Regional Upward Spirals: The Co-Evolution of Future Technologies, Skills, Jobs, Quality of Life
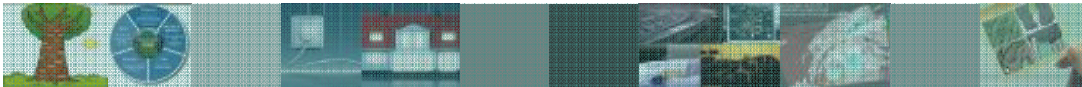
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Dr. James ("Jim") C. Spohrer, spohrer@us.ibm.com
Innovation Champion and Director IBM UPward
(University Programs worldwide, accelerating regional development)
IBM Almaden Event
Tuesday September 27, 2011

IBMers Value

Dedication to every client's success.
Innovation that matters—for our company and for the world.
Trust and personal responsibility in all relationships.

IBM has 426,000 employees worldwide

21% of IBM's revenue in growth market countries; growing at 13% in late 2010

2010 Financials
- *Revenue - $ 99.9B*
- *Net Income - $ 14.8B*
- *EPS - $ 11.52*
- *Net Cash - $11.7B*

More than 40% of IBM's workforce conducts business away from an office

IBM operates in 170 count around the globe

Number 1 in patent generation for 18 consecutive years ; 5,896 US patents awarded in 2010

The Smartest Machine On Earth

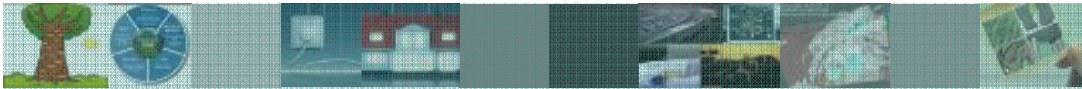**100 Years of Business & Innovation**

9 time winner of the President's National Medal of Technology & Innovation - latest award for Blue Gene Supercomputer

5 Nobel Laureates

"Let's Build a Smarter Planet"

world community grid.
technology solving problems
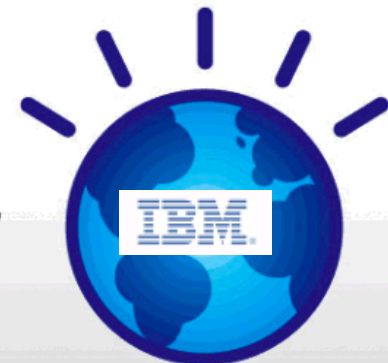
What We Do: The "6 R's" (not to be confused with 3 R's)

1. Research

Research awards focus on grand challenge problems and big bets

https://www.ibm.com/developerworks/university/research

2. Readiness

Access to IBM tools, methods, and course materials to develop skills

https://www.ibm.com/developerworks/university/academicinitiative

3. Recruiting

Internships and full-time positions working to build a smarter planet

http://www.ibm.com/jobs

4. Revenue

Improve performance, the university as a complex enterprise (city within city)

http://www.ibm.com/services/us/gbs/bus/html/bcs_education.html

5. Responsibility

Community service provides access to IBMers expertise/resources

http://www.ibm.com/ibm/ibmgives/

6. Regions

Regional innovation ecosystems – incubators, entrepreneurship, jobs

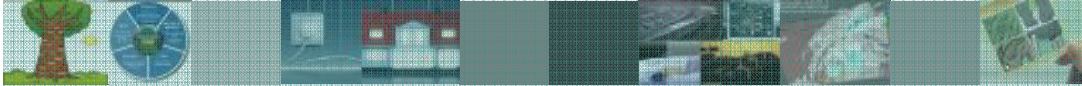http://www.ibm.com/ibm/governmentalprograms/innovissue.html

Understand the emerging innovation landscape

Enabling university and industry research

Agenda

- **1. Historical Patterns: Technology & Regional Economic Cycles (8:30)**
  - Fleming (IBM), Laboissiere (McKinsey), Qayoumi (SJSU), LeBlanc (SNHU), King (IBM)
  - 10:00 Morning Break & Refreshments
- **2. Future Technologies & Societal Infrastructure (11:00am)**
  - (Including Urban Innovation, Sustainability, and Resilience)
  - Zysman (Berkeley), O'Connor (Autodesk), Jeffery (IFTF), Narayan (IBM), Asakawa (IBM)
  - 12:30 Lunch
- **3. Future Skills & Jobs (1:30pm)**
  - Wladalsky-Berger(IBM),Chui (McKinsey),Gorbis(IFTF),Richey(Boeing),Gardner (MSU), Dunagan(IBM),
  - 3:00 Afternoon Break & Refreshments
- **4. Future Career Paths & Quality-of-Life Measures (3:30)**
  - Milbergs(WEDC), Gorham(IEEE), Kambhatla(IBM), Klein-Collins(CAEL), Shah(IBM), Griffith(SCU)
  - 5:00 Next steps & Closing

