



Coevolution Symposium

# Symposium on the Coevolution of Technology-Business Innovations

History, Definitions, Projections  
Disruptions, Advances, Challenges



September 24-25, 2003 | Contact Jim Spohrer / Almaden / IBM and Douglas McDavid / Boulder / IBM



# Welcome

- **Why this symposium? Why now?**

  - After a decade of rapid change, half of IBM employees are now in services

    - Working with clients (industry by industry) to enable on demand e-business

  - IBM Research is aligning more and more with IBM Global Services (IGS)

    - Working directly with clients on complex technology and business challenges

    - Desire to expand academic collaborations on business, social, organizational side

- **What is coevolution?**

  - Two or more systems evolve in concert to the point they cannot survive separately

  - Businesses advances depend on technology (e.g., reputation system for e-Bay)

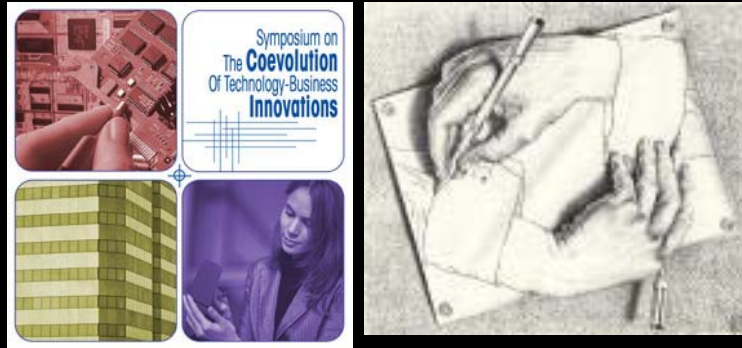
  - Technology advances depend on business drivers (e.g., Moore's law needs investment)

- **What can we do together?**

  - Identify key trends in coevolution of technology-business innovations

  - Identify key scientific questions that have the potential for significant business impact

