

# Innovation and Global Diffusion of Nanotechnology

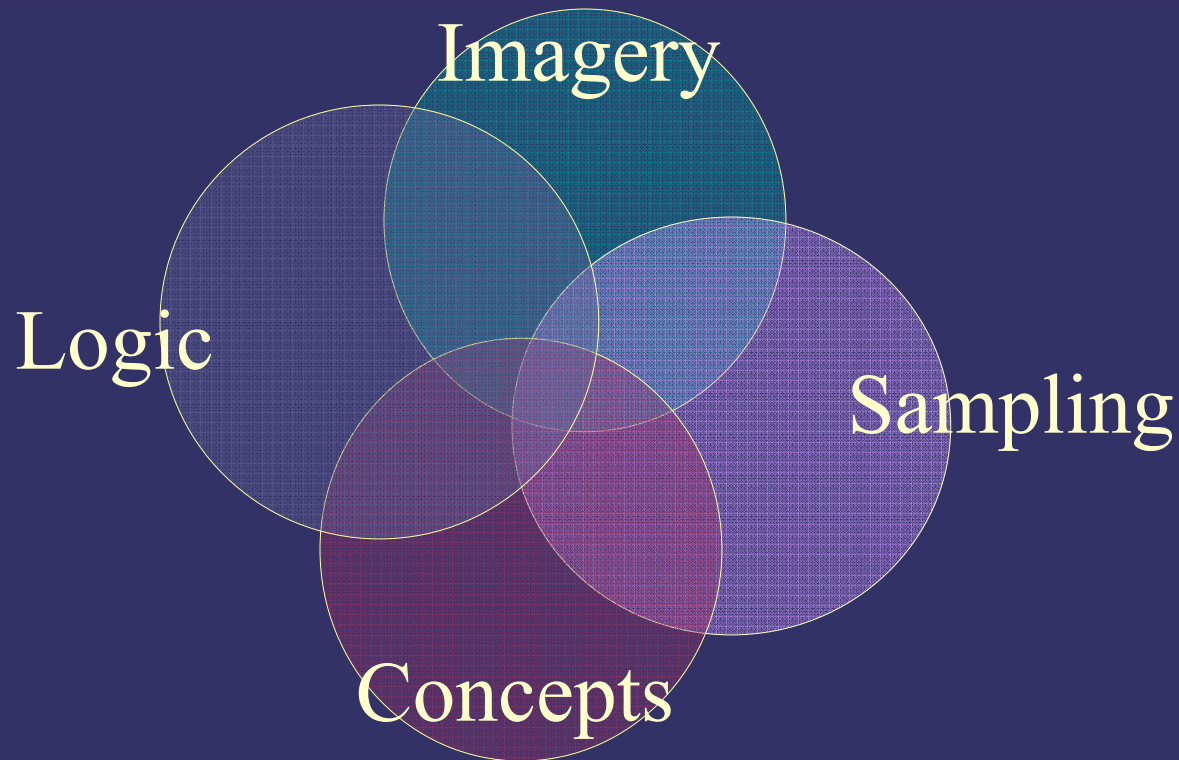
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# Research Outline

- Investigation of the possible economic implications of the global diffusion of nanotechnology with respect to China and the United States.
- Exploration of the socio- cultural variations and their influence on international collaborations between the aforementioned nations.