Frameworks, Theories, and Models that connect…

- **The 4 I's**
  - Infrastructure
  - Individuals
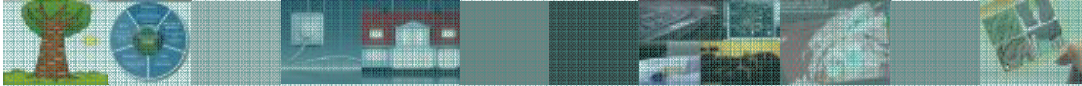 - Institutions
  - Information
- **Remember**
  - Questions
  - Connections
  - Book
  - Speed!

Cultural Information (Quality-of-Life Measures)

**Individuals (Skills)**

Institutions (Jobs)
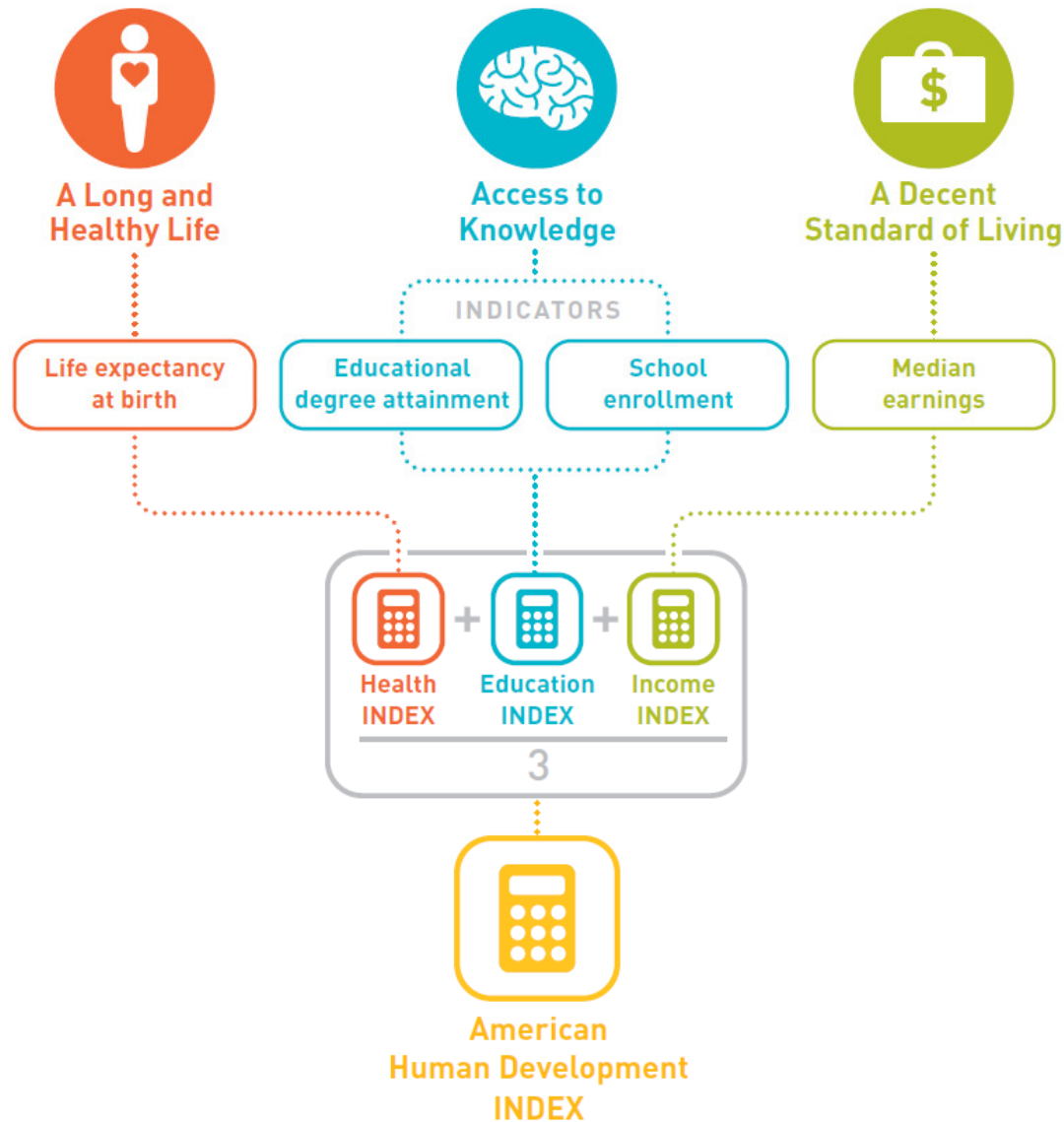
Societal Infrastructure (Technologies & Environment)

