



# **Production, Clouds, and the Transformation of the Global Economy**

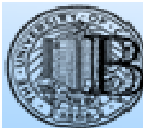
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Berkeley Roundtable on the International Economy

Regional Upward Spirals: Future Technologies, Skills, Jobs, and Quality of Life.  
IBM Aldemeda Research Center. San Jose, CA. September, 2011



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University of California, Berkeley

## Purpose Today

# Put Three Themes On the Table



## Three Themes: Future Technologies

- *Revisiting Manufacturing Matters*
- Clouds and Services
- Clouds and Energy



# Theme One: Manufacturing Matters

## The Original Argument Revisited

Manufacturing Matters: The Myth of the Post-Industrial Economy,  
S. Cohen and J. Zysman. 1987. (New York: Basic Books).



## The Original Argument

- Services and Manufacturing Intertwine
  - Linked
  - Counting: When is a service a Service
- Can you *control* what you cannot *produce*?



## Can you *Control* what you cannot *Produce*?

- The original issue in the era of US-Japan Competition
  - Semi Conductors and Sematech
  - Walkman through Autos
- Is there a current relevance



# Have the Changes In Production Altered the Crucial Question?

- **Decomposition:** controlling costs/accelerating innovation
  - Offshoring
  - Outsourcing
  - Wintelism and Open Innovation
  - Supply Chains and Supply Networks
- **Recomposition:** How do you put the pieces together



# Pattern of Decomposition Was not Inevitable

- Corporate Choices: Often mistaken or the result of limited capacities
- Policy Decisions: Trade policy facilitated corporate choices.



# Analysis Moves from Sectors to Phases of Production

- Silicon Valley: New Industry Innovation
- China: Rapid Scaling and product implementation



# **Manufacturing:**

## **The “New” Crucial Question**

### **Strategic Asset ?**

**or**

### **Vulnerable Commodity ?**

“Strategic Asset or Vulnerable Commodity? Manufacturing in a Digital Era.” BRIE Working Paper #147A (Berkeley: BRIE, May 2003) <http://brie.berkeley.edu/publications/WP147A.pdf>



# Manufacturing: The “New” Crucial Question

Strategic Asset **Facilitates *Control* ?**

or

Vulnerable Commodity ***Best to Buy?***



# Theme Two: Clouds and Services

Services with Everything: The ICT-Enabled Digital Transformation of Services.

Zysman, Feldman, Murray, Nielsen and Kushida. BRIE Working Paper #187A (BRIE: Berkeley, April 2010)

[http://brie.berkeley.edu/publications/WP\\_187a%20Services...%20revised%206.16.11.pdf](http://brie.berkeley.edu/publications/WP_187a%20Services...%20revised%206.16.11.pdf)

“Cloud Computing: Policy Challenges for a Globally Integrated Innovation Production and Market Platform,” Jonathan Murray and John Zysman. TPN Transatlantic Week. (Washington, D.C. July 2011)

[http://brie.berkeley.edu/publications/working\\_papers.html](http://brie.berkeley.edu/publications/working_papers.html) <http://www.springerlink.com/content/0102m443m6522v1u/fulltext.pdf>



## Theme Two: Part A

# Services with Everything: The Ict Enabled Transformation

Services with Everything: The ICT-Enabled Digital Transformation of Services.

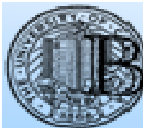
Zysman, Feldman, Murray, Nielsen and Kushida. BRIE Working Paper #187A (BRIE: Berkeley, April 2010)

[http://brie.berkeley.edu/publications/WP\\_187a%20Services...%20revised%206.16.11.pdf](http://brie.berkeley.edu/publications/WP_187a%20Services...%20revised%206.16.11.pdf)



# *The New Value Logic: The Services Transformation*

- The issue is not the service economy
  - What the numbers hide
  - The illusion and delusion of services
- The issue *is* **the algorithmic revolution**:
  - The algorithmic revolution: a services transformation driven by the application of rule-based information technology tools
  - The new importance of ICT
- Services are about the use and deployment of information



# Services with Everything: The (ICT Enabled) Services Transformation

- Services: Economic Black Hole To Productivity Driver
  - The Black hole: Limits to productivity in services?
  - The Baumol Dilemma and why it matters
- ICT enabled Services: Moore's Law or Baumol's Dilemma
  - Why Moore's Law resolves Baumol's dilemma.
  - Capacity to develop and deploy innovative (ICT enabled) services throughout the economy is central to growth
  - Critical source of value in global competition in the effort to escape price based commodity competition



# New Service-Based Business Models

- Decomposition = Commodification of products and processes
- A Central Challenge: Escaping “The Commodity Trap”:
  - Bold innovative strategy
  - What can make a unique offering.
- New Business Models throughout the economy
  - Transformation of existing offerings (Finance and Media)
  - Creation of new businesses (Google)
  - Blurring of the service/product line: Products morph into services
    - The automobile from product to transportation service
    - Design your own apparel
    - From Cranes to port services



