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2011 Global R&D Funding Forecast

House Research & Development Caucus

Presentation and Discussion

January 26, 2011

R&D™

Discussion Agenda

- Background Of R&D Funding Forecast
- U.S. R&D Situation
- Global Research Competitiveness
- Global R&D Situation

Background of Global R&D Funding Forecast

- 2011 Forecast was R&D Magazine's 53rd and Battelle's 43rd
- Truly collaborative effort between Battelle and R&D Magazine—joint efforts began in 1996
- Started "Global" Report in 2005—Converted to Combined Global/U.S. Forecast for 2009
- Synthesis, Analysis, Estimation, and Forecast Process
  - Secondary Data from NSF, OSTP, AAAS, Federal Agencies, OECD, EU, IMF, Trade/Technical Associations, Third Party Providers, Media Feeds/Alerts, etc.
  - Primary Data: R&D Magazine Reader Surveys & Battelle Internal Survey and Global Researcher Survey
  - Company Data: Annual Reports and SEC Filings

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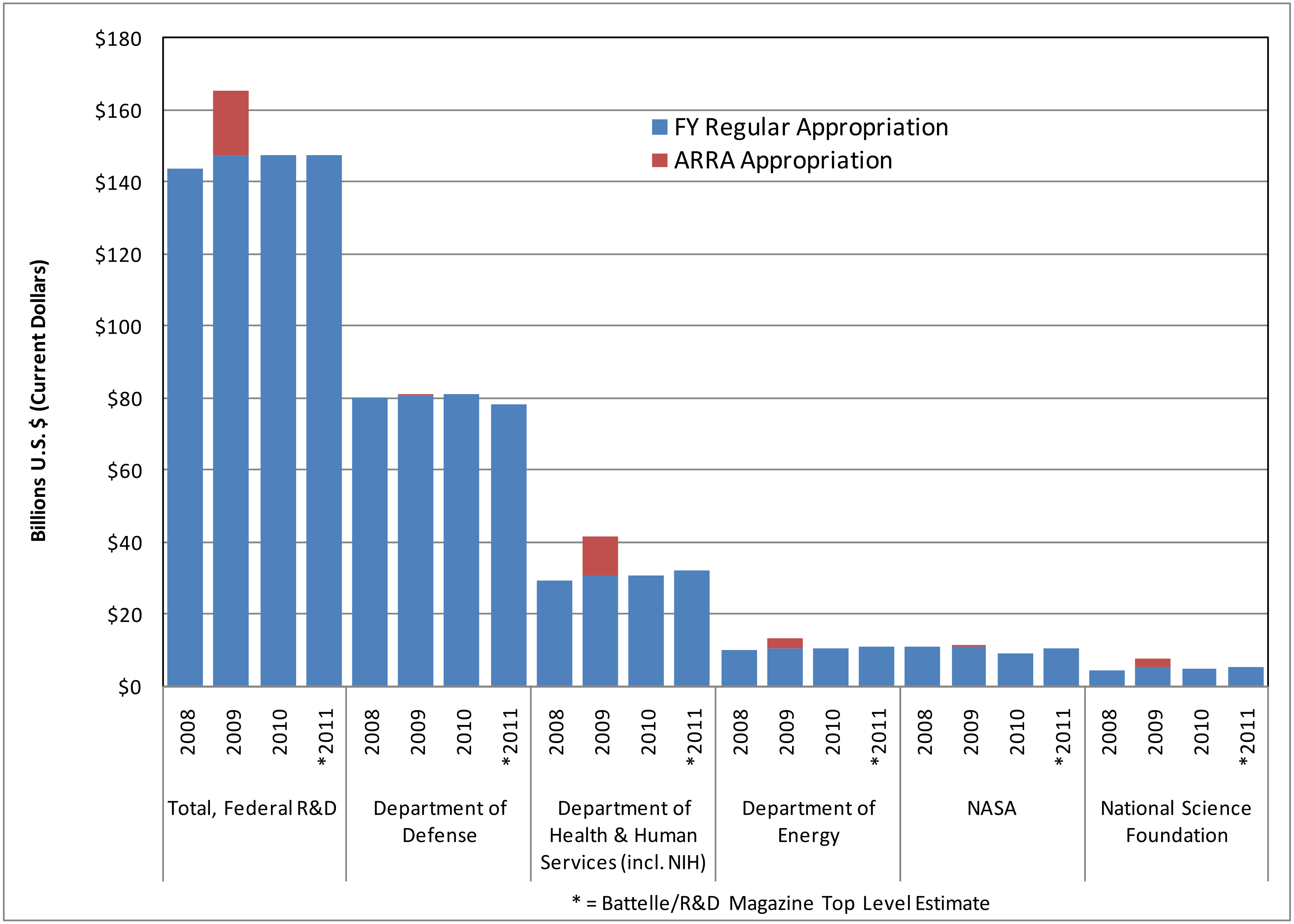
U.S. R&D Situation