NPR: Out of Economic Chaos, A New Order May Be Rising

- **HAWLEY: The grand total of U.S. automotive fatalities from 1975 to the present, about one and a half million people. Now, the grand total of U.S. fatalities from 1775 to the present in every military conflict we've had is 1.3 million. So in other words, in the last roughly 35 years we've killed more people with cars than we have in more than 300 years of warfare.**
- **I think if you step back and look at cars from a sort of 35,000 foot level, you've got to wonder why we're doing this to ourselves. And there's a tremendous amount of industry and employment built up around it. But suppose it all changed.**
- **One way it could change is if human weren't allowed to drive cars anymore. Or let me put it differently. If cars were much more appealing because they drove themselves and did it safely.**
- **And this isn't just Jetson stuff. There's a brilliant computer scientist, artificial intelligence researcher at Stanford, named Sebastian Thrun. He's invented a car that drives itself. You can hop in the car and you never touch the wheel or the pedals. It navigates through all the traffic snarls. It won't run over little old ladies in Pasadena. It won't even run over a squirrel.**
- **If you could eliminate the seven million accidents per year, the 2.9 million injuries, the 40,000 fatalities, that would be enormous boon. But if you think about what would happen in the short term. Let's suppose in the next five or ten years this idea comes to fruition.**
- **Think about all the disruption that could cause. You might not have to own a car. Well, that might be good. You'd have a garage that you could use to start up a company instead of storing a couple of rusting hulks of metal in it. You'd never have to call Tom and Ray Magliozzi again, because you wouldn't have to fix your car.**
- **There wouldn't be a parking problem, because you'd push a little button on your iPhone, a smart car would zip up, pick you up, drop you off where you need to go. That means no more valets, no more taxi drivers, no more meter maids, no more traffic cops. You'd never hear a car horn, because why would a robot car honk at another robot car. Makes no sense.**
- **But that's an example of the sort of change that in the short term can cause immense of amounts of anxiety and upheaval.**
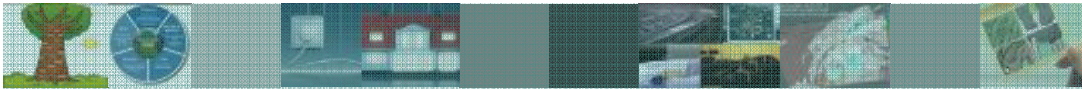
http://www.npr.org/2011/09/24/140766796/out-of-economic-chaos-a-new-order-may-be-rising
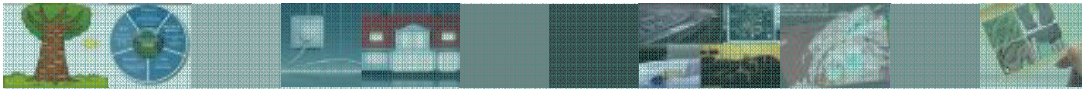
# California Human Development Report 2011

http://www.measureofamerica.org/docs/APortraitOfCA.pdf

Thanks for visiting IBM Almaden Research Center, San Jose, CA
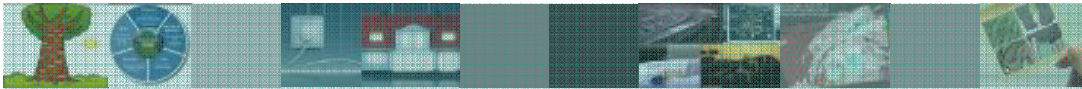
- **Upcoming Conferences**
  - Sept 27th, 2011
    - Future Technologies, Skills & Jobs
  - July 2012
    - ISSS & SRII San Jose
    - HSSE San Francisco

