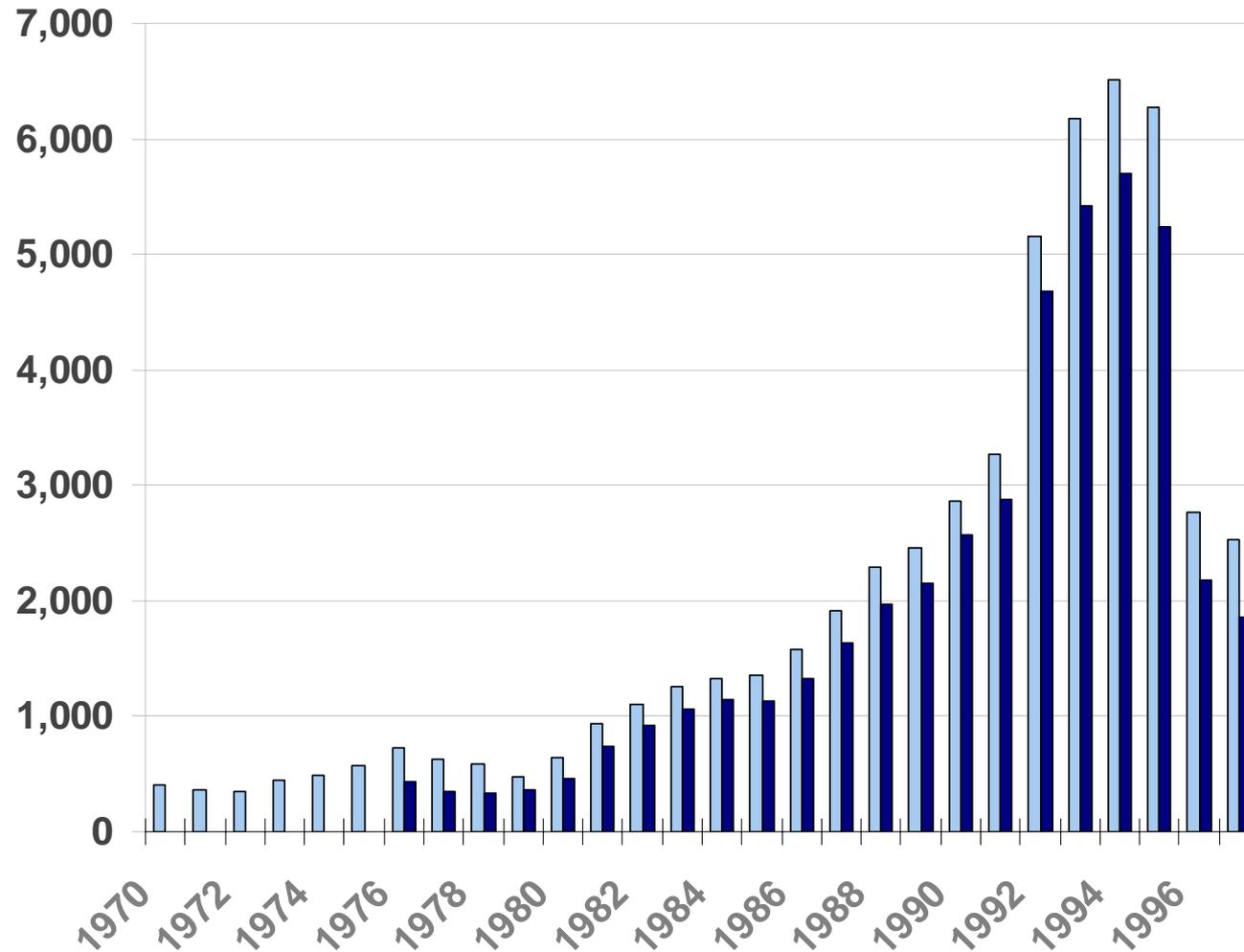


Silicon Valley's high skilled immigrants seek wealth and professional success in their home countries-- like Jason and the Argonauts of Greek mythology who faced hardship in search of the golden fleece



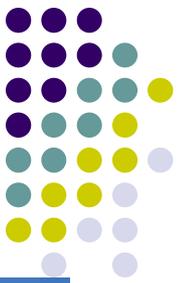


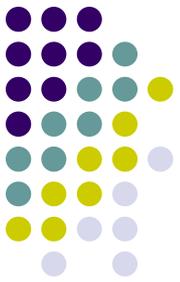
# Returnees to Taiwan, 1970-1997



# Hsinchu Science Park: Silicon Valley sibling

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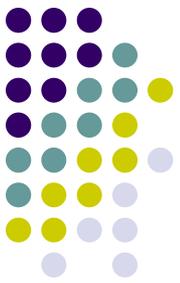
# Silicon partner: Taiwan's IC foundries:

