

#6 WHERE SMART MONEY LOCATES R&D

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Speakers:

Rene Buck, Buck Consultants International

Dennis Meseroll, Tractus-Asia

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CRE contributors:

Sanjiv Awasthi, Pfizer

Workshop Speakers

Moderator & Speaker:

**Jay Biggins, Biggins Lacy Shapiro & Co
Partner/25+ yrs experience**

- Incentives
- Public policy
- Land use
- North America Focus

Corporate Experts

Sanjiv Awasthi, Pfizer
VP of Global Real Estate

Speakers:

**Dennis Donovan, WDG Consulting, Partner/36
yrs experience**

- Site Selection
- Logistics
- HR Mobility
- Americas Focus

**Dennis Meseroll, Tractus
Partner/20 yrs experience**

- Site Selection
- Market Analysis
- Market Entry
- Logistics
- Asia Focus

**Rene Buck, Buck Consultants International
President/25 yrs experience**

- Site Selection
- Logistics
- Incentives
- EMEA focus

Workshop Agenda



- Review R&D Strategies, history and trends
- From Close to Open Innovation Networks
- Common Locational Themes
- R&D Hotspots in U.S. (Successful factors, incentives, interviews)
- R&D Hotspots in Asia
- R&D Hotspots in Europe
- Strategies for Economic Developers
- CRE participation (Comments and discussions, observations from company's vantage point)
- Questions & Answers

Globalization has pushed R&D centers elsewhere



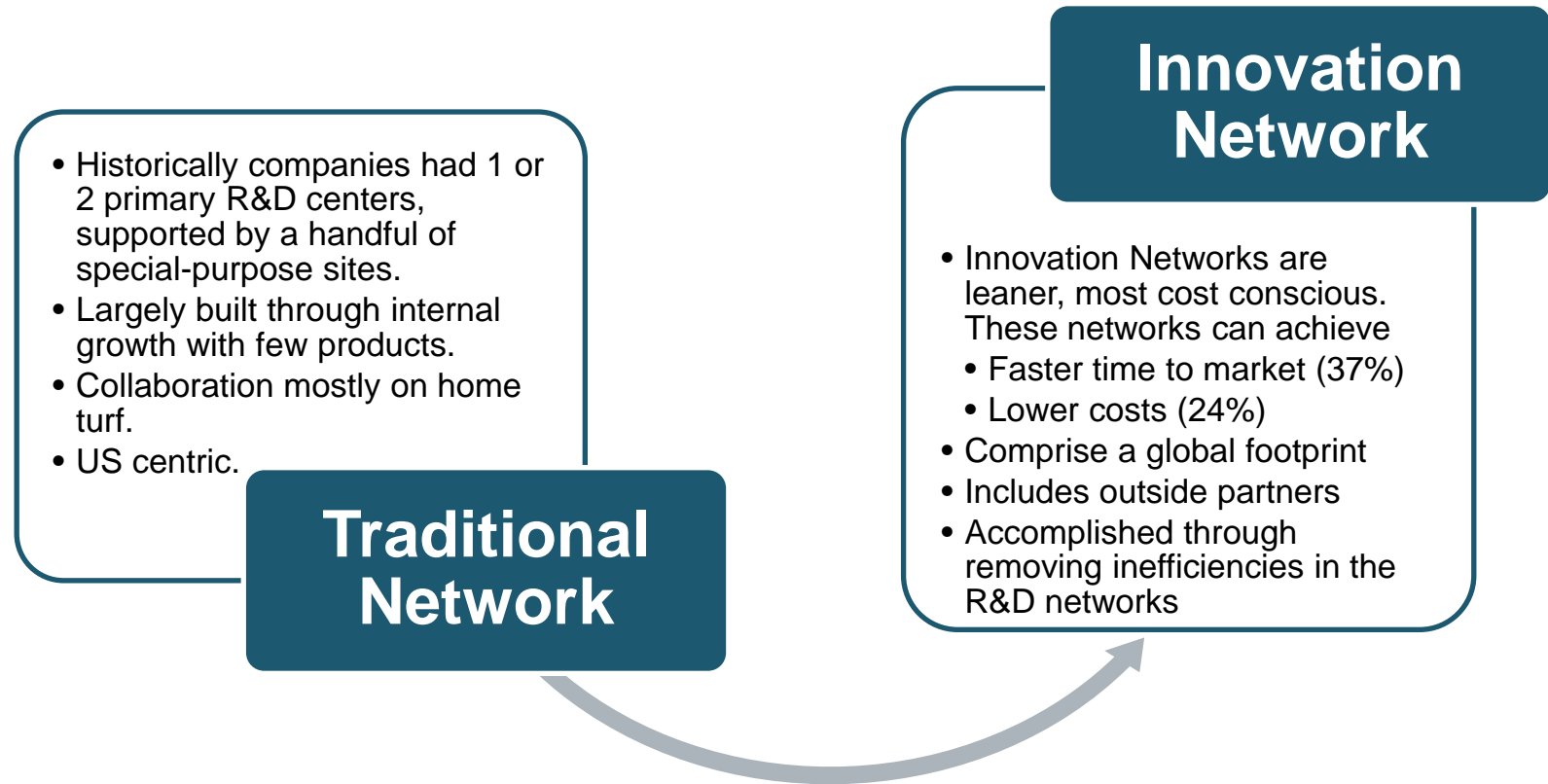
According to a study by INSEAD, two thirds of R&D centers are now located outside of company's home country.

