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## **What's the Formula for Success in the Knowledge Economy ?**

**Mary Jo Waits  
Morrison Institute for Public Policy  
Arizona State University**

March 8, 2004

## **Change in the Economy**

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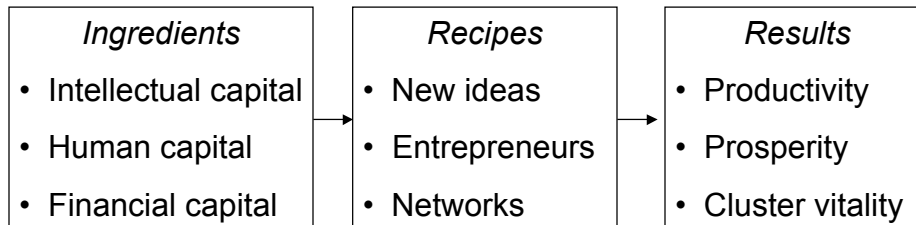
**“The first 100 years of our country’s history were about who could build the biggest, most efficient farm.**

**The second 100 years were about the race to build efficient factories.**

**The third 100 years are about ideas.”**

**-- Seth Godin  
*Fast Company*, August 2000**

## **New Growth Theory: Stanford Economist Paul Romer's Perspective**



Source: Collaborative Economics

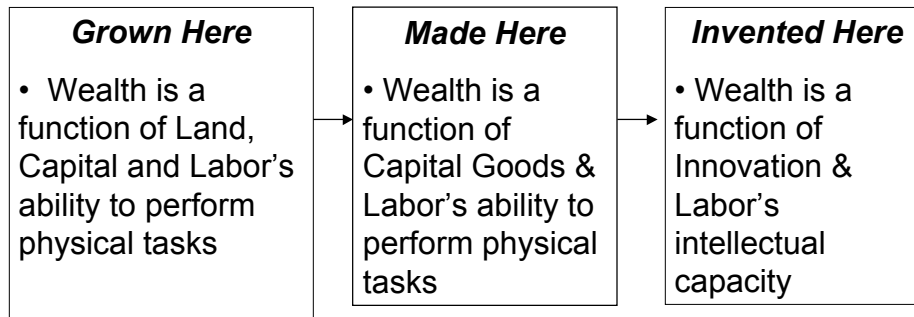
## **“Recipes” combine resources in new and different ways**

- Nanotech: You start with building blocks like nanowires, nanotubes, and nanoparticles. Put together one way, these building blocks make a computer. Put together in a different way, they make a biological sensor.
- Biology is another example. You have a limited number of building blocks, like proteins and DNA. Depending on how you put them together, you end up with a tissue, a worm, or a human being.

Charles Lieber, Harvard Chemistry Professor & co-founder, Nanosys

## **The Predominant Source of Success has Shifted**

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## **Individuals are the new “means of production”**

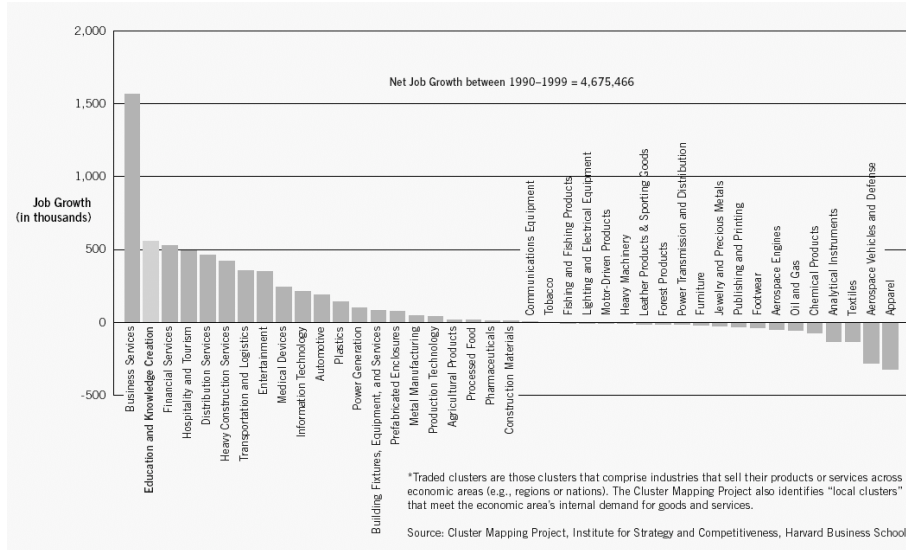
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•Individuals apply their knowledge to write software, manage mutual funds, solve technology problems, and develop new products.