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# Silicon Shanghai

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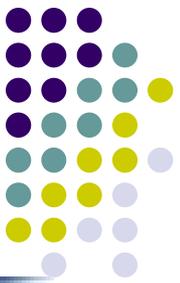


# Tel Aviv, Israel

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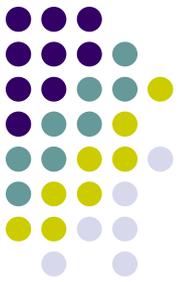


# Bangalore: a software services partner



# Innovation in the periphery

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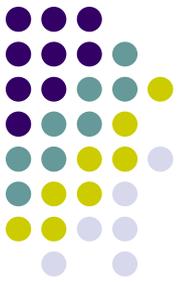


## The new Argonauts transfer global best practice-- support growth of new technology ecosystems

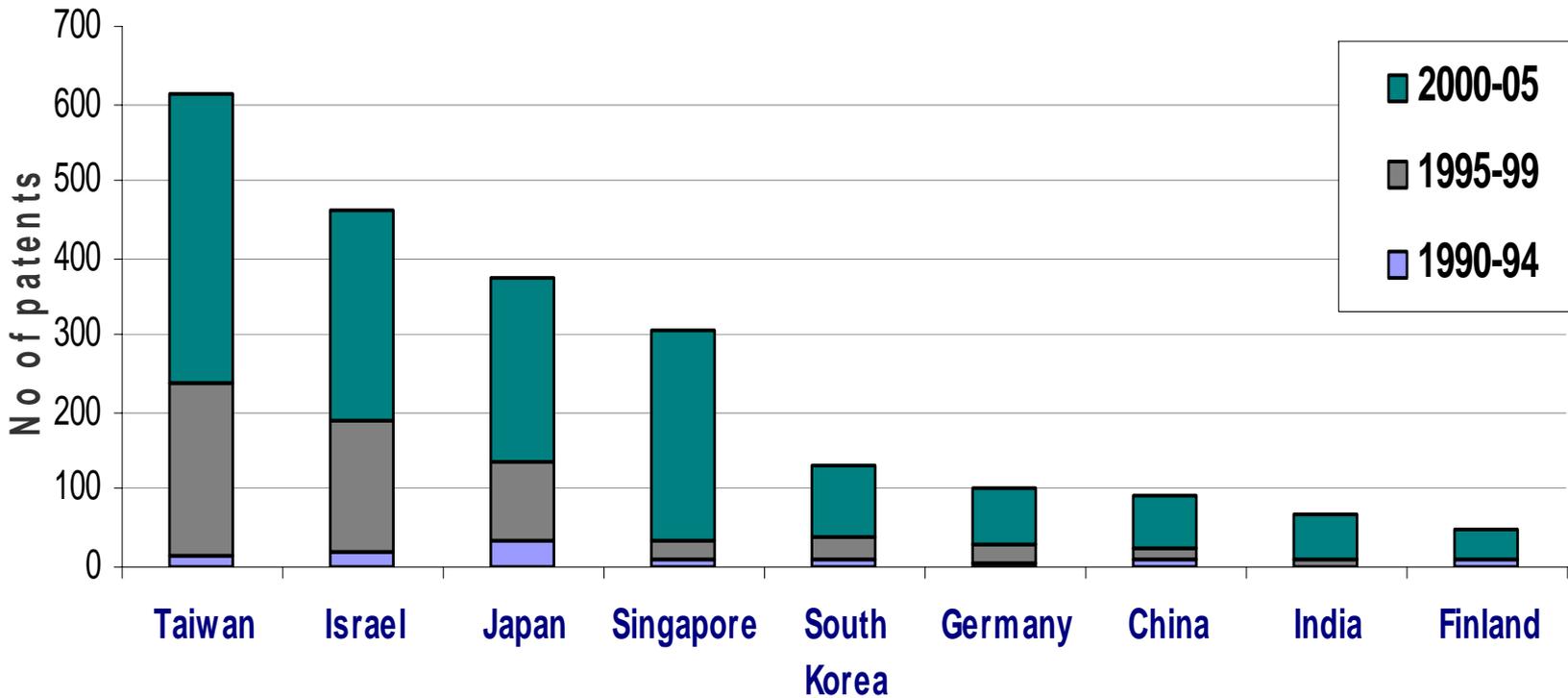
- Silicon Valley pioneers new product definition, architectures, leading edge technologies
- Taiwan specializes in global logistics and design
- Israel specializes in sophisticated security software and telecommunications
- Shanghai leads low cost, high quality manufacturing
- Bangalore leads low cost, high quality software and services