## Strategies for Value in (ICT Enabled) Services:

- Automated services: +++
  - Finance and Communications Networks
  - Search
  - Social Networks
- Hybrid Services ++
  - Health systems
  - Integrated systems of people and machines
- Augmented human services +  
(+ = potential for productivity increase)



# Capturing Value in (ICT Enabled) Services

- Automating routine business processes and services means only temporary advantage
- Continuous Innovation remains central
  - Enduring Advantage is created by re-conception and re-configuration of services
  - Value captured by:
    - Strategy
    - The organization of the firm



# **Not Your Grandfather's Services:** *Production, Services, and Manufacturing*

## **ICT Services are PRODUCED**



# Not Your Grandfather's Services:

## *Production, Services, and Manufacturing*

ICT Services are Smart Systems that are:

- Built
- Capital intensive
- Latent capacity acts as inventory

The Story of the Cloud is a Story of Production



# Clouds: The Latest ICT Platform?

## Expands the Domain Of Ict Enabled Services

Services with Everything: The ICT-Enabled Digital Transformation of Services.

Zysman, Feldman, Murray, Nielsen and Kushida. BRIE Working Paper #187A (BRIE: Berkeley, April 2010)

[http://brie.berkeley.edu/publications/WP\\_187a%20Services...%20revised%206.16.11.pdf](http://brie.berkeley.edu/publications/WP_187a%20Services...%20revised%206.16.11.pdf)

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[http://brie.berkeley.edu/publications/working\\_papers.html](http://brie.berkeley.edu/publications/working_papers.html) <http://www.springerlink.com/content/0102m443m6522v1u/fulltext.pdf>



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The Cloud

# The Cloud Dilemma



# The Cloud Dilemma

## Users: Lowers Scale

- An enhanced dynamic utility making intensive computing more accessible



## The Cloud Dilemma

# Providers: Raises Scale



# The Cloud Dilemma

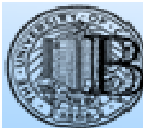
**USERS: Diffuses Innovation Potential**

**PROVIDERS: Scales and Production  
means Cloud currently controlled by  
Global Giants as an extension of their  
activities**



# The Cloud Dilemma

Traditional Tension Exacerbated  
Between Local and Global Objectives



## Theme Three:

# The Climate Debate Hides the Real Technological Issue

“From Religion to Reality: Energy Systems Transformation for Sustainable Prosperity,”

John Zysman and Mark Huberty. Prepared for Green Growth Leaders. (BRIE: Berkeley, June 2011). [http://greengrowthleaders.org/wp-content/uploads/2011/08/From-religion-to-reality\\_chapter-1.pdf](http://greengrowthleaders.org/wp-content/uploads/2011/08/From-religion-to-reality_chapter-1.pdf)



# Climate is About An Energy System Transformation: A Fundamental Transformation



# Why An Energy System Transformation? Climate and Beyond

- Emissions are Derivative of the Energy System
- Energy security
- The costs of importing energy
- Reconciling broader international objectives



# ***An Energy Systems Transformation***

**The Old: *Inefficient high-carbon***

**The New: *Efficient low-carbon***



# The Energy Systems Transformation

**The Old:** *Inefficient high-carbon*

**The New:** *Efficient low-carbon*

- More than optimizing the existing system?
  - Higher gas mileage
  - Longer lasting light bulbs



# The Energy Systems Transformation

**The Old:** *Inefficient high-carbon*

**The New:** *Efficient low-carbon*

- Optimize the existing system?  
OR...
- Create a new system
  - Smart efficient buildings
  - Renewables
- Establish a New Energy Trajectory



# Historical Guidance **Not the First Energy Shift**

- Wood to Coal\*
- Coal to Oil
- Adopting Electricity

\*"The Next Last Energy Transition: Energy policy and technological innovation across three centuries", Mark Huberty, CITRIS-BRIE Working Paper, (BRIE: Berkeley, September 2009).



# Summary

- Manufacturing Matters:
  - Can you control what you cannot produce?
  - Strategic Asset or Vulnerable Commodity?
- (Ict Enabled) Services with Everything
  - (Ict Enabled) Services are produced raising similar issues as manufacturing
  - The Cloud diffuses Ict based innovation but creates provider user dilemmas for policy and strategy
- Energy is not just about Emissions: There is a basic transformation afoot



## Three Themes

- ***Manufacturing Matters Revisited:***
- **Clouds and Services**
  - **ICT Enabled Transformation of Services**
  - The expanded domain of ICT Enabled Services
- **Clouds: An Energy System Transformation**