# Research Schematic

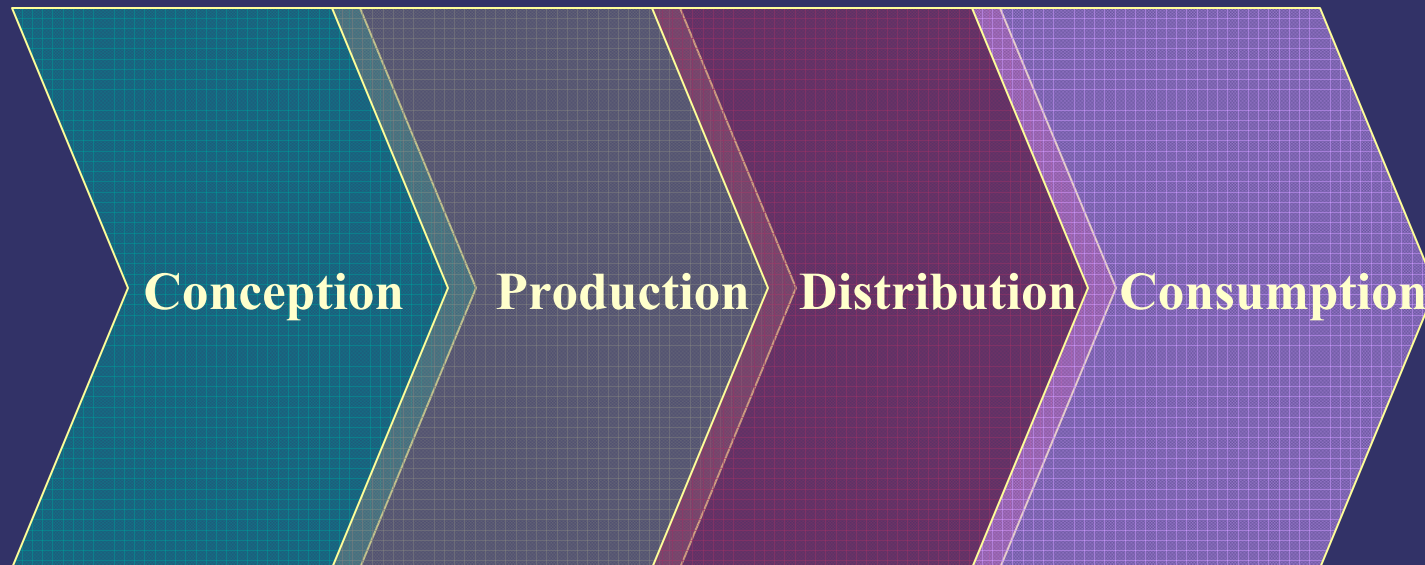


# Research Methodology

- An ethnographic approach, acknowledging the premier Chinese national nano-scientists and the establishments that support their research and training.
- In depth interviews with the leading forces behind nanotechnology in China.
- A comprehensive analysis of research literature pertaining to nanotechnology with respect to China.

# Commodity Chains

- The chain describes the full range of actors involved in the production and distribution of a particular good or service, and elucidating the kinds of relationships/collaborations that exist among the dynamics of global industries.
  - <http://www.globalvaluechains.org>



# Global Value Chain (GVC)

- Formed in September of 2000 as part of a Rockefeller Foundation sponsored initiative on Commodity Chains.
- The successor to Global Commodity Chains in that they both share policy orientation.
- Seeks to differentiate between markets and the hierarchy within the order of production