  - Use business data and experience to guide improved theory development

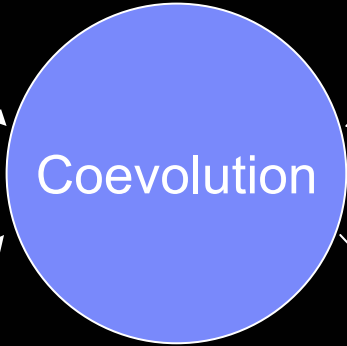


**History of Technology**

**Technology Projections**

**History of Business**

**Business Projections**



**Definitions**

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**Disruptions**

**Advancements**

**Challenges**

Session 1

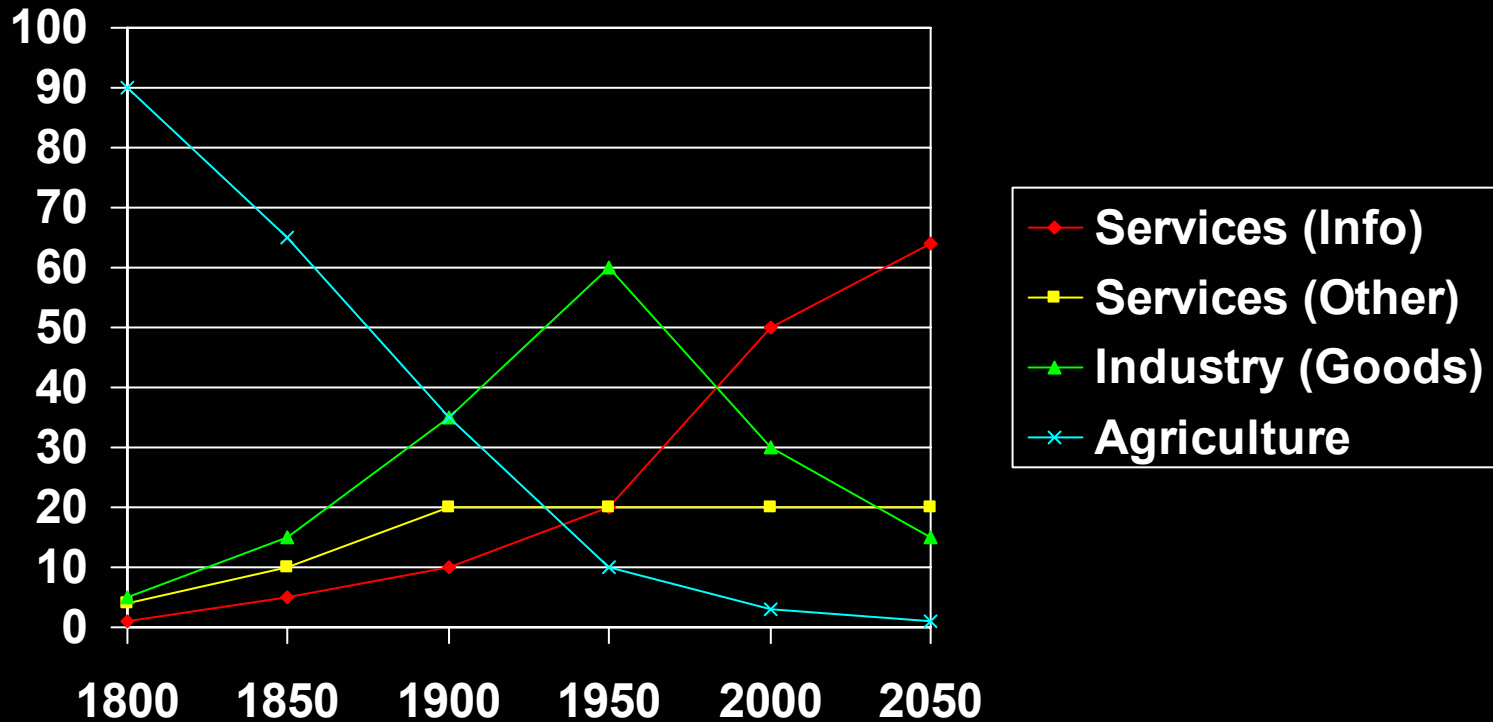
Session 2

Session 3



**Keynote:**  
On Demand e-Business

# U.S. Employment Percentages by Sector



Estimations based on Porat, M. (1977) Info Economy: Definitions and Measurement, Augmented with recent data and projections from <http://www.bls.gov/>



# Session 1: Major Technology Disruptions

Moderator: Hal Varian

- 8:45 Innovations, Components, Complements (Hal Varian)
- 9:10 Disruptive Adoptions of Technologies That Worked and Others That Did Not (Jim Cortada)
- 9:30 Taming a Disruptive Technology: Open Source, America's Army, and the Military-Entertainment Complex (Tim Lenoir)
- 9:50 As We May Work: The Pursuit of Collective IQ (Doug Engelbart)
- 10:10 Systems of Use and Technology Adoption (Andrew Isaacs)
- 10:30 Break
- 11:15 Panel
- 12:20 Discussant (Jennifer Trelewicz)

12:30 -1:50 Lunch



## Session 2: Key Organizational Advances

Moderator: Steve Haeckel

- 2:00 The Technology of History (Steve Haeckel)
- 2:25 From the Accidental Corporation to the On-Demand Business (James Hoopes)
- 2:45 The Crisis of Branding and the Theory Needed to Solve It (Paul Magill)
- 3:15 Leadership and Organizational Effectiveness in a Fast-Changing World (Martin Chemers)
- 3:35 Towards Living Networks: the active reconfiguration of economic flows (Ross Dawson)
- 3:55 Break
- 4:25 Panel
- 5:15 Discussant (Kate Ehrlich)

5:30 Wine & Cheese

6:15 Dinner & Key Note (Mike Zisman)