- **More Information**
  - Blog
    - www.service-science.info
  - Twitter
    - @JimSpohrer
  - Presentations
    - www.slideshare.net/spohrer
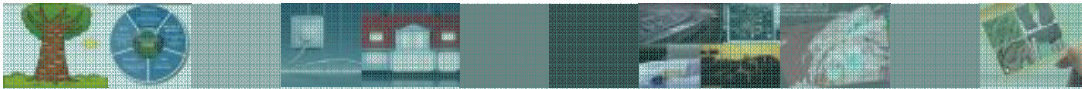 - Email
    - spohrer@us.ibm.com
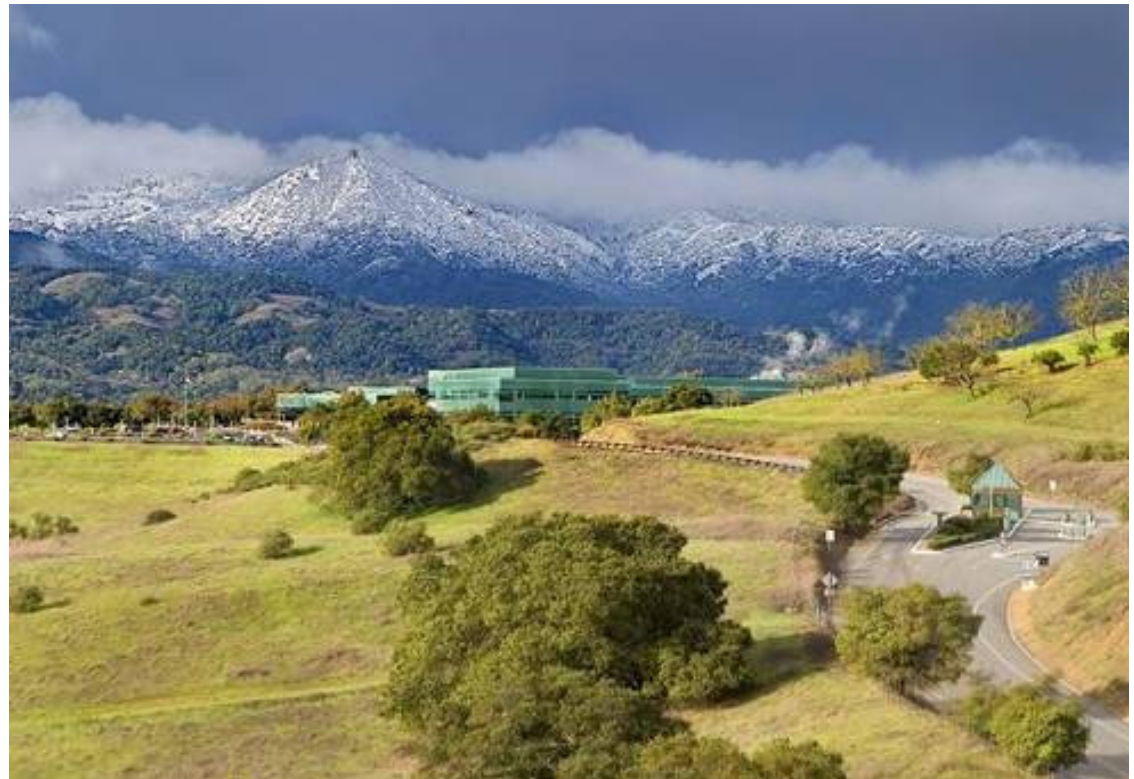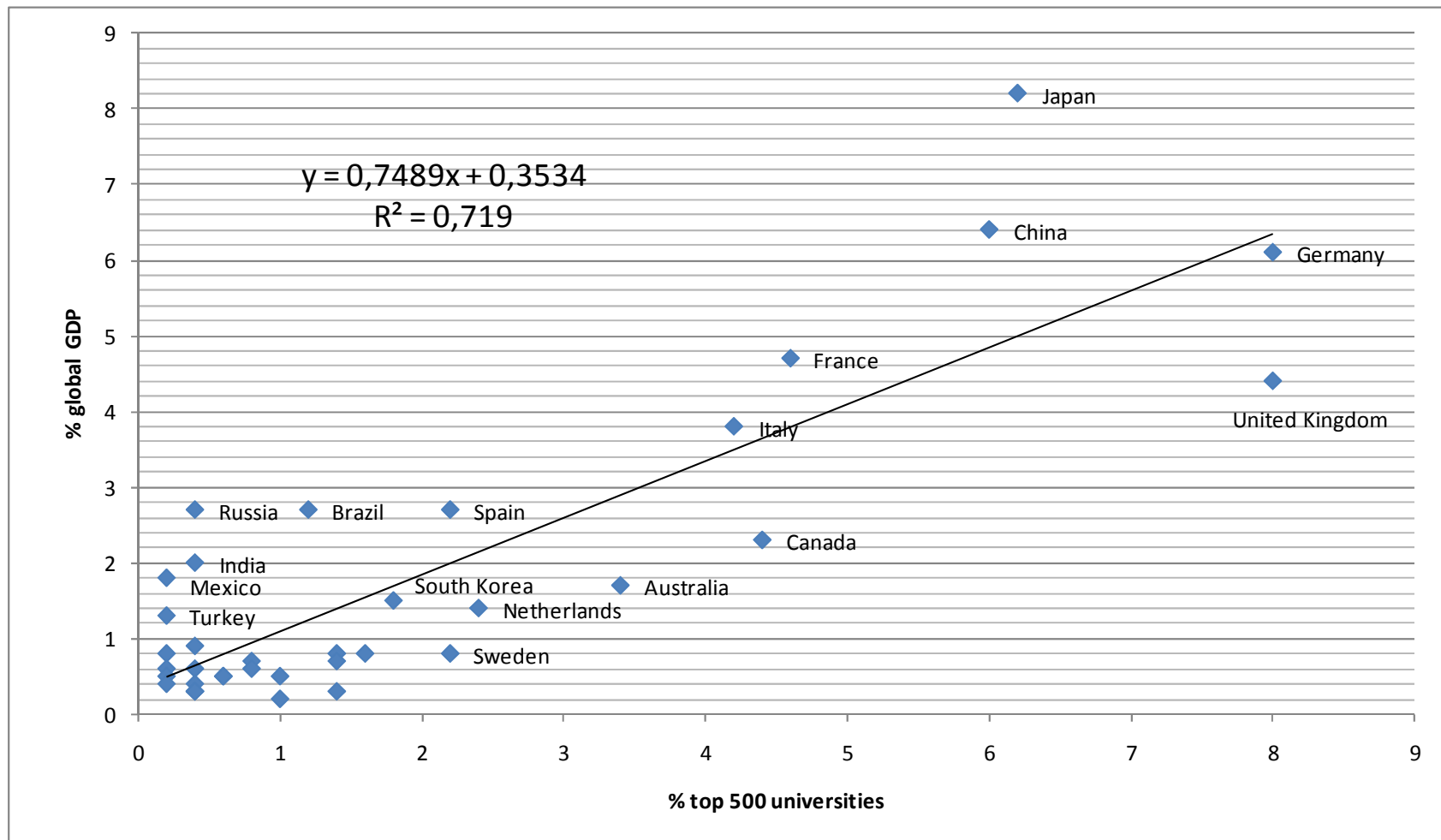
A Framework for Global Civil Society