•Individuals are the key to innovation. “If we make great technology, that’s only because we’ve been able to hire great engineers.”

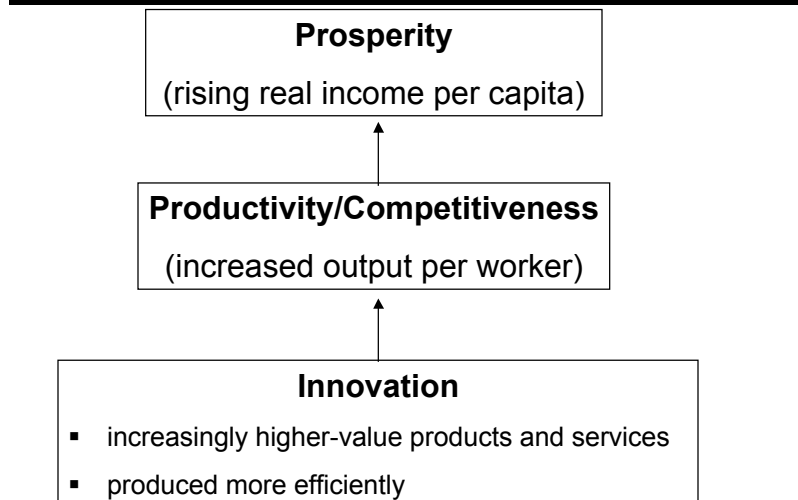
## Economy shifted from goods production to more information intensive sectors & occupations

Net Job Growth by Traded Cluster\*, 1990-1999



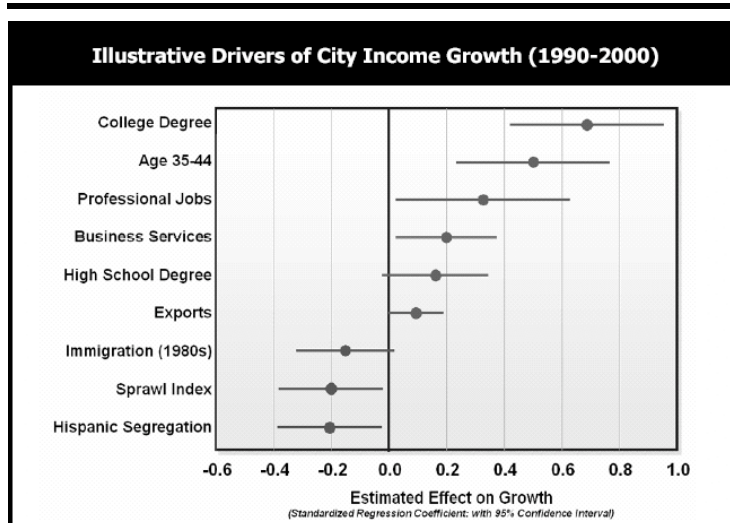
Source: Leveraging Colleges and Universities for Urban Economic Revitalization.