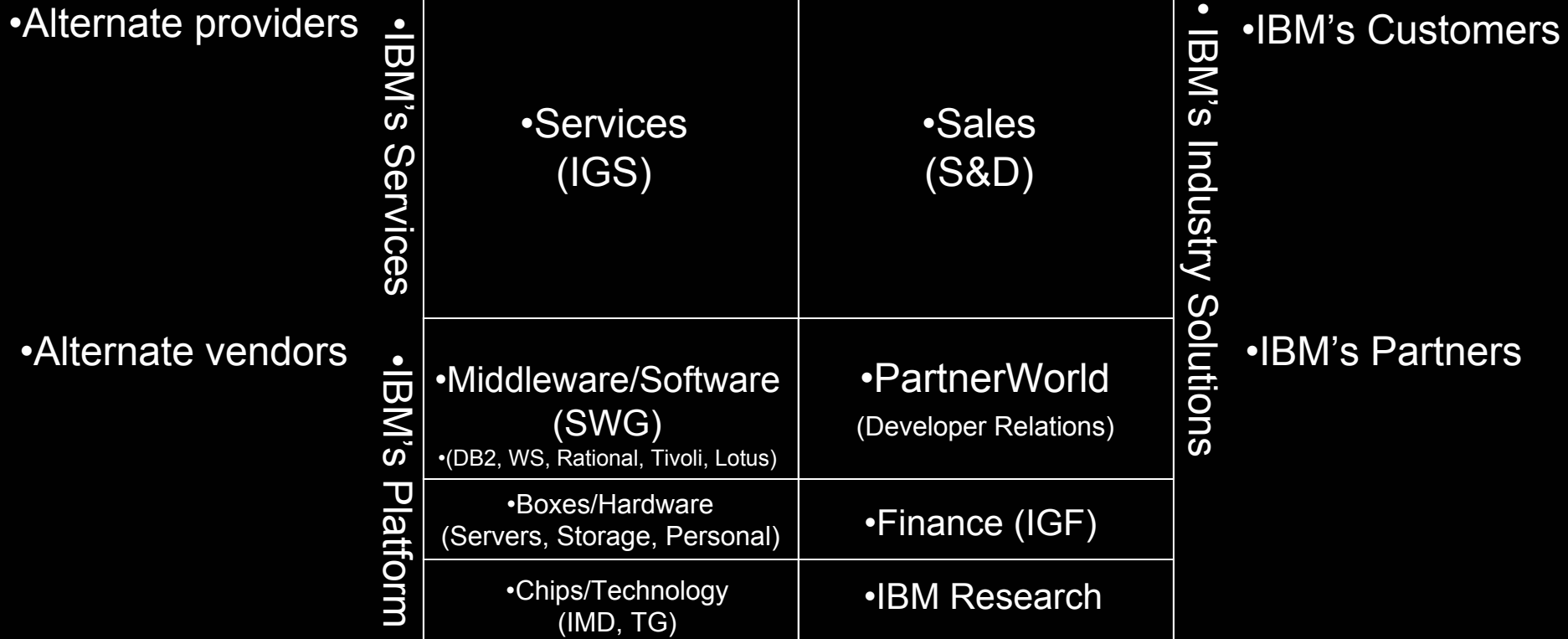
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# EXTRA SLIDES

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IBM's business is helping customers transform their businesses. Services is now 50% of IBM, with rapid growth from strategic outsourcing, help desk, business consulting.