- With India & China leading the way in favored locations
- New emerging markets including Latin America, Eastern European

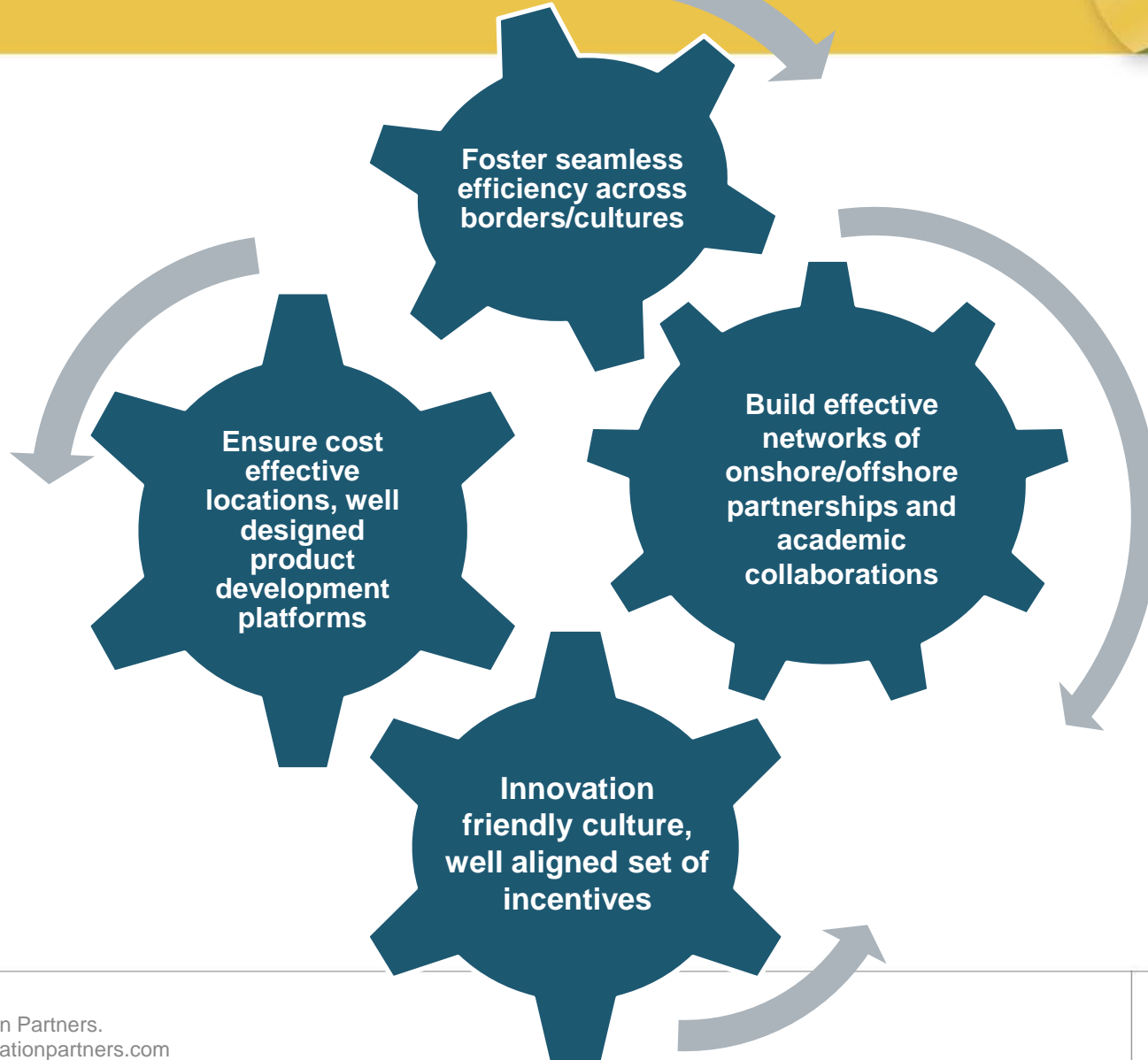
Among drivers for offshoring of R&D activities

- Rising cost in west
- Rapid advancement of info technology
- Scarcity of scientists/engineers in home country
- Opening of developing markets especially

Progress from Traditional to Innovation Networks



Driving Factors for Success



All regions will grow R&D (U.S., West Europe, Japan)