## Benefits of studying GVC

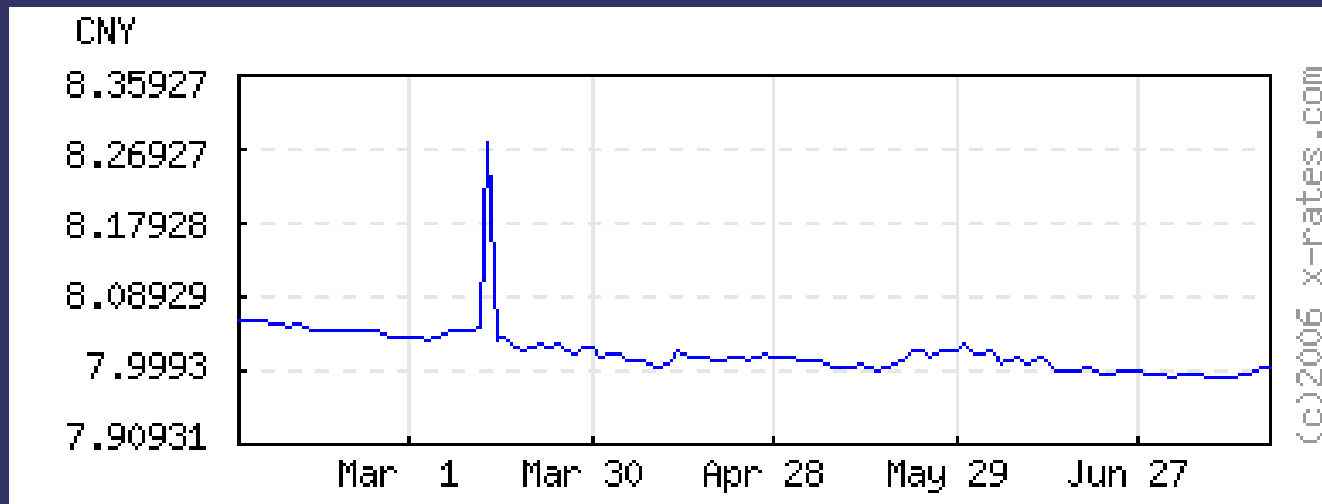
- Allows one to analyze a nation's developmental prospects. Assessing China's leap from imitation to creation
- Aids policy-makers in their attempt to maximize the possible benefits derived from participation in international trade and production networks

**Bair, Jennifer, Global Commodity Chains; A conceptual and disciplinary mapping. Department of Sociology. Yale University, 2005.**

# Expenditure

- Between 2000-2005 China spent ¥1.5 billion (> 200 million USD) on nanotechnology R&D

- \* 1USD ~ ¥8.2



["Chinese Yuan to USD." [x-rates](http://www.x-rates.com/d/CNY/USD/graph120.html). 19/07/06. Federal Reserve Bank of New York . 19 Jul 2006  
<<http://www.x-rates.com/d/CNY/USD/graph120.html>>. ]



# China as a hub for low-cost R&D

- The official national salary given to a tenured professor as set by the Ministry of Education (MOE) is a mere ¥4,000 Yuan per month (> 487 USD)

[Pallavi, Aiyar. "China hunts abroad for academic talent." Asia Times Feb 18, 2006 - Jul 27, 2006 <[http://www.atimes.com/atimes/China\\_Business/HB18Cb05.html](http://www.atimes.com/atimes/China_Business/HB18Cb05.html)>. ]

- Low wages permit around 50-60 Principal Investigators (PI) per research project

[Anonymous I, interview.]

# Scientific Papers

Table 1 Nanotech Papers by Chinese Authors, 1995-2004

Year	Papers	Citations	Citations/Paper
1995	244	1984	8.13
1996	336	3608	10.74
1997	487	4824	9.91
1998	624	6367	10.20
1999	932	10341	11.10
2000	1197	12675	10.59
2001	1732	13549	7.82
2002	2411	15384	6.38
2003	3498	13622	3.89
2004	4138	6048	1.46

Source: The Chinese nanotechnology publication dataset derived from Science Citation Index by the authors

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[Li, Lui. & Zhang, Jingjing. "Nanotechnology Research in China: Performance, Policy and Prospects." Prime workshop. Campus Universitaire, MSH Alpes, Maison Des Sciences de l'Homme. March 1<sup>st</sup> & March 3<sup>rd</sup> 2006.]

## Possible motives behind zealous publishing

- Post-doc positions in Europe and the US are vital in securing tenured avocation in academia.  
[Leung, R.. ""Cultural Bonds" in High Technology: Collaborations between Chinese Researchers in Nanotechnology." NSTI-Nanotech Vol. I (2006)]
- Immediate returns on prestigious publications may induce monetary rewards.  
[Anonymous I, interview.]