IBM 101 – The New (Post 1995) IBM Ecosystem

Revenue: \$80+ Billion/Year

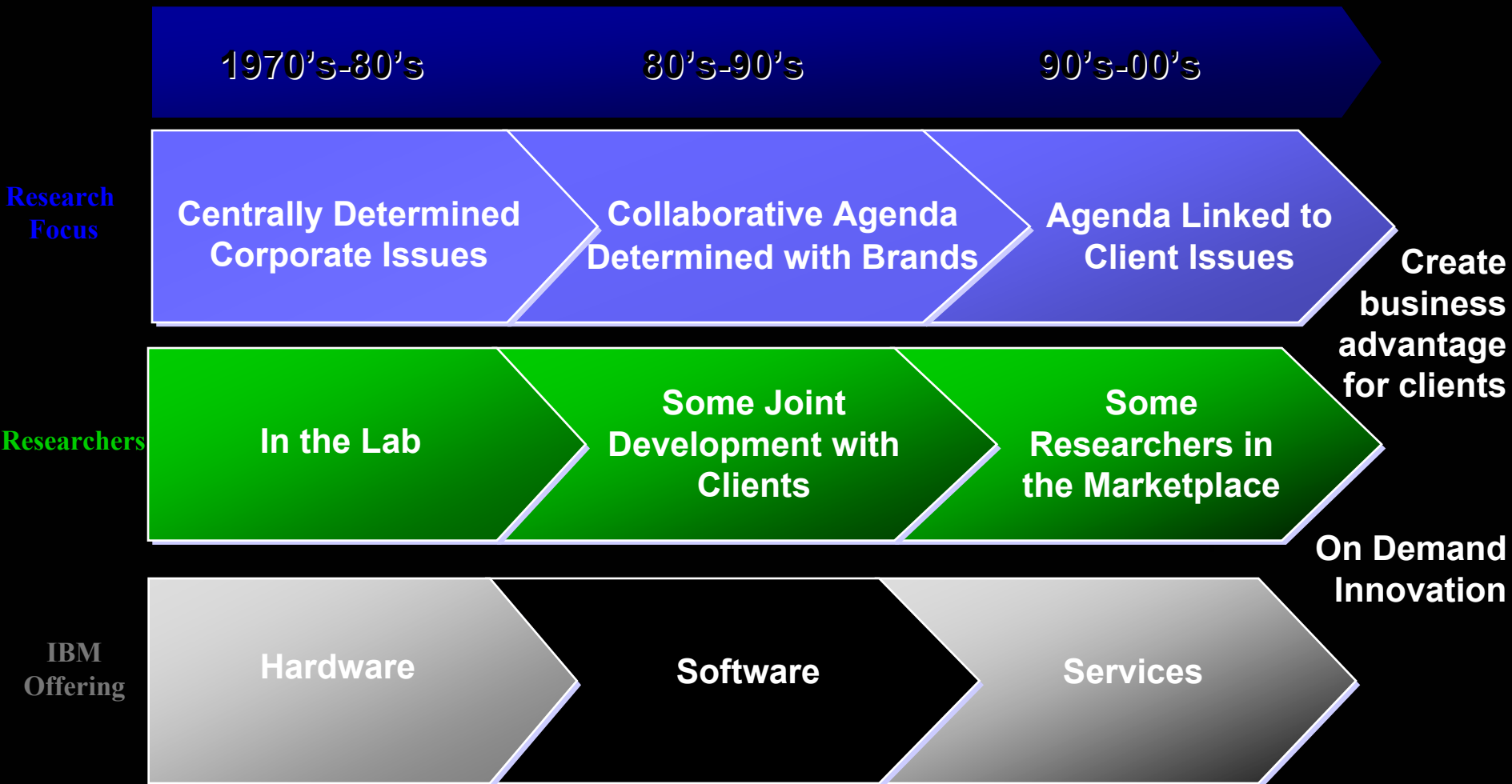
Employees: 320,000+, about 50% inside-US, 50% outside-US