- **Daniel Patrick Moynihan said nearly 50 years ago: "If you want to build a world class city, build a great university and wait 200 years." His insight is true today – except yesterday's 200 years has become twenty. More than ever, universities will generate and sustain the world's idea capitals and, as vital creators, incubators, connectors, and channels of thought and understanding, they will provide a framework for global civil society.**
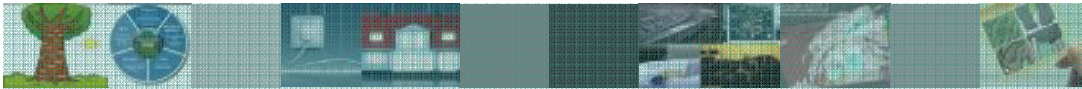 - John Sexton, President NYU

$$y = 0,7489x + 0,3534$$
$$R^2 = 0,719$$

Data points labeled: Japan, China, Germany, France, Italy, United Kingdom, Russia, Brazil, Spain, Canada, India, Mexico, South Korea, Australia, Turkey, Netherlands, Sweden

Y-axis: % global GDP

X-axis: % top 500 universities

Strong Correlation (2009 Data): National GDP and University Rankings
http://www.upload-it.fr/files/1513639149/graph.html

Our 21ˢᵗ Century World:
Nested, Networked Holistic Service Systems

http://www.service-science.info/archives/1056

- Holistic Service Systems provide access to "Whole Service" to people inside, including Transportation, Water, Food, Energy, Communications, Buildings, Retail, Finance, Health, Education, Governance, etc.

