# Local Innovation for a Global Economy

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## The puzzle: from Taiwan



# to Bangalore



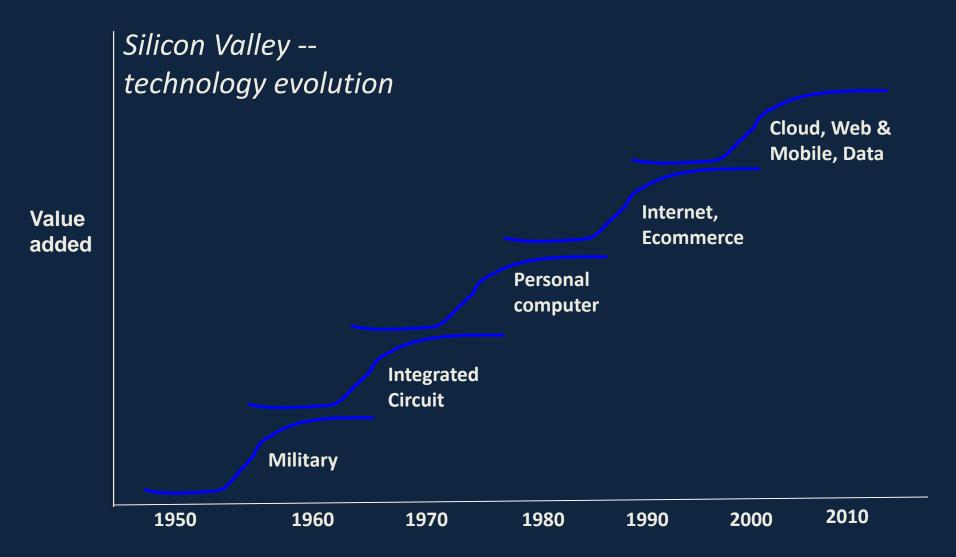
# Global value chains and innovation in the "periphery"



## Fragmentation and reintegration



#### Growth through innovative recombination



#### Innovation as recombination

Information technology creates a proliferation of potential solutions and new pathways

Unpredictability of innovation: multiple solutions with different strengths in different contexts

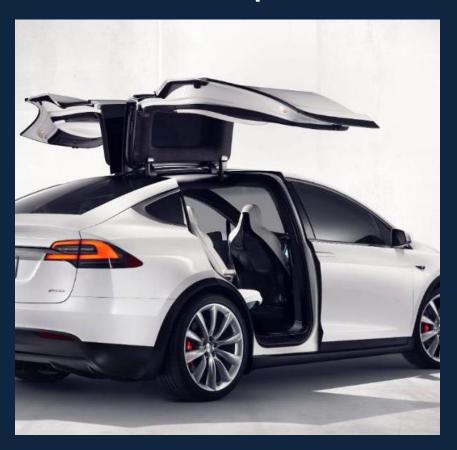
Boundaries between sectors becoming indistinct: key is the capacity to search effectively and recombine changing capacities rather than dominate a fixed subset of technology

## Is it a car . . . or a computer?

Is it a phone or a camera?



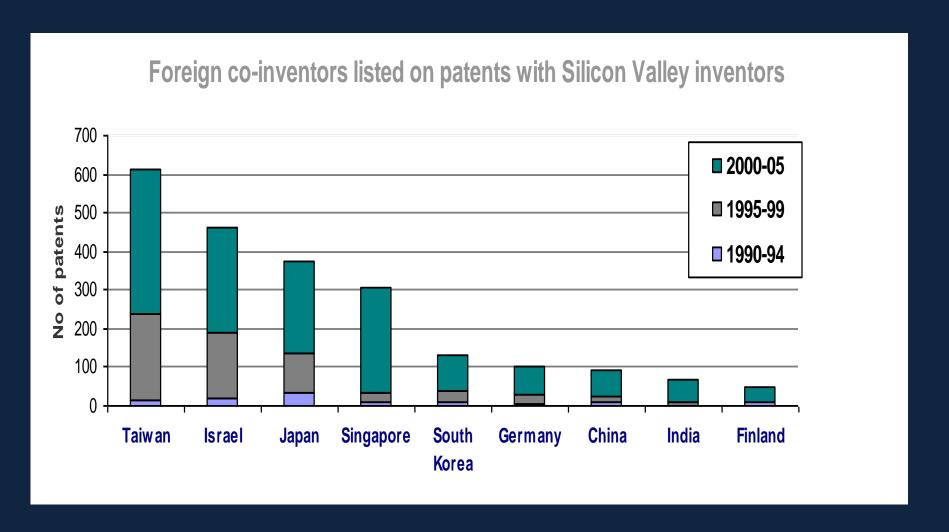
Is it a car or a computer?