**Cross-regional collaborations deepen innovative capabilities of local ecosystems**

# Silicon Valley's foreign co-inventors



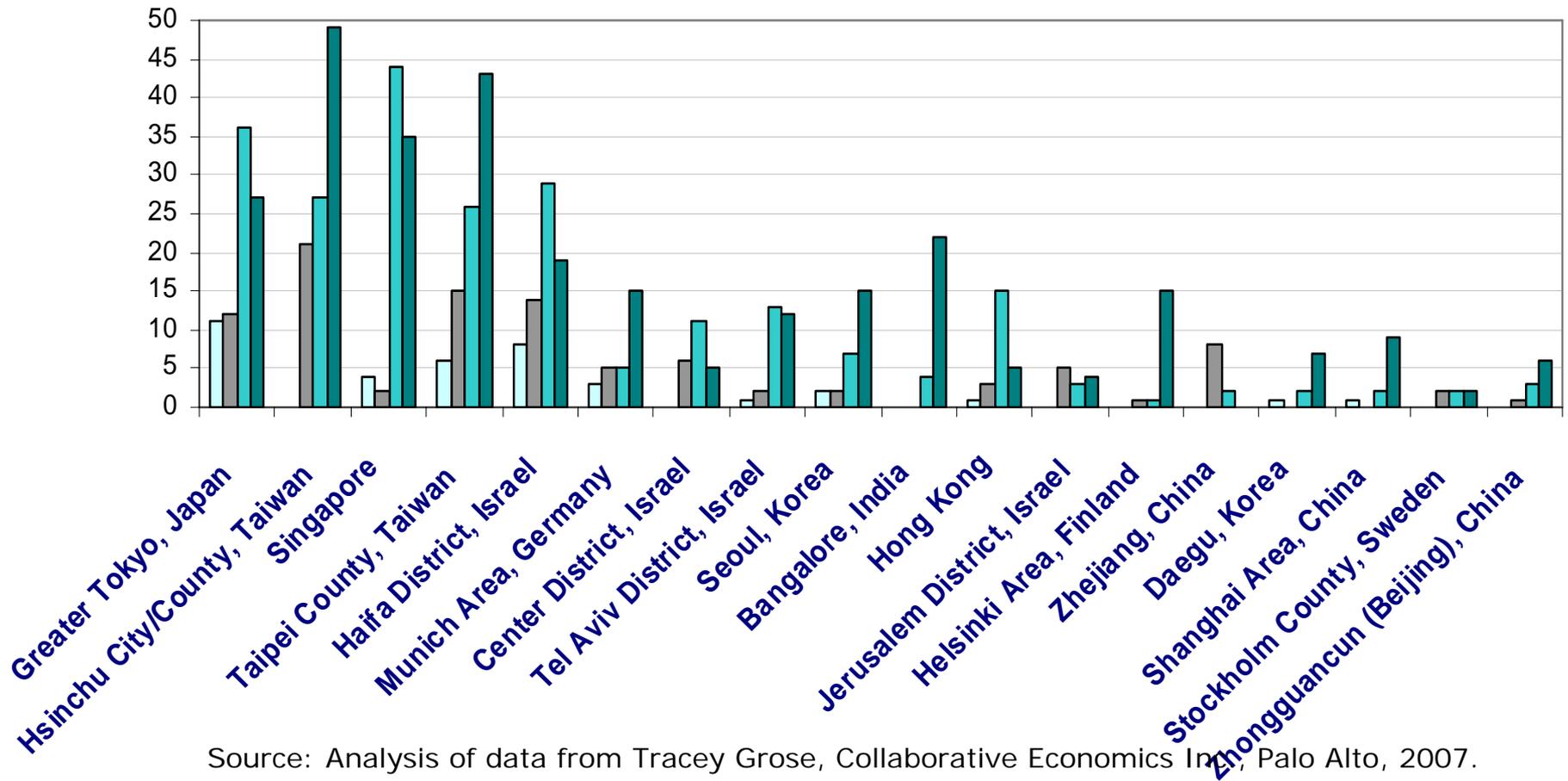
Foreign co-inventors listed on patents with Silicon Valley inventors



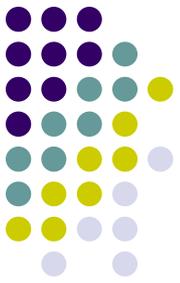


# Silicon Valley's global collaborations

Top regions for collaboration with inventors in Silicon Valley  
1993, 1997, 2001, 2005



Source: Analysis of data from Tracey Grose, Collaborative Economics Inc., Palo Alto, 2007.



# Rethinking the global economy

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## Not just global corporations

- *The New Argonauts*: Cross-border professional and technical communities transfer technical, market & business information rapidly between distant regions

## Not just the nation-state

- Sub-national clusters of skill and technology in peripheral regions, supported by aggressive local policymakers, pursue cross-regional collaboration, reciprocal upgrading

## Not low-cost labor

- Highly mobile scientists and engineers pioneer entrepreneurial experimentation and innovation that supports upgrading and rising wages in periphery

**Thank you!**