- Examples: Nations, States, Cities, Universities, Hotels, Hospitals, Homes

- Definition: An holistic service system is a service system that can provide "whole service" to its primary population of people, independent of all external service systems, for an extended period of time, balancing independence with interdependence (outsourcing limits, re-cycle to sustain, etc.)

- University-Based Entrepreneurial Ecosystems (U-BEE's): Universities are usually in the "top five" job creators of regions, when they have associated incubators & science-technology parks, super-computing data centers, hospitals, cultural & conference hotels, K-12 schools, etc.
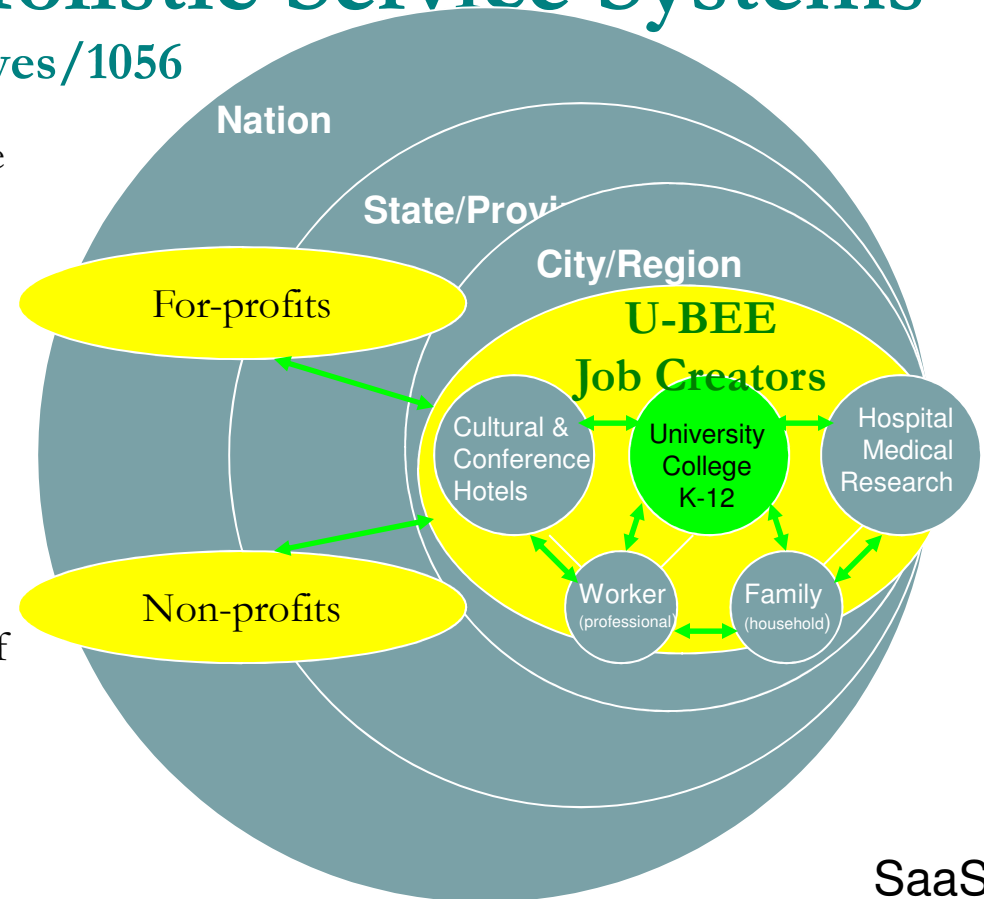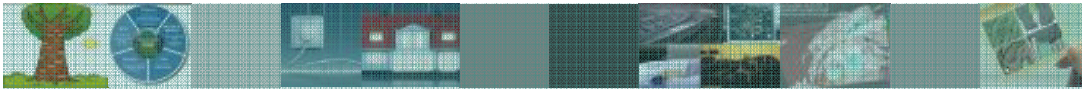

