

National Science Foundation
Building a New Foundation For Innovation -
Workshop
Partnerships, Clusters and Networks
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INTERNATIONAL VIEW

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International Innovation Environment

- ***Private Sector (Data from 500 global firms from 1992-1998)**
 - **Sectors Covered: Electronics, Chemicals, Aerospace, Software Pharmaceuticals, Automobiles, Computers, Petroleum**
 - **US R&D intensities have remained the same, but patent count has increased**
 - **R&D spending as a % of sales: biotechnology>software>pharmaceuticals**
 - **US based firms increased their technological lead in automobiles, computers, biotechnology, software and pharmaceuticals**
 - **R&D and patenting trends suggest that knowledge – intensive industries such as biotechnology, software and pharmaceuticals will dominate the coming decade**
 - **In all sectors-top 10 R&D spenders hold 50% of patents granted.**

(*) “R&D spending patterns of Global Firms”, B. Bowonder, S.Yadau, and B. Sunil Kumar, Research – Technology Management, Sept/Oct 2000, p.40.

International Innovation Environment (continued)

- ***Global R&D Investments by Country of Origin**
 - **Foreign R&D Investments In the United States**
 - **Tripled between 1987 and 1997 (\$6.5B to 19.7B)**
 - **At the end of 1998 there were 715 R&D facilities owned by 375 parent companies**
 - **Japan lead with 251 facilities; Germany with 107; the United Kingdom with 103; France with 44**
 - **R&D expenditures: Switzerland and Germany, \$3.3B; Japan, \$3.2B; UK, \$3.1B. Biggest impact from acquisitions in the US.**
 - **Sectors: drug and biotech, 116 facilities; chemical and rubber, 115; computer software, 54, automotive, 54; medical devices and instrumentation, 53.**
 - **Geographic concentration: CA (Silicon Valley and LA); Detroit; Princeton: Research Triangle Park, and Boston**
 - **Reasons for US Investments**
 - **Meet US customer needs**
 - **Keep abreast of tech developments in US**
 - **Employ US scientists and engineers**
 - **Cooperate with other US R&D labs**

(*) Globalizing Industrial Research and Development, Office of Technology Policy, U.S. Dept. of Commerce, 1999

International Innovation Environment (continued)

● *US Investment in R&D Abroad

- From 1987 to 1997 US firms have increased spending abroad from \$5.2B to \$14.1B
- Spending in newly industrialized or emerging markets has increased substantially

Israel	24M(1992)	209M (1997)
Mexico	76M (1992)	132m (1997)
Taiwan	54M (1992)	87M (1997)
Hong Kong	13M (1992)	84M (1997)
Singapore	112M (1992)	73M (1997)
China	3M (1992)	35M (1997)
India	3M (1992)	22M (1997)

(*) Globalizing Industrial Research and Development, Office of Technology Policy, U.S. Dept. of Commerce, 1999

International Innovation Environment (continued)

- Major Activity in Europe

Germany	1.7B (1989)	2.9B (1997)
UK	1.7B (1989)	2.3B (1997)
Canada	.98B (1989)	1.8B (1997)
France	0.52B (1989)	1.2B (1997)
Japan	1.00B (1989)	1.09B (1997)

National Collaborative Research in Developing Countries: Building Capacity

Scientifically Advanced Countries

- o Spend a portion of their R&D money for collaborative research
- o Mostly on individual collaborators
- o Overall Spending (1997): Collaboration (c) and Development Aid (d)

Canada	59M (c)	82 M (d)
EC	122 M (c)	-
France	328 M (c)	204 (d)
Germany	3 M (c)	118 (d)
Japan	406 M (c)	86 (d)
Sweden	57 M (c)	20 (d)
UK	64 M (c)	38 (d)
US	393 M (c)	236 (d)

Note: from “Science and Technology Collaboration: Building Capacity in Developing Countries”, C.S. Wagner, I. Brahmakulam, B. Jackson, A. Wong and Y. Yoda, Rand Corp (MR-1357.0WB), March 2001

Major R&D and Technology Collaborative Initiatives *

- e-ASEAN

- Endorsed by ASEAN leaders in November 1999
- Mission – to develop a comprehensive plan promote an e-ASEAN space including the economy, society, and government
- Goal – create a regional information technology network

- e-Europe

- Created by EC in January 2000
- Explicit plan for regional improvement
 - local loops
 - skills gap
 - entrepreneurship

(*) Foina J. M. Paula, Student Report for the Kennedy School of Government, Autumn 2000 (Thanks to Professor Deborah Hurley)

International Collaboration

- Science and technology results (excluding proprietary work) and globally dispersed
- R&D activity is globally dispersed
- “Outsourcing” by global companies growing rapidly
- New pockets of R&D competence
 - Finland
 - Israel
 - Singapore
 - India: People for hire
 - Ireland: People for hire
 - Others



Consequences of United States

- Workforce
- Capital In-flows
- Infra-structure