IBM Global Services, approx. 170,000 people in 120 countries



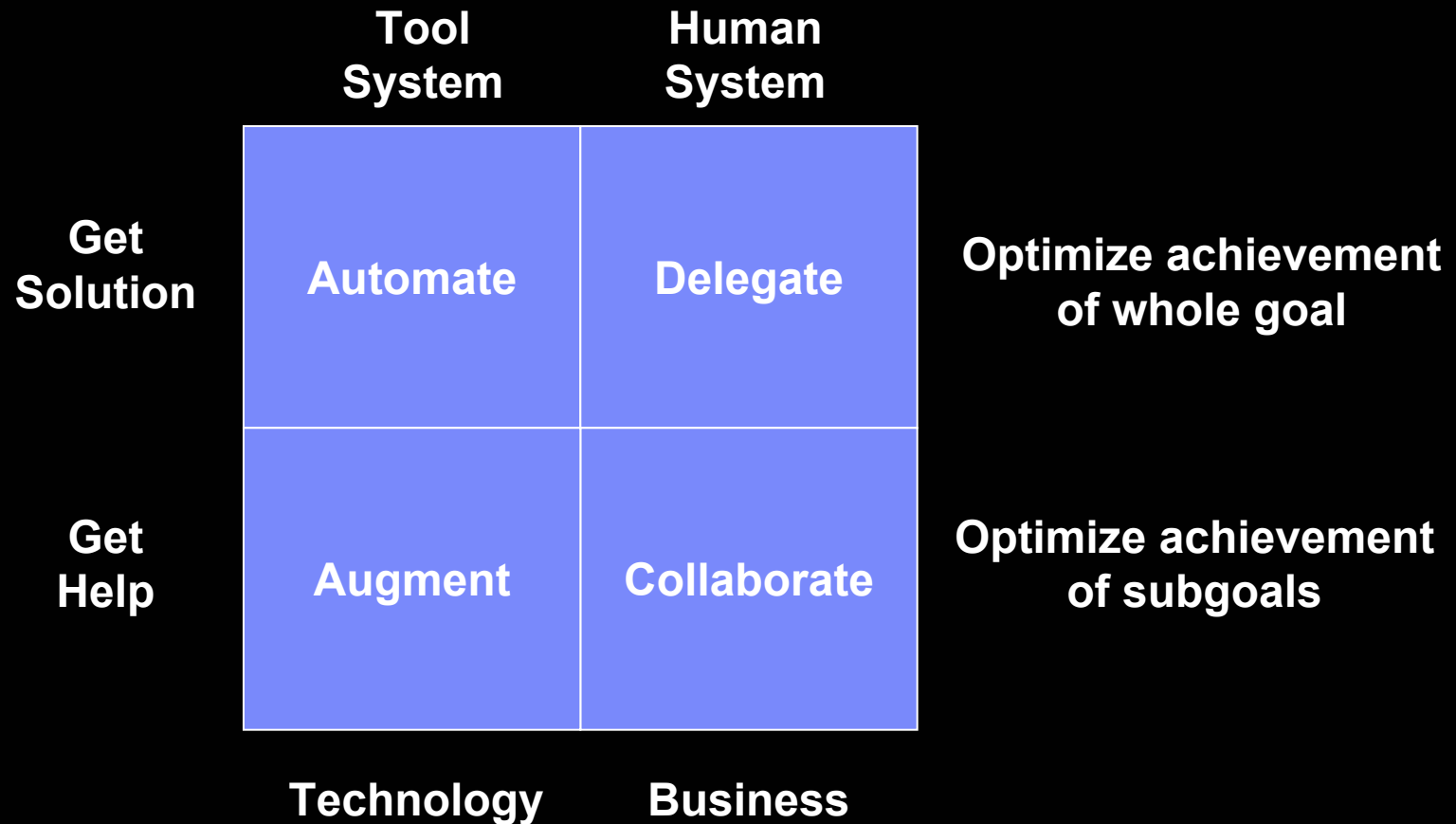


**ODIS 101: On-Demand Innovation Services (ODIS) sets the stage for the next generation researcher – one that is closely tuned with real-world client issues to drive and validate innovations, technological-organizational-business perspectives. Requires new academic collaborations beyond technological.**