Assumptions for 2011 U.S. R&D Forecast

- The recession is "technically" over
- Limited, flat "growth" in 2010 R&D investment likely continues through 2011
- ARRA continues to affect R&D expenditures
- Looming federal R&D funding cuts?
- Continued uncertainty regarding federal R&D tax cuts
- Changing baseline data from NSF

- *Underlying assumption that R&D funding has a certain level of inertia*

Recent R&D Appropriations for Key Federal Departments/Agencies



Source: Battelle/R&D Magazine Estimates with data from OSTP, AAAS

2011 U.S. R&D Forecast

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The U.S. Source-Performer Matrix

Estimated Distribution of R&D Funds in 2011

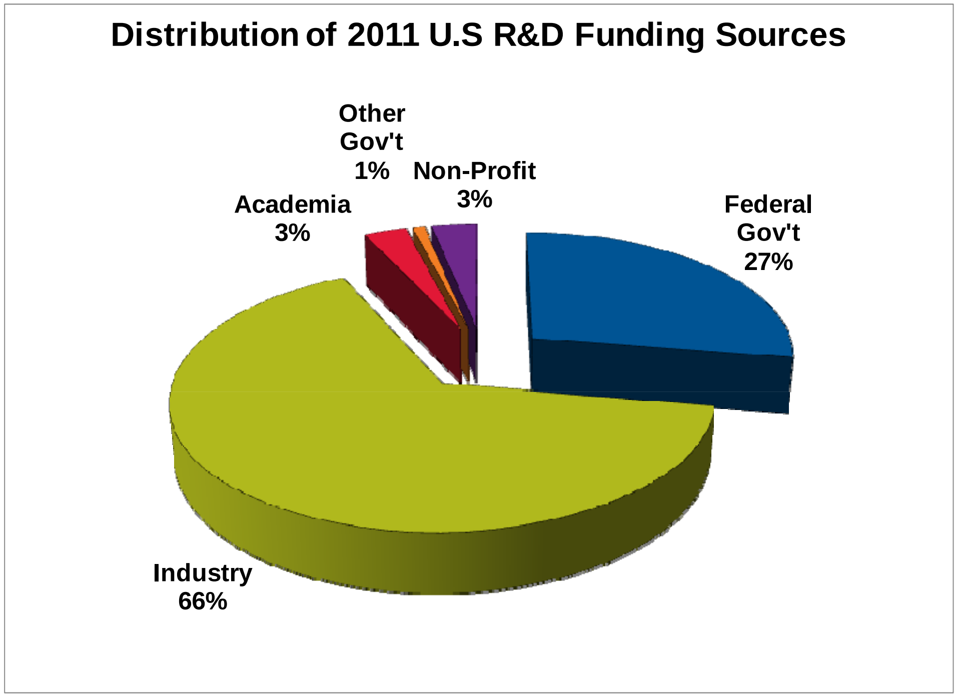
Millions of Current $US Dollars

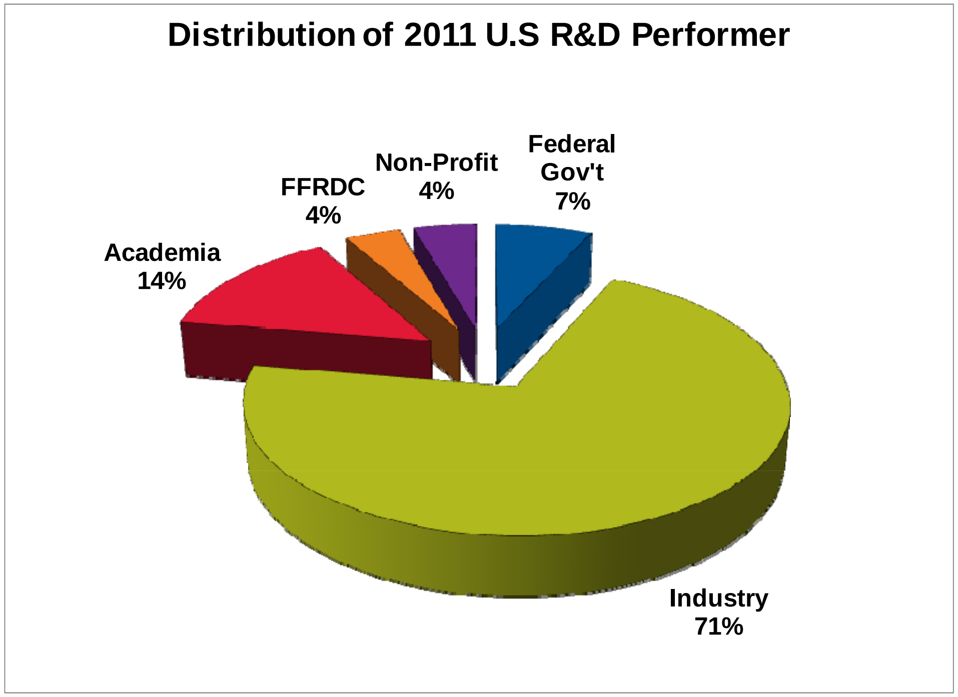
Percent Change from 2010

Source	Performer					
	Federal Gov't	Industry	Academia	FFRDC	Non-Profit	Total
Federal Government	$27,499 *-0.71%*	$25,983 *-0.05%*	$36,098 *0.58%*	$15,595 *-0.24%*	$6,245 *-0.19%*	$111,421 *-0.04%*
Industry		$260,878 *3.33%*	$2,785 *5.89%*		$1,781 *2.56%*	$265,444 *3.35%*
Academia			$12,140 *4.35%*			$12,140 *4.35%*
Other Government			$3,413 *5.34%*			$3,413 *5.34%*
Non-Profit			$3,088 *1.58%*		$9,778 *2.13%*	$12,865 *2.00%*
Total	$27,499 *-0.71%*	$286,862 *3.01%*	$57,524 *1.93%*	$15,595 *-0.24%*	$17,803 *1.348%*	$405,283 *2.40%* *