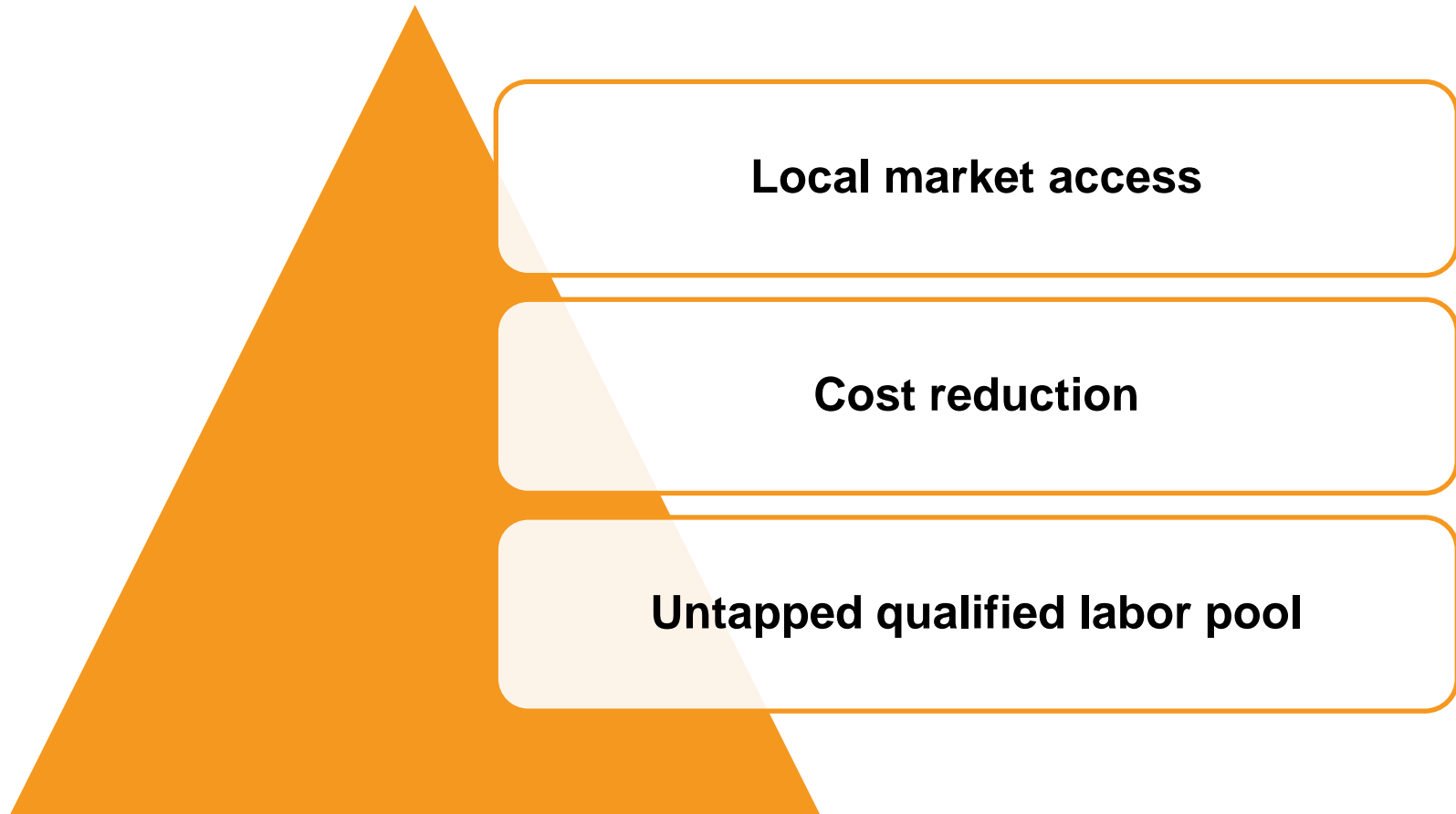
**Proximity to technology/research clusters,
markets, specialized talent justifying high cost**

**Established government/university/corporate
partnerships**

Favorable intellectual property protection rights

All regions will grow R&D

Developing world



Historically, US Companies' R&D Centralized

- Microsoft in Seattle
- Cisco in Santa Clara
- Sun in Palo Alto
- Bristol-Myers Squibb in Connecticut
- Nike in Portland



Examples of Multinational Corporations with Global R&D Networks

Intel

- US (Santa Clara, Portland, Seattle, Pittsburgh)
- Israel
- China
- Taiwan
- Saudi Arabia
- Korea
- India
- China
- Belgium
- France
- Switzerland
- Germany
- Ireland
- Northern Ireland
- Poland
- Russia

Sanofi Aventis

- US (Philadelphia, Cambridge, Bridgewater, NJ, Tucson)
- France
- Austria
- Brazil
- Mexico
- India
- China

Infosys (Indian, software)

- Bangalore (India)
- Canada (Toronto)
- US (Dollars)
- Brazil (bilotarizante)
- China
- Malaysia
- Philippines
- England (London)
- Russia (Moscow)
- Czech republic
- Spain (Madrid)
- Mauritius (applications & customer service)

Red Hat

- US (Raleigh Durham)
- Brazil
- Czech Republic
- Russia
- Israel
- Serbia
- China
- India

Globallogic

- US (McLean, VA)
- India
- Ukraine
- China
- Argentina

Bristol Myers Squibb

- US (CT, NJ, MA, Silicon Valley)
- Belgium
- France
- England
- Japan

Huawei (Chinese, telecom)

- US (Dallas, Silicon Valley)
- China
- India
- Sweden
- Indonesia
- Turkey
- Netherlands
- France
- Ireland
- Russia

Embraer (Brazilian aircraft)

- Brazil
- China
- Germany
- France
- Japan
- UK
- US

Reflects two major trends

- MNCs from developed countries tapping emerging markets
- Companies from development markets becoming global players.