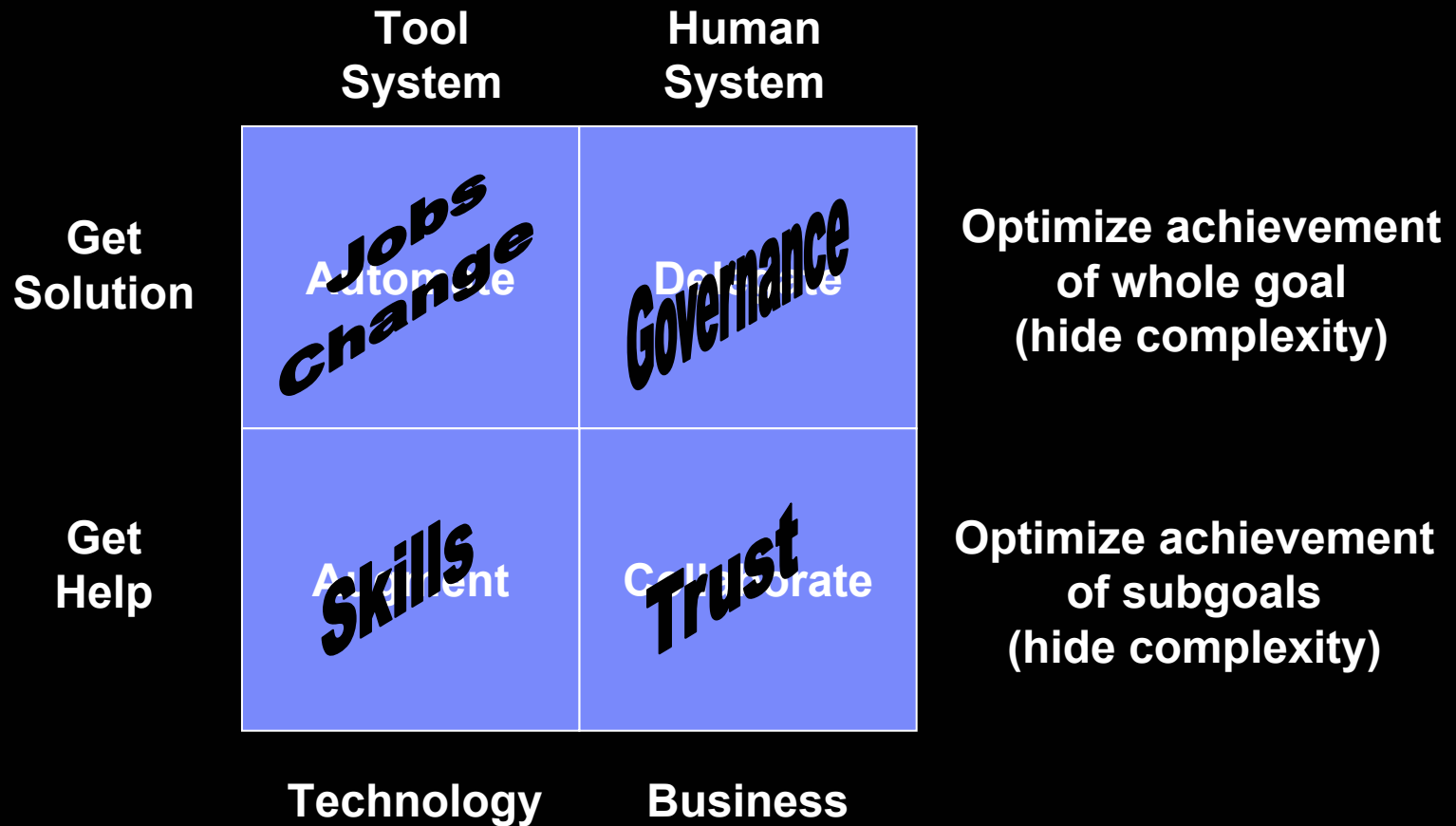


# Coevolution in terms of Interacting Systems (How to Scale and Optimize Complex Adaptive Systems)





# Human Issues are Everywhere





## Systems Questions about Possible “Improvements”

- **Should we?**  
Risks: human decision
- **Can we?**  
Capabilities: technology decision
- **May we?**  
Permissions: legal or policy decision
- **Will we?**  
Returns: business decision



# On-Demand e-Business

Businesses are evolving. Last transformation was business to e-business. Drivers of change are: Technology, People, Outsourcing +M&A, Regulations. Characteristics of an on-demand e-business.

## Responsive

An on demand business will seem almost intuitive in its ability to sense and respond to dynamic, unpredictable changes in demand, supply, pricing, labor, competitors' moves, capital markets and the needs of all its constituencies—customers, partners, suppliers and employees.