## Advanced Economies Must Compete on Innovation



Source: Collaborative Economics

## Keys to Prosperity



Source: CEOs for Cities, *The Changing Dynamics of Urban America*, 2003

## Talent Key to Prosperity

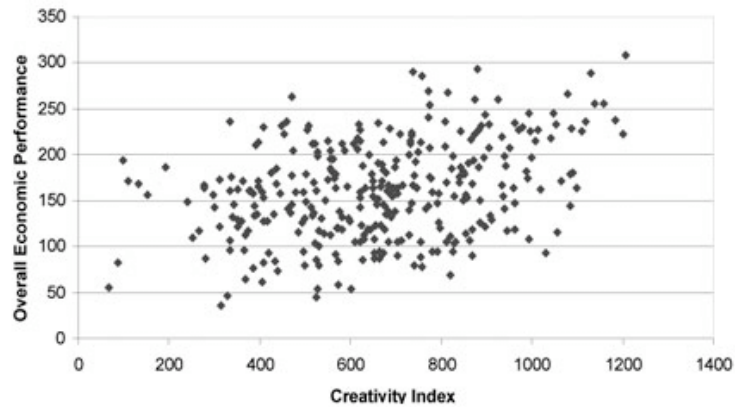
- The single factor with the greatest power to explain differences in per capita income between states is the percentage of college graduates.
- On average, a one-year increase in a metro area's educational level raises wages by 3 to 5 percent.

Source: Milken Institute, 2002

## Creativity Key to Prosperity

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U.S. Metro Areas



Cool Town Studios/Catalytix

## S &T Key to Prosperity

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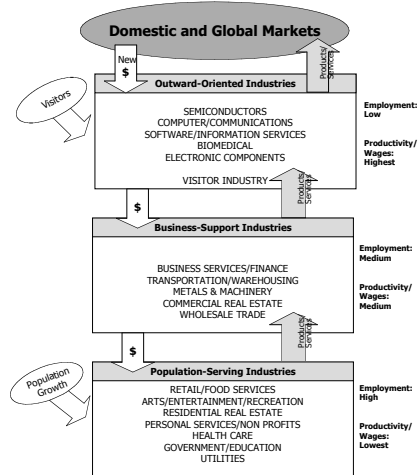
“Although high-tech is not the only development strategy to pursue, it will be the key distinguishing feature of regional vitality in the 21<sup>st</sup> century.”

More than three-fourths of personal income growth can be tied to increases in technology output.

Milken Institute, 2002

# Key to Prosperity: Highest-value Economic Activity

High-Value, Outward-Oriented Industries  
Drive the Local Economy



A diverse portfolio of high-value driving industries is important for the overall health of the economy, including business-support and population-serving industries

## Clusters of Exceptional People

**“Wherever knowledge workers cluster, whether in small towns or in big cities, that is where wealth will accumulate.”**

- Joel Kotkin

*“Digital Geography: The Remaking of City and Countryside in the New Economy”*

## Talent Migration

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Income Growth	1990-2000	Population Growth	
1. San Francisco	27%	1. Las Vegas	62%
2. Austin	23%	2. Bakersfield	35%
3. Atlanta	23%	3. Austin	34%
4. Seattle	21%	4. Mesa	32%
5. Tampa	21%	5. Charlotte	31%
6. San Antonio	18%	6. Phoenix	30%
7. Charlotte	18%	7. Raleigh	28%
8. Cincinnati	17%	8. Colorado Springs	25%
9. Colorado Springs	16%	9. Arlington	24%
10. San Jose	16%	10. Aurora	22%
13. Portland	15%	14. Portland	19%
74. Phoenix	5%		

Source: Weissbourd and Berry, October 2003

## What Does It Mean?

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- What's Important to economic success is changing
- We need to better understand the new dynamics and
- Promote policies to enhance them

## The Challenge for Economic Development

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How do ideas come about?

We know 2 very pertinent things:

- Ideas require intelligent seeding;
- Ideas that sit on the shelf are worthless. Ideas have to move, grow, and touch lots of people and businesses to provide benefits.

## What's Important to Economic Success is Changing

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**Most Important Sources of Prosperity are Created**

### Created Assets

- Top universities
- Research centers
- Talented people
- Entrepreneurial culture
- Networks
- Vibrant downtowns

### Inherited Assets

- Geography
- Climate
- Population

## **Elements of a Knowledge-based Economy**

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### **5 tangible elements:**

- A strong intellectual infrastructure (universities and firms generating new knowledge and discoveries)
- Mechanisms through which knowledge is transferred from person-to-person / firm-to-firm
- Excellent physical infrastructure (high-speed internet)
- A highly skilled technical workforce
- Good sources of capital