R&D Geographic Evolution in U.S.



- \$400 Billion Industry
- Private Sector amounts for 64.7% (\$260.3)
- Government (mostly federal) second at 28.4%
 - NIH, DOP, NITS, DOE, NSF
- Academia 2.9% (\$11.6)
- Nonprofit 3.1% (\$12.6)
- Stimulus added roughly \$18 Billion, most to universities

R&D Geographic Evolution in U.S.



- **Exceptional Technical universities** whose research helped spawn entrepreneur many of whom grew to become major players

- Stanford (Silicon Valley)
 - Google, Sun Silicon Graphics, Cisco, Yahoo
 - 300 patents
- MIT (Boston)
 - 150 cos annually, 15 from tech transfer/commercialization

- **Organic growth of locally founded company**

which became global giant

- Houston (Energy)
- Seattle (IT)
- Chicago (Medical Devices)
- MSP (Medical)
- NJ/Phil (Pharma)
- SF (Bio)
- So Cal (Aerospace/Defense)
- Detroit (Auto)

- **Federal government presence**

- Baltimore (BIO)
- NOVA (Defense, IT)
- Atlanta (Medical)
- Houston (Aerospace)

- **Unique Situations**

- Raleigh/Durham
 - RTP
 - University collaboration
- Los Angeles
 - Television
 - Movies
- New York
 - Financial Services
 - Media

R&D Undergone Geo Diffusion with Second Tier Metros gaining ground

- Profusion of new industries/technologies
- Technology commercialization focus at research universities
- Leadership zeal to spawn high-tech jobs
- Typically a small base of companies
- Sometimes the benevolence of foundations (kaufman, Heinz, Monsanto)
- Strategic concentration by economic development organizations
- Business startup/entrepreneurship
- Business expansion
- Selective recruitment
- Build critical mass to get on radar screen wherein company place area on long list
- Technology transfer/commercialization
- University research parks have also played a role due to economic
- Imperative to replace well paying jobs
- State programs dedicated to a specific industry (e.g. biotech)
- Companies, especially mid-size seeking locations wherein a relatively modest operation can be a major player
- Seed capital availability critical
- State fund, Angel Networks, VC introductions

Technology Transfer/Commercialization Programs Essential for Spurring New R&D Clusters

Involves

- Committed universities
- Licensing arrangements
- Equitable royalties
- World class R&D (often targeted)
- Risk taking culture
- Physical infrastructure
- Seed capital
- Entrepreneurial Incentives
- Qualified intermediaries (e.g. legal)
- Collaboration

Key components

- Best of class professors
- University leadership
- Innovation centers
- Incubators/accelerators
- Research parks
- Networking
- Formal linkages
 - Universities
 - Corporations
 - Real estate
 - Foundations
 - Economic development agencies
 - Federal labs (permanent)
- Leveraging federal dollars (e.g. stimulus dollars)
- Venture capital access/programs



Emerging R&D Hotspots in U.S.

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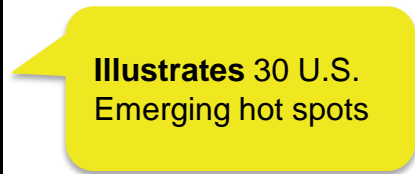
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See Appendix
for more details



Sample of Emerging R&D centers in South America



0 390 780 1,560 2,340 3,120 Miles

WDG C

CORENET
GLOBAL

Common Themes: Results from ED interviews



- Critical Mass
- Collaboration
 - University
 - Private setting
 - Foundation
 - Government
 - Economic Development
- Industry Growth Strategy
- Entrepreneurship /Business Startup
- Long Term View
- Leveraging state/federal dollars
- Selective business recruiting
- Website (business case)
- Publicity
 - Branding
 - Reputation
- Talent Pool Production
 - Education
 - Networking
 - Business planning assistance
 - Venture capital

R&D Hotspots in US: Albany, New York (Microelectronics)

Key Factors

World Class Facility

Collaboration

Vision/Branding/
Marketing

Study Target Industry/Needs

Incentives

Research Tax Credit

Investment Tax Credit

Empire State Zones

Qualified Emerging
Technology Company
Credits

Examples

Sematech
(\$400 million partnership)

Tokyo Electron
(\$300 Million facility)

Albany Nanotech
(\$25 semiconductor firms/2,500
researchers)

Global Foundries
(\$4.5. Billion Chip Fab)

R&D Hotspots in US: Denver, Colorado (Wind/Solar)

Key Factors

Renewable Energy –
Programs & Laws

Funding

Federal Environmental
Office Cluster

Research Lab Access –
Private & Federal

Incubator Space

Collaboration

Incentives

Innovation Investment
Tax Credit

Enterprise Zones

Bioscience Discovery
Evaluation Grant program

Job Creation Performance
Incentive Fund

Examples

Vestas Wind Systems
(four CO plants; 2,500 jobs)