## Variable

An on demand business will use variable cost structures and adapt processes flexibly. This flexibility will enable it to reduce risk and to do business at high levels of productivity, cost control, capital efficiency and financial predictability.

## Focused

An on demand business will concentrate on its core competencies, its differentiating tasks and assets, while tightly integrated strategic partners manage selected tasks, everything from manufacturing, logistics and fulfillment, to HR and financial operations.

## Resilient

An on demand business will manage changes and threats—from computer viruses, to earthquakes, to spikes in usage—with consistent availability and security.



# On Demand Operating Environment

## Integration

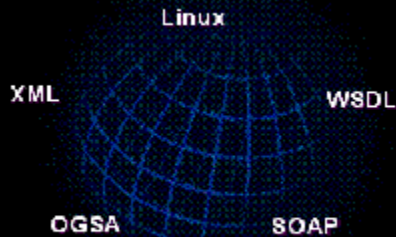


On Demand Operating Environment

## Virtualized



## Open Standards



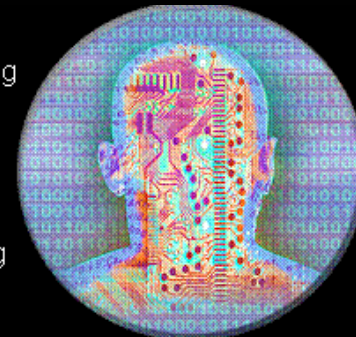
## Autonomic

Self-protecting

Self-optimizing

Self-healing

Self-configuring





# On Demand Enterprise – the Evolution of e-Business

- **Sense & respond organizations**

E-Utilities, Web Services, Real Time, Adaptive, Policy-Driven, Product Lifecycle Management (PLM), Value-Driven to Profit Zone, ROI, Human Capital, Business Intergration, Supply Chain, Customer Relationship Management, Strategy & Change, M&A, Growth, Cost cutting, Value Creation, Business Resilience and Maintenance, Financial Management, Brand Management, Outsourcing, Knowledge Management

- **Business Processes as the evolving DNA of business**

People (costs rising)

Labor Value Creation: Empowerment via tools and new organizations, Learning

Technology (cost dropping)

Outsourced Services (cost dropping)

Labor Commoditization: Automation, Off-shore, Deskilling

External Regulations and Government Policy

- **Organizations as the fastest evolving “agents” on the planet**

Monetizing science is done increasingly rapidly as new products/services

New products/services accelerating science, new data, new technologies

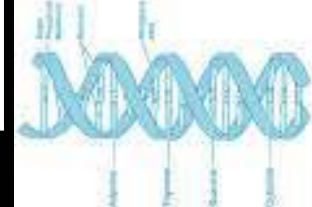
People costs and ability/willingness to change are increasingly the limiting factor



People science or human sciences increasingly driving technology and hence business  
**The Business of People – Healthy, Wealthy, Wise, and the Pursuit of Happiness (Security, Freedom, Entertainment...)**

U.S. Census website defines quality of life metrics (health, material goods, info access)

|            | Science                                  | Technology  | Business   |
|------------|--|---|--|
| Group      | Social Science, Economics, Org. Behavior | Science produces Data, drives Info Tech<br>Tech underlies new Products & Services<br>New Products & Services drive Business | Financial Services, Legal, Insurance, Government |
| Individual | Cognitive Science                        |   | Education, Communication                         |
| Brain      | Neurophysiology                          |   | Healthcare, Public                               |
| Cell       | Proteomics                               |   | Healthcare, Industrial                           |
| Gene       | Genomics                                 |   | Healthcare, Distribution                         |