### **2 intangible elements:**

- Entrepreneurial culture
- Quality of life

Source: National Governors Association

## **Austin: City of Ideas**

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- Three decades ago: Sleepy University/Govt Town (per capita income 85% of US average)
- Today one of 20 “Cities of Ideas” (per capita income is 107% of US average)
- Started with Vision: “Poised for Greatness” - IT and quality of life
- Attracts Motorola, AMD in 70s; MCC research consortium; SEMATECH- 13-firm research consortium; many IT- related firms follow
- UT top 10 of engineering graduate schools (1989)
- Multiple startups: Dell and spin offs from UT

## **Being on the Right Path is More Important Than Ever**

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- The new century will be a highly competitive one—especially as cities and regions realize that key features are “buildable” and thus can be had by nearly any place that puts its mind to it.
- Success Breeds Success

## **The “Big Sort”**

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A pack of cities is racing away  
from everybody else

## Success Breeds Success

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### 10 Regions Racing Away

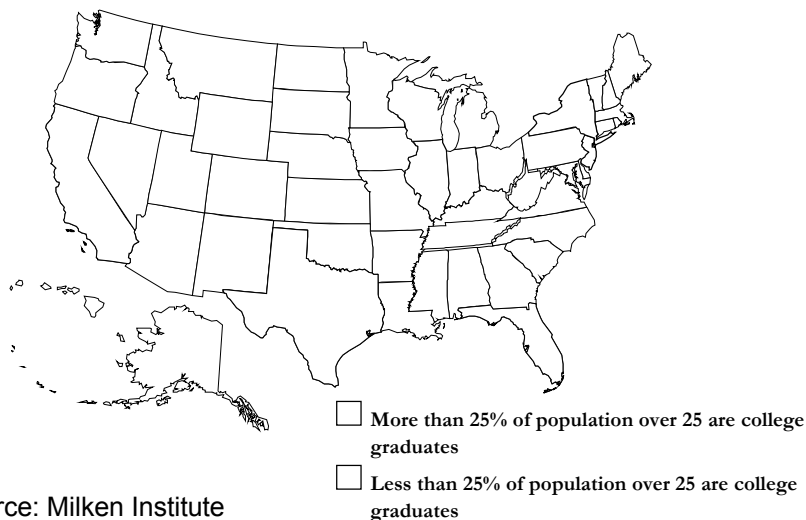
- above national average in technology output and patents per capita
- attracting Generation X
- third higher in “creative class”

Austin, Boise, Phoenix. Atlanta, San Francisco, Denver, Raleigh-Durham-Chapel Hill, Dallas-Fort Worth, Seattle, Portland, San Jose, Houston, New York, Washington DC, Albuquerque, Chicago, San Diego, Los Angeles-Long Beach, Boston, Philadelphia

Bill Bishop, Austin-American Statesman

## Education Attainment

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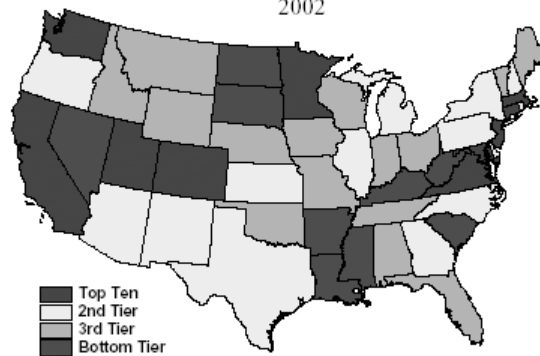


# Science and Technology

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State Technology & Science Index

2002



Source: STATE TECHNOLOGY AND SCIENCE INDEX SEPTEMBER 2002, Milken Institute

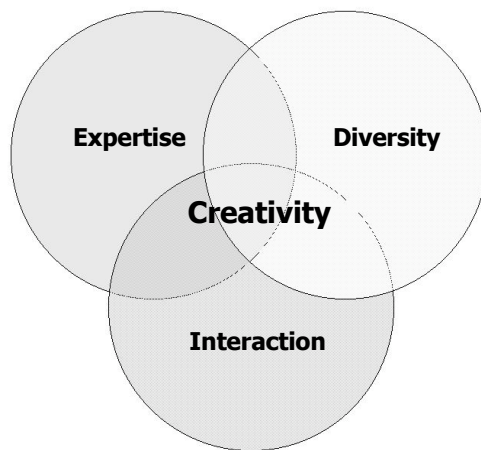
## Place Still Matters — But for Different Reasons

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- *Innovation is tied to place*
- *Entrepreneurship requires a “habitat”*
- *Quality of Place draws talent*

## Innovation is tied to Place

### EDI's of Innovation



- **EXPERTISE** means talented people
- **INTERACTION** when people come together, there's a better chance for the passionate exchange of ideas & synergies that create new business models, marketing plans or products
- **DIVERSITY** is important in generating the "Next Big Thing"; people learn most by interacting with people less like themselves.