Vestas Suppliers
(Seven or more new firms)

SMA Solar Technology AG
(new mfg facility)

R&D Hotspots in US: Kansas City, Missouri (Animal Science)

Key Factors

**Capital
Facilitation/Assistance**

Educational Institutions

**Research Base –
Private & Academic**

**Infrastructure & Support
Services**

**Focused Mission/
Branding/Marketing**

Incentives

Quality Jobs Program

**Enhanced Enterprise Zone
Tax Benefit program**

**Chapter 100 Industrial
Development Bonds**

BUILD Program

Examples

**National Bio & Agro-Defense
Facility**

(new facility in Manhattan, KS: \$700
million+, 500 Jobs)

**Boehringer Ingelheim
Vetmedica Inc.**

(expansion in St. Joseph, MO: R\$150,
124 jobs)

Mars Petcare US

(New R&D facility in Kansas City, Mo;
157 jobs)

R&D Hotspots in US: Orlando, Florida (Digital Media)

Key Factors

Marketplace

Education

World Recognition

Workforce Development
Programs

Medical Simulation

Incentives

High Impact Performance
Incentive Grants

Enterprise Zone credits

Capital Investment Credit
(High Impact Sector)

Qualified Target Industry Tax
Refund.

Examples

Creative Village

68 acre campus, 700
employees developing EA
sports games

Indra Systems

\$12M contract to develop a
simulator for the Marines' AV-8B
Harrier vertical takeoff aircraft

Helios:

incubator that spawned IMI
Labs

R&D Hotspots in US: Pittsburgh, Pennsylvania (Information Technology)

Key Factors

IT- Foundation for other
Sources

Collaboration

Educational Institutions

Research Base –
Private & Academic

Funding

Incubators

Incentives

Research Tax Credit &
Assignment Program

Keystone Opportunity &
Innovation Zones

Opportunity Grant Program

Job Creation
Tax Credit

Examples

Google Pittsburgh

(Expansion, employment growth not
disclosed)

Carnegie Mellon University- Collaborative Innovation Center

(Corp, Univ & gov research tenants
include: Intel, Apple, 3Ksoft, Microsoft
Robotic, Cylab, CERT, Disney)

R&D Hotspots in US: St Louis, Missouri (Bio/Agro Technology)