~25-50% of start-ups are new IT-enabled service offerings

SaaS
PaaS
IaaS

http://www.thesrii.org

Service Research and Innovation Institute

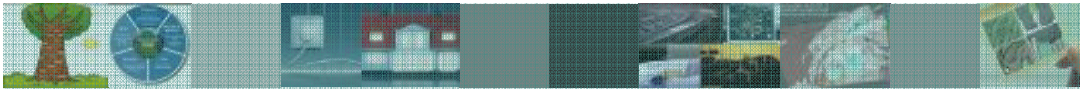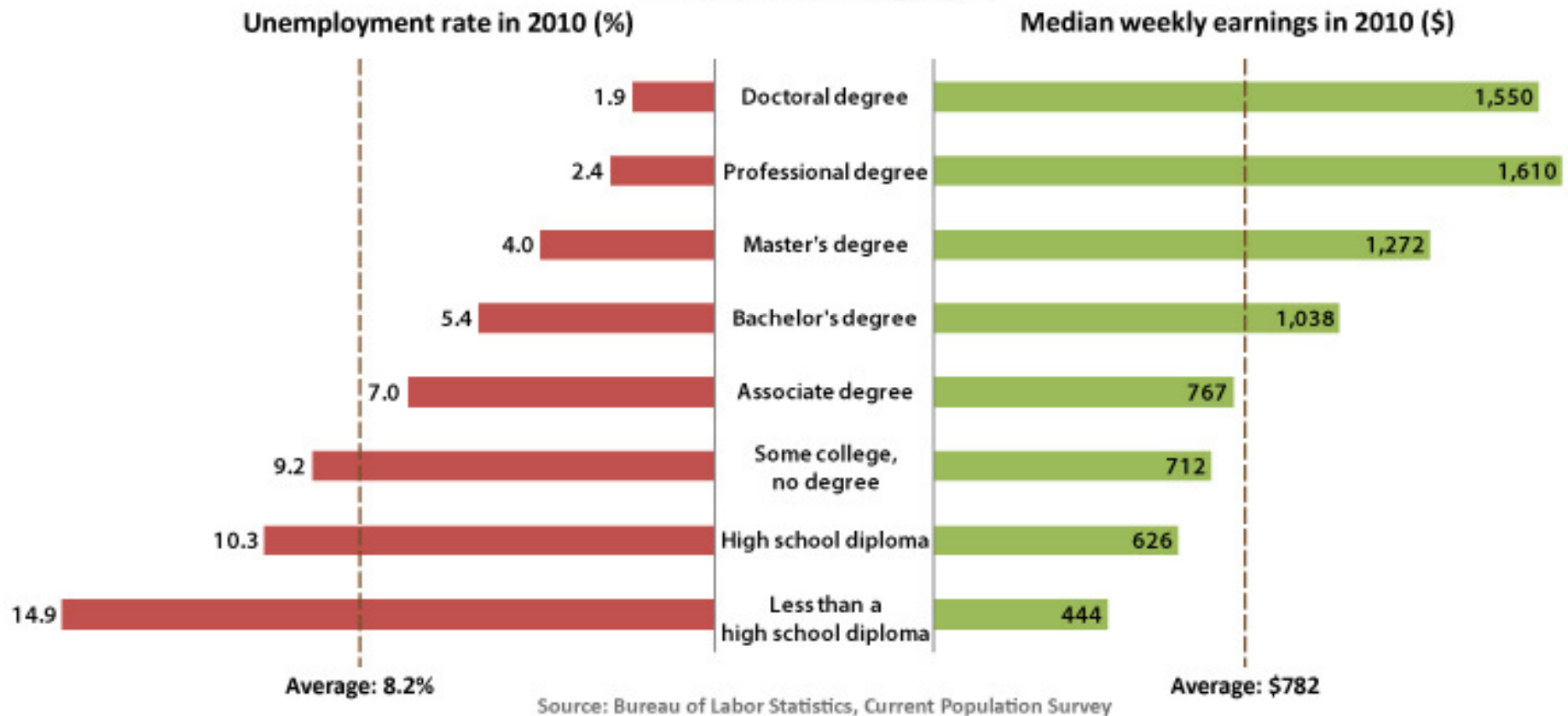# Universities Worldwide Accelerating Regional Development