Source: Waits, 2003

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**"It's at the intersections of disciplines where sparks fly."**

Telecommunications, biotech,  
software, the Web, great music,  
architecture, and art.

## **Business Geography by Product Maturity**

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<b>Age of Product</b>	<b>Examples of Product</b>	<b>Location Priorities</b>
Young	New media: Internet product development; Web-site design	<ul style="list-style-type: none"><li>• Urban lifestyle</li><li>• High face-to-face interaction</li><li>• Availability of talent from multiple disciplines: designers, computer technicians, advertising, telecommunications, etc.</li></ul>
Mature	Small electronic goods manufacture, athletic shoes	<ul style="list-style-type: none"><li>• Low cost entry level labor</li><li>• Low cost space</li><li>• Affordable low-income housing</li></ul>

Source: Cohen, N. *Business Location Decision-Making and the Cities: Bringing Companies Back*, April 2000.

## **Entrepreneurship Requires a “Habitat”**

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- “What distinguishes Silicon Valley is not its scientific advances or technology breakthroughs.
- Instead, its edge derives from a “habitat” or environment that is tuned to turning ideas into products and taking them rapidly to market by creating new firms.”

The Silicon Valley Edge

## **Quality of Place Draws Talent**

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The shift to knowledge-based industries frees people and businesses from traditional constraints on mobility.

“More and more, companies and skilled labor locate where they want—not where they must.”

Ross Devol, the Milken Institute, 2002

## **Make Sure Talented People Want to Live in Your Region**

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**“Arugula is how I define cities. I go to a grocery store, and either you can get arugula or you can’t.”**

**Cindy Crawford**  
international super model

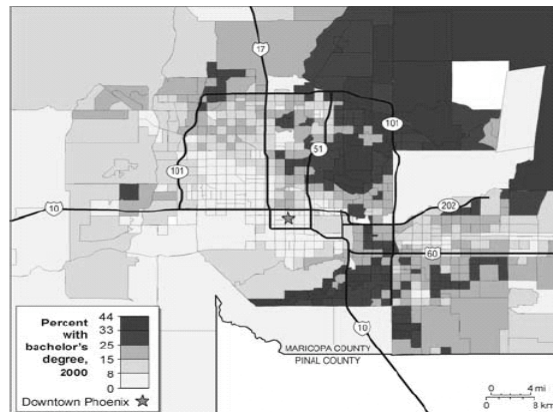
## The Calculation for Quality of Place is More Complex

- Natural environment counts for a lot.
- But natural features aren't enough. Places must have distinctive urban amenities as well.
- Choice (in lifestyle) matters in the talent war.
- Being a smart, innovative place matters.
- It's not just about physical attributes. Intangibles such as "hipness," tolerance, entrepreneurial culture are part of the calculation.
- Speed is a vital amenity.

Source: Mary Jo Waits, Morrison Institute for Public Policy

## Percent With College Degrees

Percent with BA/BS Degree, 2000



Source: Morrison Institute for Public Policy, 2003.

## The Challenge Ahead: Strategic, Sustained Effort

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“There was no single defining action, no grand program... no solitary lucky break, no wrenching revolution.