Key Factors

University Programs

Research Centers –
University & private

Incubator Space

Legislation to fund R&D

Contract Research
Organization presence

Incentives

Quality Jobs Program

Enhanced Enterprise Zone Tax
Benefit program

Chapter 100 Industrial
Development Bonds

BUILD Program

Examples

Centocar Biologics

Stereotaxis

Kereos

Orion Gernomics

NanoVir

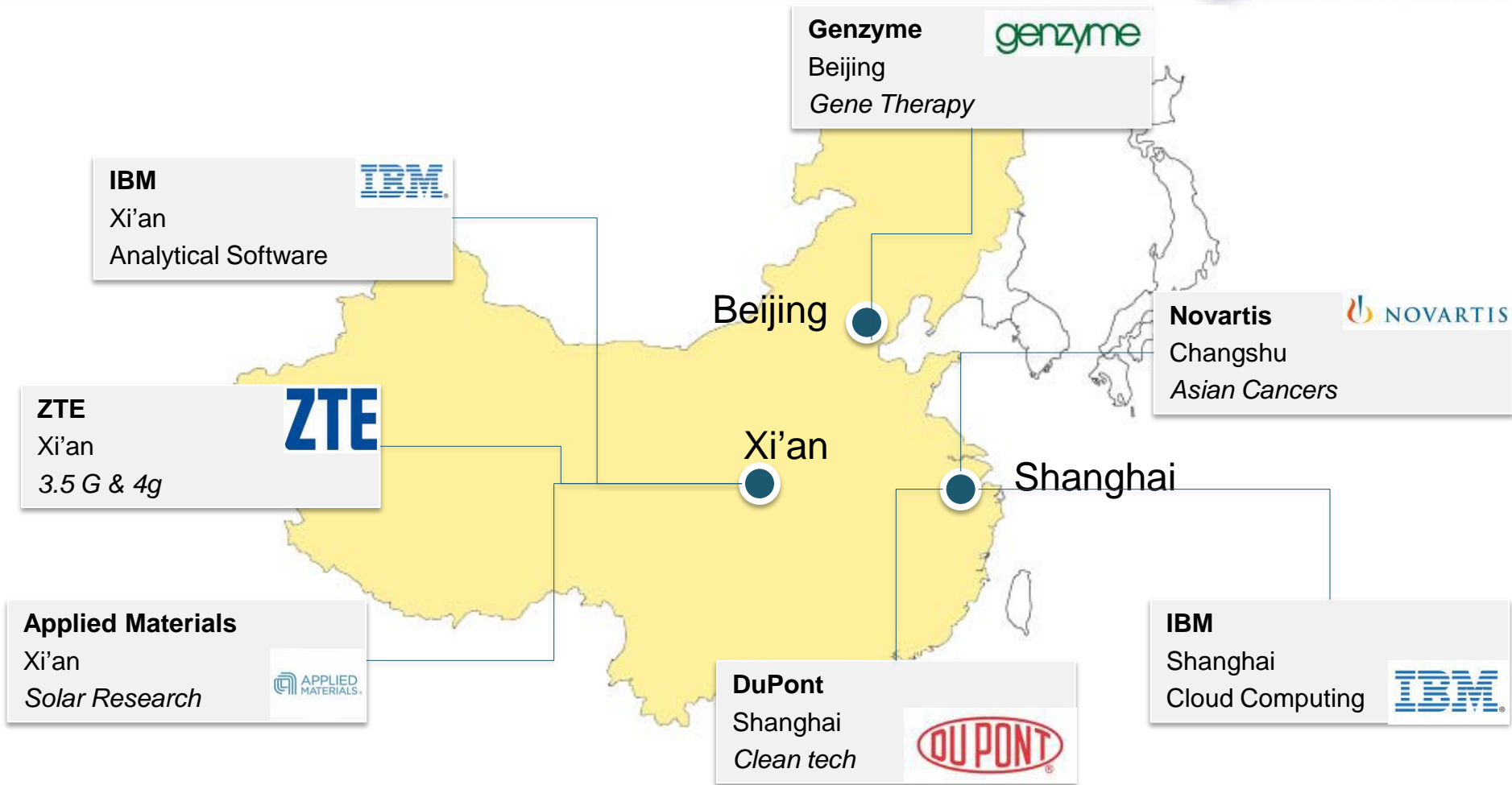


R&D Hotspots in Asia

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R&D Hotspots in North East Asia