## Future endeavors

- An expansion of the geographic scope of our research to Taiwan, South Korea and possibly India.
- A network mapping of co-publication with Tim Lenoir from Duke University
- Inquiry into the *North Carolina in the Global Economy project*

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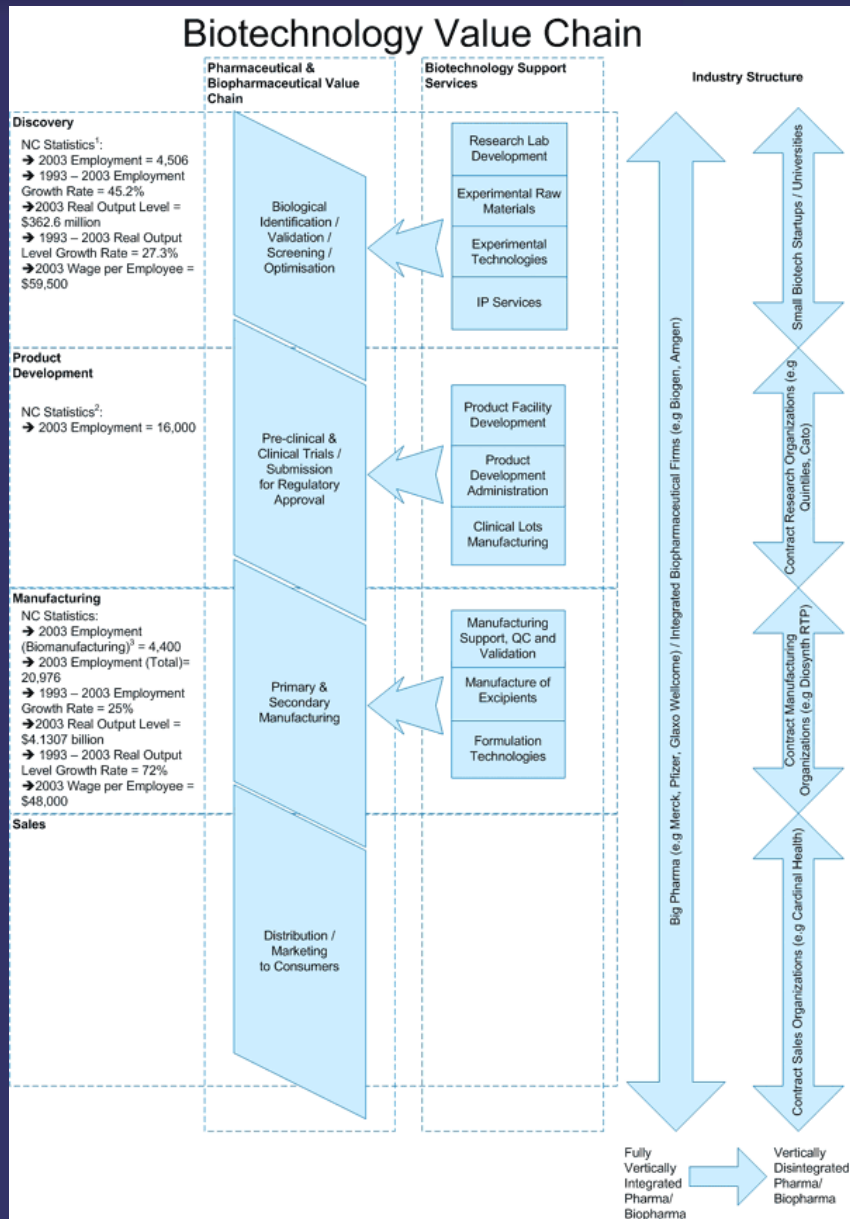
A very special thank you to Irene Wong

# Questions & Answers



# CNS-UCSB

Center for Nanotechnology in Society



## Evaluation of chain frameworks

- The complexity of transactions
- The codifiability of information
- The capabilities of suppliers

Department of Sociology, Duke University.  
 "Biotechnology Value Chain." North Carolina in the Global Economy  
 <[http://www.soc.duke.edu/NC\\_GlobalEconomy/biotechnol/ogy/value.php](http://www.soc.duke.edu/NC_GlobalEconomy/biotechnol/ogy/value.php)>.