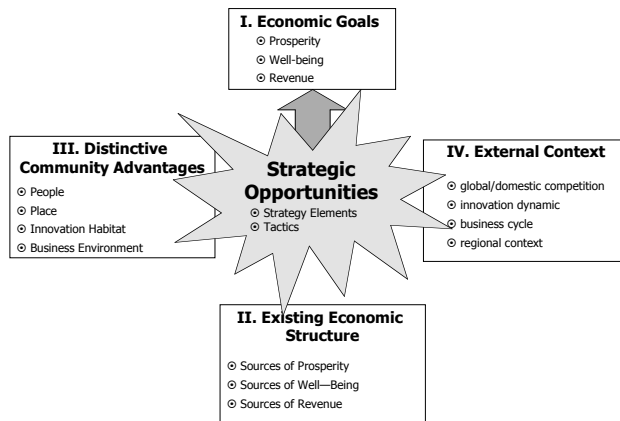
Good to great comes about by a cumulative process--step by step, action by action, decision by decision, turn by turn of the flywheel—that adds up to sustained and spectacular results.”

Jim Collins, 2001

## Strategic Framework

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### Framework for Economic Strategy



San Jose Economic Strategy, 2003

## **Strategy Elements**

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- **Strategic Framework**
- **Assessment Findings**
  - Performance
  - Economic Structure
  - Community Advantages
  - External Context
- **Goals**
- **Vision/Strategic Opportunities** (Opportunities to excel, to achieve goals)
- **Strategy Elements** (How you'll realize vision)
- **Tactics** (specific actions, policies, investments to advance strategy)

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**What is the Role of Public Policy in Economic Development ?**

## **Strategy IS Public Policy**

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**If you want to make a difference as a leader, you've got to make time for strategy. The essence of strategy is choice and trade-offs and fit. That's because strategy is about being different.**

**A leader also has to make sure that everyone understands the strategy. They go out and they repeat, "This is what we stand for, this is what we stand for." So everyone understands it.**

**--Michael E. Porter**  
*Harvard Business Review, March 2001*

## **Any public policy here?**

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- **Natural environment counts for a lot.**
- **But natural features aren't enough. Places must have distinctive urban amenities as well.**
- **Choice (in lifestyle) matters in the talent war.**
- **Being a smart, innovative place matters.**
- **It's not just about physical attributes. Intangibles such as "hipness," tolerance, entrepreneurial culture are part of the calculation.**
- **Speed is a vital amenity.**

## **Success factors from the community**

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- Exceptional People
- World-Class Place
- Efficient Business Environment
- Habitat for Innovation
- Local Mindset

San Jose Economic Strategy, 2003

## **San Diego: Rise of a High-Tech Cluster**

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- Geography produces tourist & military town and begets Scripps Institute (1912)
- Today: 3<sup>rd</sup> Biotech hub behind San Francisco & Boston
- North Torrey Pines Road: Densely packed 2-mile stretch w/ Scripps Research Institute, Salk Institute for Biomedical Studies, UCSD
- Diverse Economy softens recession impact

## **Rise of a High Tech Cluster**

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- **City dredges harbor, 1907**
- **City gives land to General Atomics to increase HT (1956); designated S&T zone; spawns 60 companies**
- **Headquartered Qualcomm & Leap Wireless (1968)**
- **Leaders get a University (USCD)—post-grad science focus (1960); in 1990's, spawns 69 companies**
- **Salk Institute (1960) ; since 1980's spawns 17 companies**
- **Scripps produces 40 companies in similar time**
- **Headquartered Qualcomm & Wireless Leap (1968)**
- **UCSD CONNECT (1995) "meet the researcher"**
- **BIOCOM—informal network**
- **\$1 B in private VC (2002) ; \$ 500 M annually NIH**
- **USCD opens graduate business school (PhD/MBA)**

## **Maryland and San Diego: Factors of their Success**

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- **Maryland and San Diego represent successful state and region building a bioscience research base and a critical mass of firms over past 12 –14 years.**
- **In 1991 Maryland had 53 firms employing 3,600; today it has 258 firms employing nearly 16,000 bioscience personnel.**
- **In 1990 San Diego had 11,000 employees working in the biosciences; today it has nearly 23,000 bioscience employees.**
- **Key lessons:**
  - **Research anchors (universities and academic health centers)**
  - **Talent pool that attracts and grows firms**
  - **Capital gaps addressed**
  - **Networking to build a critical mass of firms**
  - **Federal funds leveraged**
  - **Champions and leadership**
  - **Access to wet lab space, equipment & instrumentation**
  - **Patience and long term perspective**

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## **What is the Best Geography ?**