R&D Hotspots in China

Key Factors

Low Costs

Government Support

Domestic Market

Millions of Researchers

Incentives

Lower Corporate Income
Tax

150% deduction on fees

Free Import Duty

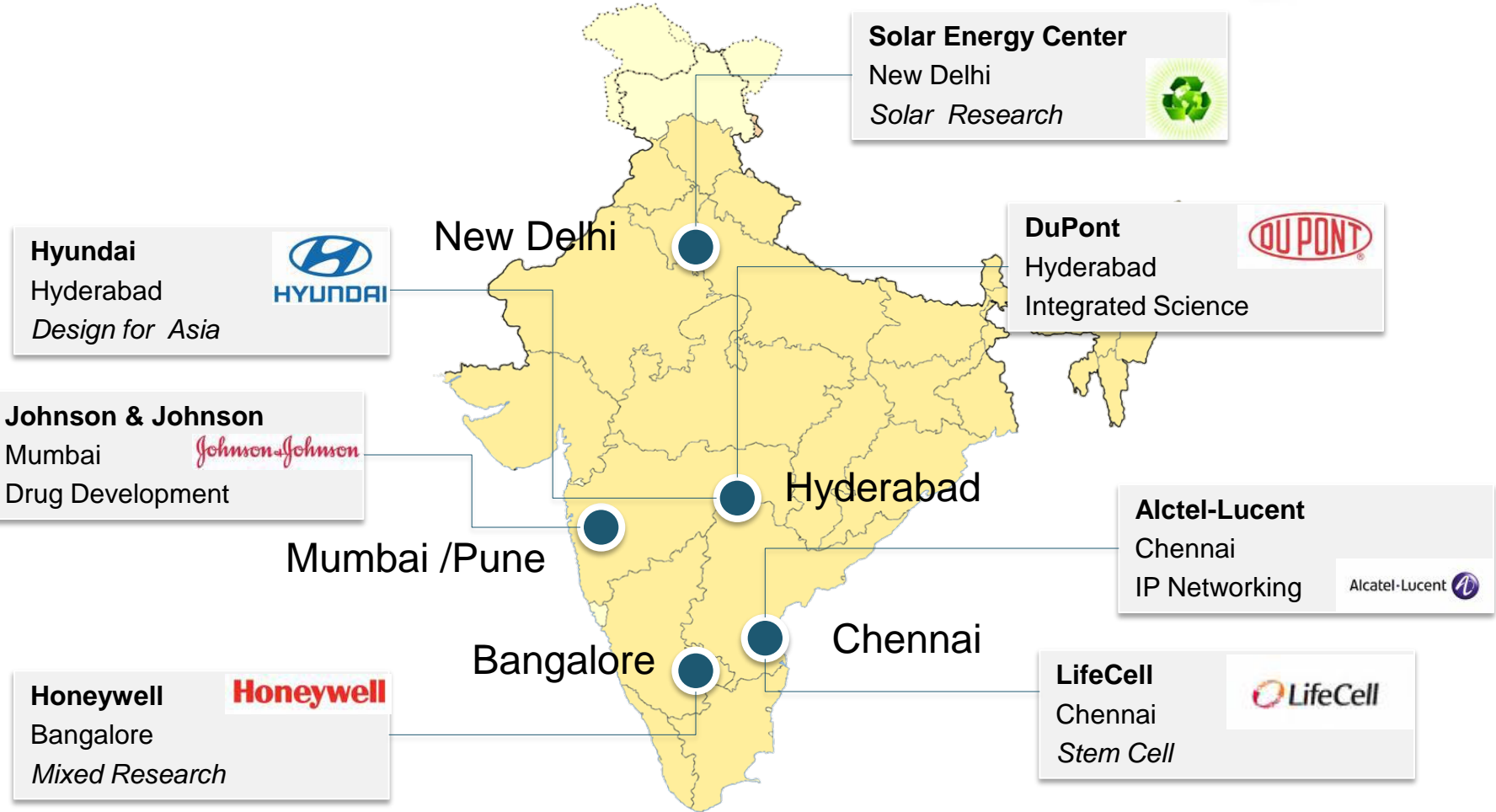
VAT Return

Examples

Genzyme R&D and
Laboratory Base

Novartis

R&D Hotspots in India



R&D Hotspots in India

Key Factors

Talent

Domestic Market

Spending

VC for start ups

Incentives

10 Year tax holiday

Up to 200% reductions

Duty free import of
specified goods

Excise duty waiver

Examples

Honeywell
International

LifeCell

R&D Hotspots in Southeast Asia



R&D Hotspots in Southeast Asia: Singapore

Key Factors

Spending

IP laws

NUS & NTU

Commercialization

Incentives

Cash Grants

Up to 15% deductions

Write down allowances

VC Incentive

Examples

HP Printer R&D Lab

Abbott



R&D Hotspots in Europe

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Objective

Insight and understanding of the competitive strengths of Europe's tech cities. Research by Buck Consultants International, 2008

Methodology

- 1 Technology and know-how
- 2 Talent
- 3 Market size
- 4 Connectivity
- 5 International Business Climate



Results Europe's Tech Cities Index



Rank	City	Total score ¹⁾	Factor scores				
			Technology & know-how (20%)	Talent (35%)	Market (10%)	Connectivity (20%)	International business climate (15%)
1	Paris	4.01	3.8	3.9	5.0	5.0	2.7
2	London	3.80	2.4	4.0	5.0	4.2	3.9
3	Oxford	3.70	3.4	3.7	4.0	3.8	3.9
4	Cambridge	3.62	3.8	3.3	3.6	3.8	3.9
5	Berlin	3.45	4.0	2.8	4.3	4.3	2.6
6	Madrid	3.43	1.9	4.0	4.0	4.3	2.7
7	Munich	3.41	4.4	2.4	4.3	4.4	2.6
8	Copenhagen	3.36	3.0	3.7	1.7	3.4	4.1
9	Manchester	3.35	2.2	3.1	4.3	4.0	3.9
10	Zurich	3.20	4.4	2.2	2.4	4.1	3.2
	Amsterdam	3.20	1.9	3.1	3.0	5.0	2.9

1) Maximum score is 5

Source: Buck Consultants International

How can regions & cities develop successful strategies?

Companies have specific locational strategies

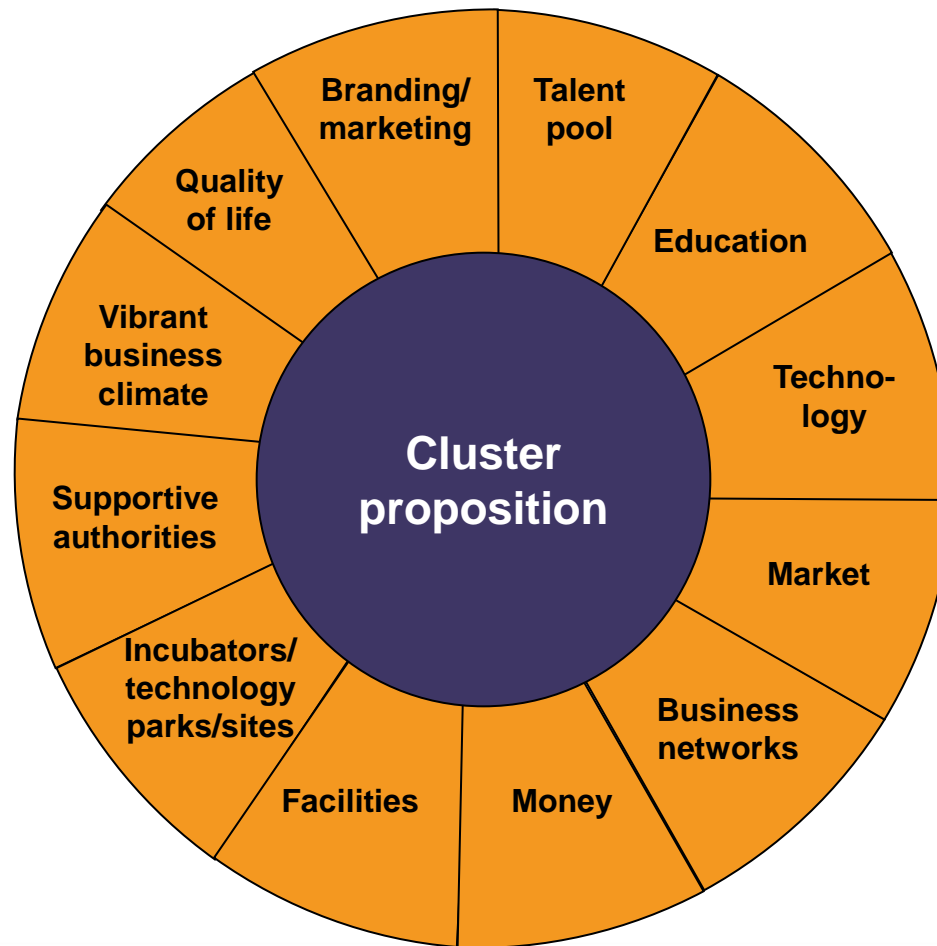
Sector of industries have specific hot spots

