

# Research to Realization: Transferring Innovations to Industry

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**Premature to talk about specific  
ideas or process for technology  
transfer**



# Three Takeaways

Tech Innovations

Open Infrastructure

Entrepreneurship



Commercialization  
Growth/Prosperity

GENI



Tech Innovations &  
Open Infrastructure

***Tremendous entrepreneurship opportunities for startups and established companies to commercialize innovations***



# A Century of Innovations National Academy of Engineering

- Infrastructure innovations have transformative impact
  - Electrification
  - Water supply and distribution
  - Highways
  - Radio and television
  - Telephone
  - **Internet**



# Internet Tech Innovations

- Packet switching
- Internetworking architecture
- Routers, switches, security devices, routing systems
- Domain name system
- Client/server architectures and applications
- HTTP, browsers, servers
- Wireless and mobile networking
- Search engines, targeted advertisements
- P2P technologies and applications
- Optical transmission and WDM
- And many more



# The Technology IPO Yearbook

- Between 1980 and 1994
  - 581 technology (non-healthcare) companies went public and created \$238 billion in market cap
- Between 1984 and 2002
  - 1720 technology companies (non-healthcare) went public and created \$1.7 trillion in market cap

Source: The Technology IPO Yearbook: 9<sup>th</sup> Edition – 23 years of Tech Investing, Oct. 3, 2003, Morgan Stanley via Vinod Khosla's talk



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# GENI's Potential

- Focus on Future Internet infrastructure
- Emphasis on
  - Broad research agenda seeking bold ideas
  - Experimentation at scale with real applications
- Result
  - High quality and relevant innovations
  - High quality workforce

To shape the future networking industry



# How to Realize GENI Potential?

- Get appropriate communities engaged
  - Academic, industry, and user communities
  - Each community has an important role to play
  - Each community has a distinct role to play
- Get
  - best people to
  - contribute best ideas
  - in a disciplined execution setting  
with successive refinements
- GSC/GPO appropriately charged to accomplish this



# Why Should Industry Engage?

- GENI to significantly improve "quality of innovation" in networking & dist systems
  - Experimentally evaluated and demonstrated
  - At bigger scale than possible otherwise
  - Under realistic conditions
- Significantly improved "quality of innovation" would make it easier to commercialize them
- Thus participation by industry in GENI are likely to bring tremendous benefits to them



# What Industry Can Offer?

- Industry can share with research community
  - Technology and market trends
  - What matters in real world
  - Experience in creating systems & nation-wide facility
  - State of the art platforms and facilities
- Industry participation would make GENI much more effective in achieving its mission

**There is a tremendous opportunity for research and industry communities to collaborate**



# Opportunities for Participation

- Submit targeted proposals to programs
  - FIND, Cyber Trust, CSR, SING, ...
- Participate in research & education plan development
  - Whitepapers, workshops, comments initiate drafts
  - As outlined by GSC
- Participate in GENI definition
  - Design teams, town hall meetings, discussion lists
  - As outlined by GPO



# Opportunities for Participation

- Plan to build and use components of GENI
  - CRI and MRI programs
  - GENI development and prototyping projects
- Plan to use GENI
  - Propose and prototype exciting new architectures



# Internet Overhaul Possible?





# Internet Overhaul Possible?



**Internet ideas and technologies emerged during the decades when its predecessor infrastructures (telephone, television, radio) were growing rapidly**

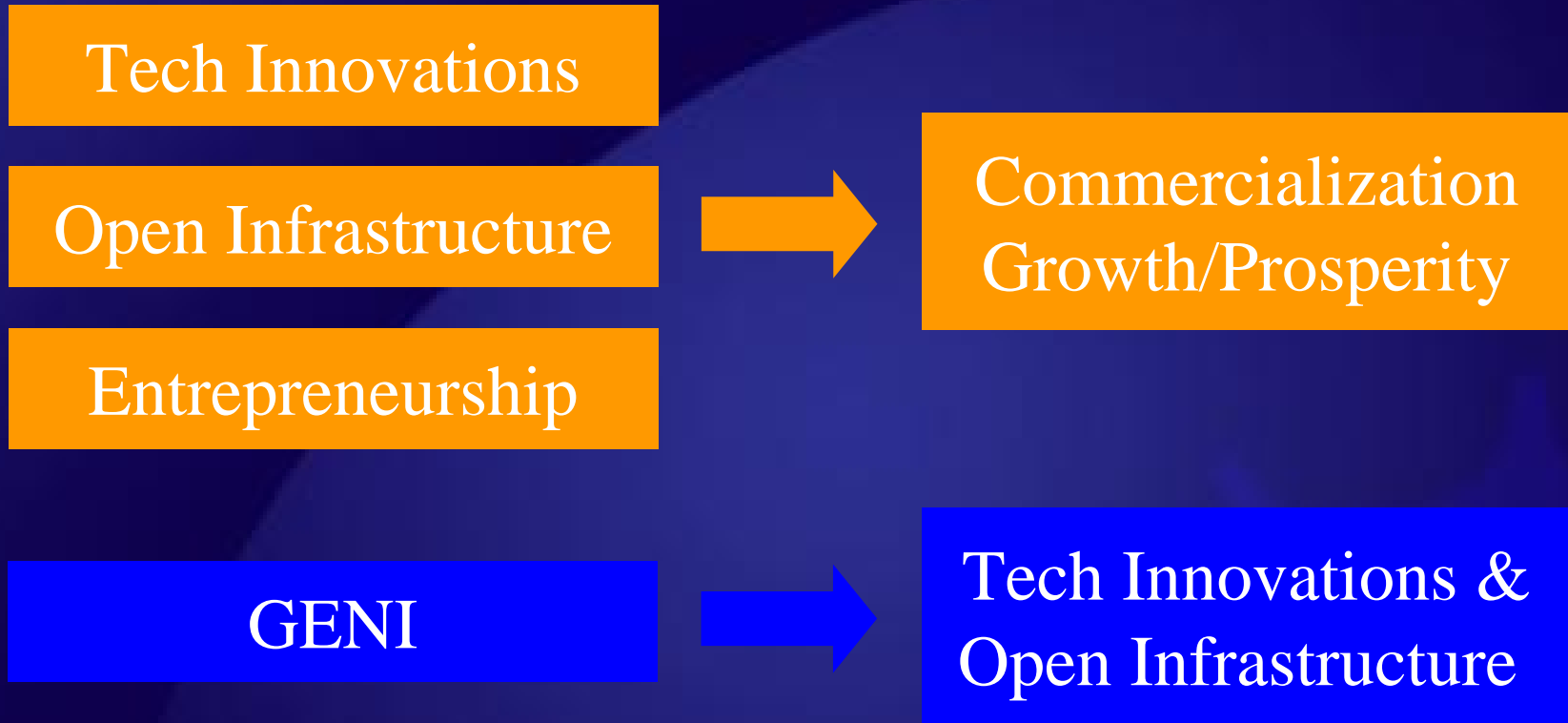


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  - Telephone
  - Internet
- **Every established infrastructure undergone overhaul a few times**
  - **Internet cannot and will not be an exception**



# Research to Realization Lessons from the Past



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# Success Scenarios

- **Internet evolution influenced by clean-slate approach**
- **Alternate Internet architecture emerges**
  - **Alternate architecture(s) coexist with the current Internet**
  - **Virtualization becomes the norm with plurality of architectures**
  - **Single architecture emerges and dominates**
- **New services and applications enabled**
- **Many other payoffs**
  - **Some unexpected**



# Jim Collins Model: Good to Great