# Brief History of Accelerating Change

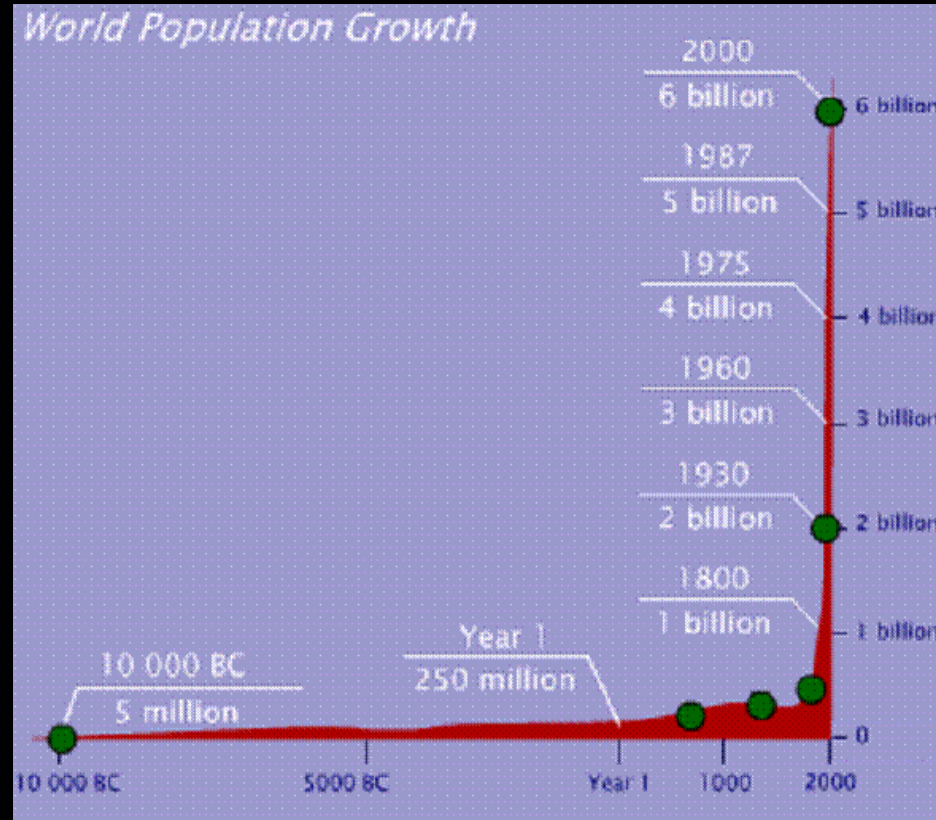
| Billion Years Ago |  |
|-------------------|--|
| 12                | Big Bang (EMST)                        |
| 11.5              | Milky Way (Atoms)                      |
| 8                 | Sun (Energy)                           |
| 4.5               | Earth (Molecules)                      |
| 3.5               | Bacteria (Cell)                        |
| 2.5               | Sponge (Body)                          |
| 0.7               | Clams (Nerves)                         |
| 0.5               | Trilobites (Brains)                    |
| 0.2               | Bees (Swarms)                          |
| 0.065             | Mass Extinctions                       |
| 0.002             | Humans<br>Tools & Clans<br>Coevolution |

| Generations Ago |                 |
|-----------------|-----------------|
| 100,000         | Speech          |
| 750             | Agriculture     |
| 500             | Writing         |
| 400             | Libraries       |
| 40              | Universities    |
| 24              | Printing        |
| 16              | Accurate Clocks |
| 5               | Telephone       |
| 4               | Radio           |
| 3               | Television      |
| 2               | Computer        |
| 1               | Internet/e-Mail |
| 0               | GPS, CD, WDM    |



# World Population Growth

Effects of Agriculture, Colonial Expansion & Economics, Scientific Method, Industrialization & Politics, Education, Healthcare & Information Technologies, etc.





## About the future

- The future is already here, it's just not very well distributed.
- The best way to predict the future is to invent it.
- History is the greatest resource for planning the future.
- Sometimes it is hard to recognize the future, even when it is staring you right in the face.



Coevolution Symposium

We need your help to make this successful!

We will be rapidly evolving, and suggestions and ideas are very welcome. E-mail [spohrer@almaden.ibm.com](mailto:spohrer@almaden.ibm.com) or Jim Spohrer/Almaden/IBM.