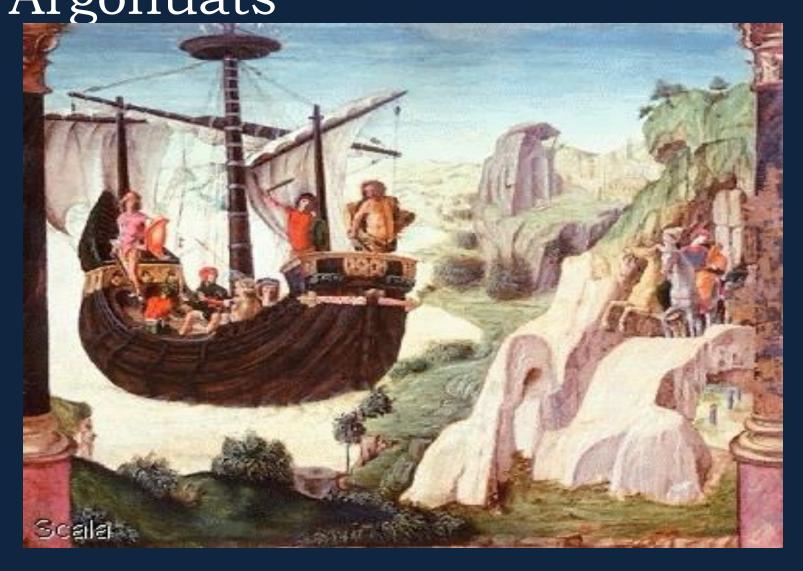
## Diasporas and development

- Standard view: Diaspora increases intellectual capital via scientific collaboration, knowledge flows, reduced reputational/informational barriers to trade.
- Alternative: Diasporas contribute importantly to design and construction of new institutions—like financial rules to support venture capital

#### Silicon Valley's foreign co-inventors



Search and the new Argonuats



## Brain circulation: Taiwan case

#### SNOWBALLING

- Policy adapts to more adv tech environment
- New business models to adapt to competition
- · Expand to China

#### **ENTREPRENEURSHIP**

- New firm fdn; new layer of mngrial talent
- · Xfer of ownership model
- Diversification of PC & IC industries
- Learning-by-doing and upgrading
- Expansion of x-regl collaboration

#### **INFLUX**

- Invest in expanding universities & training
- VC initiated, expertise xfer
- Stock market takes off
- End of martial law
- Recession in SV
- Massive reversal of brain drain

#### FOREIGN EDUCATION

- To US for grad degrees in eng & computer science
- Not necessarily elite schools - wherever will accept and fund

#### **BRAIN DRAIN**

- Stay in US in big R&D labs or electronics
- Move into Silicon Valley, big companies, job hop
- Hit glass ceiling, develop shared identities, associations
- Become entrepreneurs
- Initial successes become role models, self-reproducing

#### EXPATS BEGIN TO RETURN

- Policy advising for top govn't officials, influence policy
- . Govn't xfer of US semicon tech
- Early returnees start tech co's
- Early cloning and retailing
- · Early contracts from Chinese in SV

#### External search networks

- Embedded (social) networks: tacit knowledge
- Modular networks: explicit knowledge
- External (open) search networks: partial formalization via information pooling that supports collaboration and joint problem solving (e.g. quality standards)