Think Globally, Act Regionally,  
Prosper Locally

## **Four “Big Bets”**

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- Big Bet No. 1  
Greater Phoenix targets (2001) five export-oriented, knowledge intensive clusters to build regional strengths in:
  - Electronics/Information Technology
  - Aerospace
  - Software
  - Biomedical
  - Advanced Business Services

## Perceptions of Phoenix Metropolitan Area



### Retirement Lifestyle Tag

	<b>National Business Media</b>	<b>Business Executives</b>	<b>Site Selection Consultants</b>
<b>Describing Greater Phoenix</b>	1.Retirement 2.Vacation/Touristy 3.Sprawling 4.Too Hot 5.Good Place for Golf 6.No Water	1.Retirement 2.Vacation/Touristy 3.Too Hot	1.Retirement 2.Vacation/Touristy 3.Sprawling 4.Too Hot 5.Techno-Advanced
<b>Industries Associated with Greater Phoenix</b>	1.Retirement 2.Tourism	1.Retirement 2.Tourism	1.Electronics 2.Financial Services 3.Retirement 4.Tourism 5.High Technology

Source: Greater Phoenix Economic Council, 2002.

## Four “Big Bets”

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- Big Bet No. 2  
Earmarked University Funds – Prop 301: In 2000 citizens recognized that top-tier universities are a critical infrastructure for the 21<sup>st</sup> century. Sales tax increase provides \$1 billion over 20 years for 3 universities.

## Four “Big Bets”

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- Big Bet No. 3  
The Arizona Biosciences Roadmap Effort—funded by Flinn Foundation and guided by a steering committee that included Arizona Bioindustry Association, universities, key economic development groups  
  
Begins to develop shared understandings and build trusting relationships

## Four “Big Bets”

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- Big Bet No. 4  
Genomics – \$90 M raised in 2002 to jumpstart the bioscience industry.  
  
Lead with Brainpower—Jeffery Trent, scientific director, National Human Genome Research Institute and chief of Cancer Genetics Branch, NIH

## **Two BHAGs....**

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### Converge

Private Sector- Cure Cancer/TGen/IGC

Public Sector- Downtown Phoenix

## **Biosciences: Putting it all together**

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- **3<sup>rd</sup> Cluster Analysis-Flinn Foundation**
- **3 Core Competencies- Cancer therapeutics, neurological sciences, bioengineering**
- **\$90 Million Investment IGC/Tgen**
- **Passionate Leader : BHAGs**
- **Phoenix Bioscience Center at Copper Square (3 Universities)**
- **Arizona Biodesign Institute (ASU/Tempe)**
- **One-of-a-Kind Computer**
- **ASU Research Park Biocampus**
- **Arizona's Biosciences Roadmap (Battelle)**

## **Biosciences: Putting it all together**

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- **Maricopa Bioindustry Workforce Development Commission**
- **Phoenix Biosciences High School**
- **Phoenix Biotechnology Directory**
- **Biofunding Summit 2003**
- **New Market Tax Credit (\$ 30M)**
- **ASU's version of UC CONNECT**
- **Research Facilities Legislation (12 facilities)**
- **Legislation gives university equity position**
- **Real Estate sessions on wet lab space**
- **Urban BUZZ**
- **Mayo-TGEN research facility/collaboration (Scottsdale)**

## **Questions for You**

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- **What opportunities will change create for Greater Portland?**
  - The "Big Sort"
  - Knowledge Generators vs Knowledge Users
  - Convergence
  - Outsourcing vs "jobs of place"
  - Talent Shake Up
- **How will you differentiate your region/community from competitors?**
- **What's the region's BHAGs?**

## Greater Portland Biography

### Seattle

- Has been the hare
- Gotten a bit more distant, fast-paced, grown-up
- Project-centered, entrepreneurial & expansive
- A “go-ahead” city—Bigger and Better Seattle
- Continually looks toward the future
- A place of singleness of mind

### Portland

- Has been the tortoise
- Remains casual, friendly, available
- Process-oriented, cautious & localized
- Frequently fails to dream big dreams
- Often shaped by ideas from the past
- Split personality often leads to inaction and missed opportunity