"When we combined the impact of Harvard's direct spending on payroll, purchasing and construction – the indirect impact of University spending – and the direct and indirect impact of off-campus spending by Harvard students – we can estimate that Harvard directly and indirectly accounted for nearly $4.8 billion in economic activity in the Boston area in fiscal year 2008, and more than 44,000 jobs."
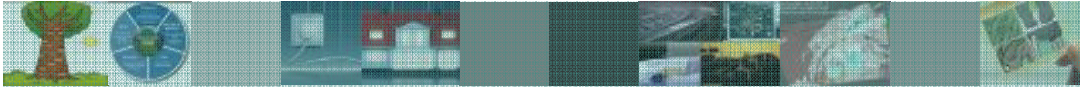
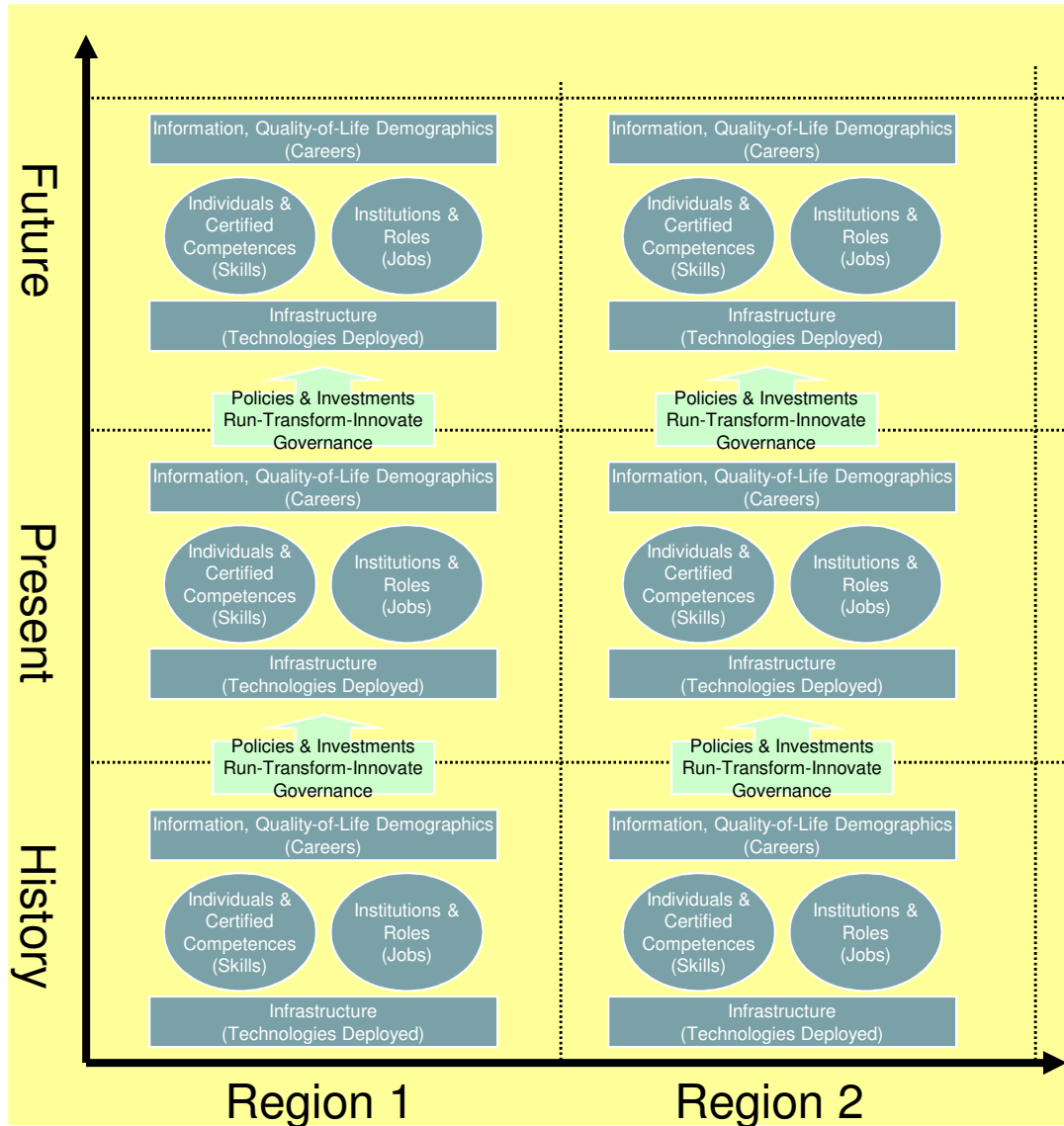# What are the benefits of more education? Of higher skills?

Education pays:

Unemployment rate in 2010 (%)		Median weekly earnings in 2010 ($)
1.9	Doctoral degree	1,550
2.4	Professional degree	1,610
4.0	Master's degree	1,272
5.4	Bachelor's degree	1,038
7.0	Associate degree	767
9.2	Some college, no degree	712
10.3	High school diploma	626
14.9	Less than a high school diploma	444
Average: 8.2%		Average: $782

Source: Bureau of Labor Statistics, Current Population Survey

…But it can be costly, American student loan debt is over $900M

Overview: Elements of Interest

Frameworks Theories Models

IBM UPward (University Programs worldwide – accelerating regional development)