#### Taiwan: from imitator to partner for SV



10,000 electronics-related firms

## iPhone 6: global supply chain



#### Top suppliers

CHINA 349 \*

USA 149

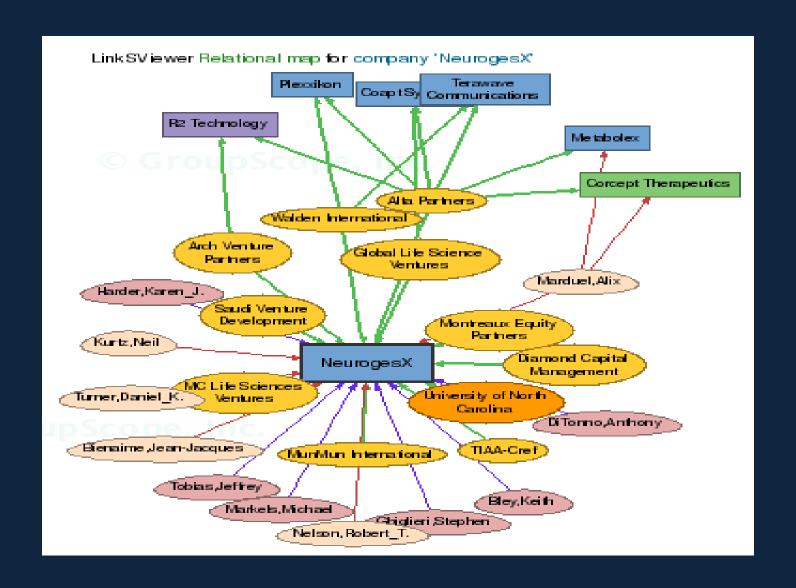
JAPAN 60

TAIWAN 42

KOREA 32

\* Over 50% Taiwanese

## Venture capital as search network



### Open (global) search networks



#### Taiwan: Diaspora & institutional reform

Diaspora collaborates with govt. to design institutions to support entrepreneurship and innovative search

- Venture capital is a powerful search network to identify and (re) combine parts of firms—financial, technical or marketing expertise, managerial talent, IP—to form ventures that in turn become nodes in networks for co-designing and building new products
- Public-private research labs (ITRI) for joint research, improvement of designs and/or processes, standard setting (SEMI: Flat Panel Displays, Photo Voltaics)

#### Taiwan: Diaspora, clusters and co-design

Entrepreneurship, vertical decomposition and clustering of IC & electronic system production: Deepening specialization and co-design of components, subsystems, and periodic re-integration

Diaspora instrumental in collaborative exploration and innovative recombination

1980-90s: Silicon Valley-Taiwan cross-regional collaboration, mutual upgrading

Post 2000s: Taiwan-China-Silicon Valley cross-cluster linkages

#### SV-Taiwan-China network





#### Beyond Diaspora

- Growing importance of external networks that firms and other actors rely on to locate collaborators to solve problem or provide solution
- Search networks as alternative to hierarchical decomposition of tasks as means of overcoming bounded rationality
- Information "pooling" across firms (in region, across supply chain) allows joint learning and adaptation

### Lessons: Don't try to replicate SV

The recipe still doesn't work . . .

#### Ingredients:

- Technology park
- University research
- Engineers
- Venture capital
- Incubator
- etc.



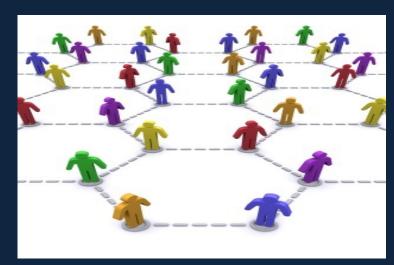
#### Lessons: Open organizational boundaries

- Connect to (not replicate) successful regions
- Search for collaborators
- Partner across boundaries: geographic, organizational, sector

#### Lesson: Differentiate and collaborate

- Define ad invest in dindtinct capacities
  Search for local and global partners
  Collaborate to
- Identify and compete in new markets
- Jointly solve problems and adapt

University-industry
Public-private
Across sector, domains



#### Lesson 2. Specialize and collaborate

- Define and invest in distinct capacities

  Open boundaries of firm, institutions

  Partner locally and globally to:
- Identify new markets "self discovery"
- Experiment and iterate to solve problems
- Monitor and adapt

# Thank you!