Regions and cities have to define specific strategies

Technology based marketing starts with specifying in which technologies your city/region is world class (mapping the technology base) and then market that proposition to a selected group of companies who should have your specific proposition on their radar screen

Value proposition
commitment
investment

The Buck Consultants International Cluster Propositions Clock





Review of Key Factors

- Talent
- Culture
- Universities
- Investments

New Paradigms

- Partnership with innovative companies
- Partnership with innovative communities

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Appendix A: Sample of Emerging R&D Centers in U.S.



Metro	Principal University	Primary
Sacramento	UC Davis	Electronics
Portland	Portland State, U of Portland	Electronics, Solar
SLC	U UT, UTSU, BYU	Life Science, IT, Finance
San Antonio	UT (70 mi), Military	Life Science, IT, Finance
San Diego	UCSD, SDSU	Life Science, IT, Finance
Madison	UWI	Life Science, IT, Finance
Tucson	U of Arizona	Optics
Phoenix	Biomed Ct., ASU	Bio
C-Springs	UCCP, USAF, NORAD	IT
Kansas City	JMKC, KU	Animal Science, Geospatial
St. Louis	Washington U, St. Louis U	Biotech, IT
Boise	BSU	Electronics
Orlando	UCF	Digital Media
Melbourne	NASA	Aerospace
Huntsville	UA Huntsville	Aerospace, Defense

Appendix A: Sample of Emerging R&D Centers in U.S.



Metro	Principal University	Primary
Cleveland	Clinic, Cleveland St., John Carroll	Bio, Materials
Akron	U of Akron	Fuel Cells
Denver	U of CO, CSU	Alternate Energy
Hampton Roads	ODU	IT
Pittsburgh	Carnegie Mellon, U of Pitt	Materials, IT, Bio
Albany	SUNY Albany, RPI	Micro-Electronics
Baltimore	Johns Hopkins, UMBC	Life Sciences, Aerospace
Nashville	Vanderbilt, TN Tech	Automotive, Bio, IT
Knoxville	UT	Alternate Energy
Charleston	Med. U of Charleston, Citadel	Bio, Aerospace
Greensboro	UNC Greensboro, Wake Forest	Logistics
Louisville	U of Louisville	Logistics
Indianapolis	UPUI, Butler	Bio
Richmond	U of Richmond, VCU	Bio
Kalamazoo	Western MI University	Bio

Appendix B: Examples of Successful University Tech Transfer/Commercialization

University	Sample Spinoff Companies
Georgia Tech	Cyber Clonee (telemed systems), Syntermed (cardiac imaging tools), Sinova (solar)
University of central Florida	Opti Grate (photonics), The Innovation Shop (broadcast video design), Nanospective (biomaterials)
Colorado State University	Solix BioFuels, Envirofit (Best practices for developing countries), Avoitechnologies (solar panels)
University of Kansas	Critech (nano particles), DAR Corp (aerospace), Xenotech (pre-clinical drug safety)
Wake Forest	Fiber Cell (solar panels), Great Wall Systems (network security), Point DX (medical imaging devices)
IUPUI	Tiento Sciences (bio), Angel Learning (online learning systems), CS Keys (proteomics)
Cleveland Clinic	Cleveland Biolabs, Intellect Medical, Cleveland Heart Inc, ZIN technologies
Case Western Reserve	Fluence Therapeutics, Athersys (stem cell therapies), Synopse (bio)
University of Michigan	Sheppard Intelligent systems (transportation tracking), Arbor Photonics (MXR), Precision Lasers, Translume (waveguide optics), Tissue Regeneration Systems (bio)
University of Tennessee	Innutrial(Bio) Viral Antigens, Neil One Therapeutics
University of Utah	Lino Gen (diagnostic tools), Vestan (Medical Imaging), Intellisun (engineering software systems)
University of Science Center (Penn + other) schools	Avid Radiopharmaceuticals, Integral Molecular, BioNonomatrix
University of New Mexico	Applied Technology Associates (precision sensing), Concise Logic (semiconductor design software), Avanca (medical devices)

Appendix D: Strategic Collaborative efforts in metros such as those appearing on maps have produced results

New R&D Center	Industry	Metro
Revolt Technology	Batteries	Portland OR
Fiber Web	Non woven materials	Nashville
Steak & Shake	Food research/test kitchen	Indianapolis
Siemens Energy	Wind Turbines	Boulder
Sanofi – Aventis	Pharma	Tucson
DRI Medical	Instruments	Cleveland
Ceramic tec	Batteries	Salt Lake City
Immune togix- Measurement Specialties	Instruments	Hampton Roads
Syngentia	Crop research	Greensboro
Edge Technologies	Electronics	Boise