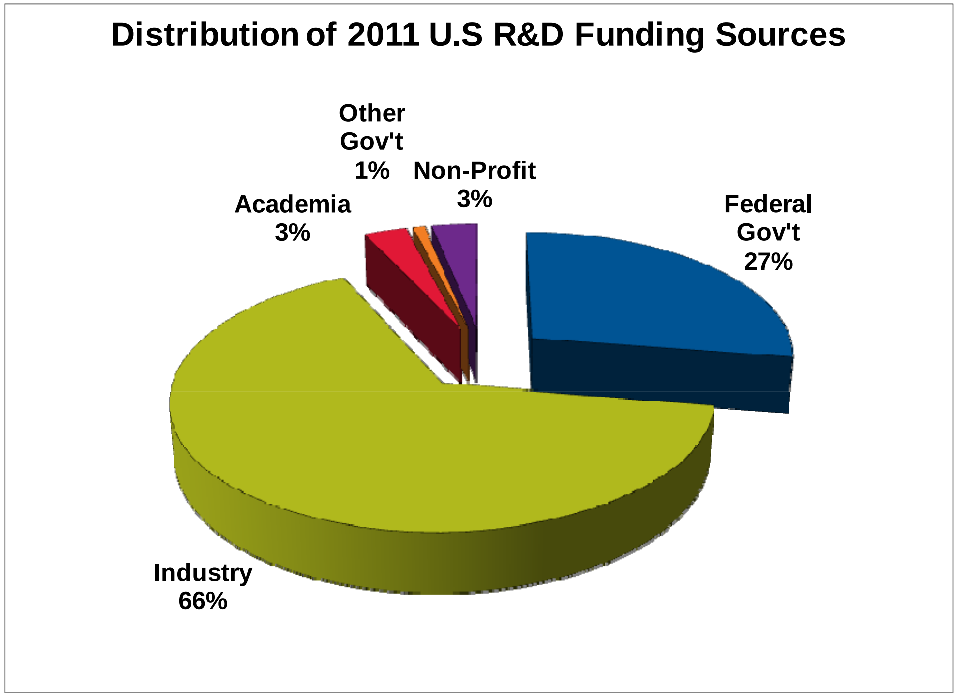
* When adjusted for a projected 1.5% inflation, *0.86%* “real” growth

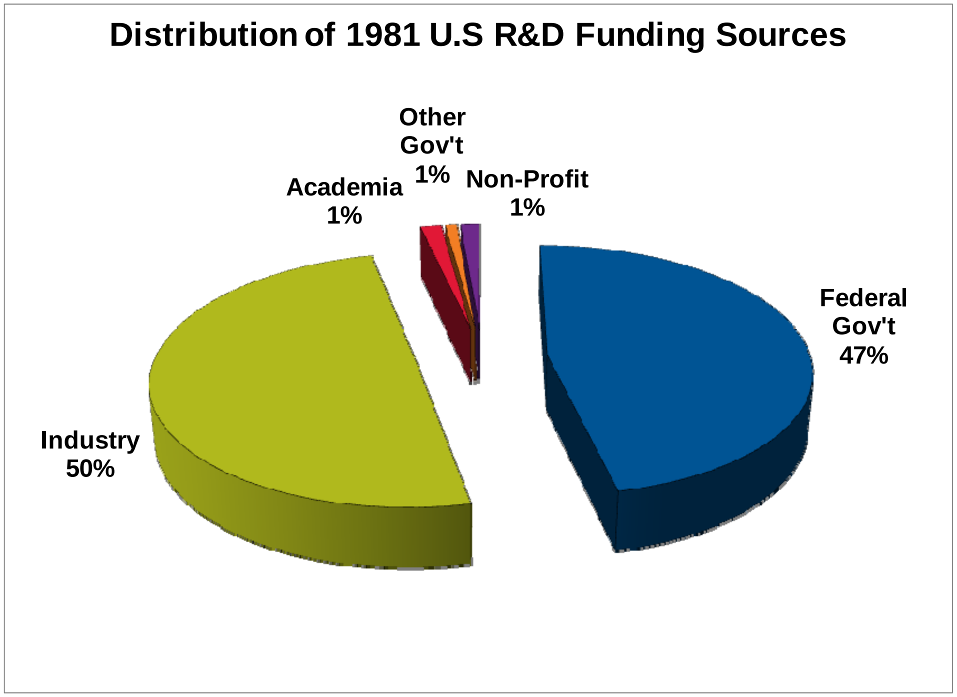
2011 U.S. R&D Source-Performer Shares



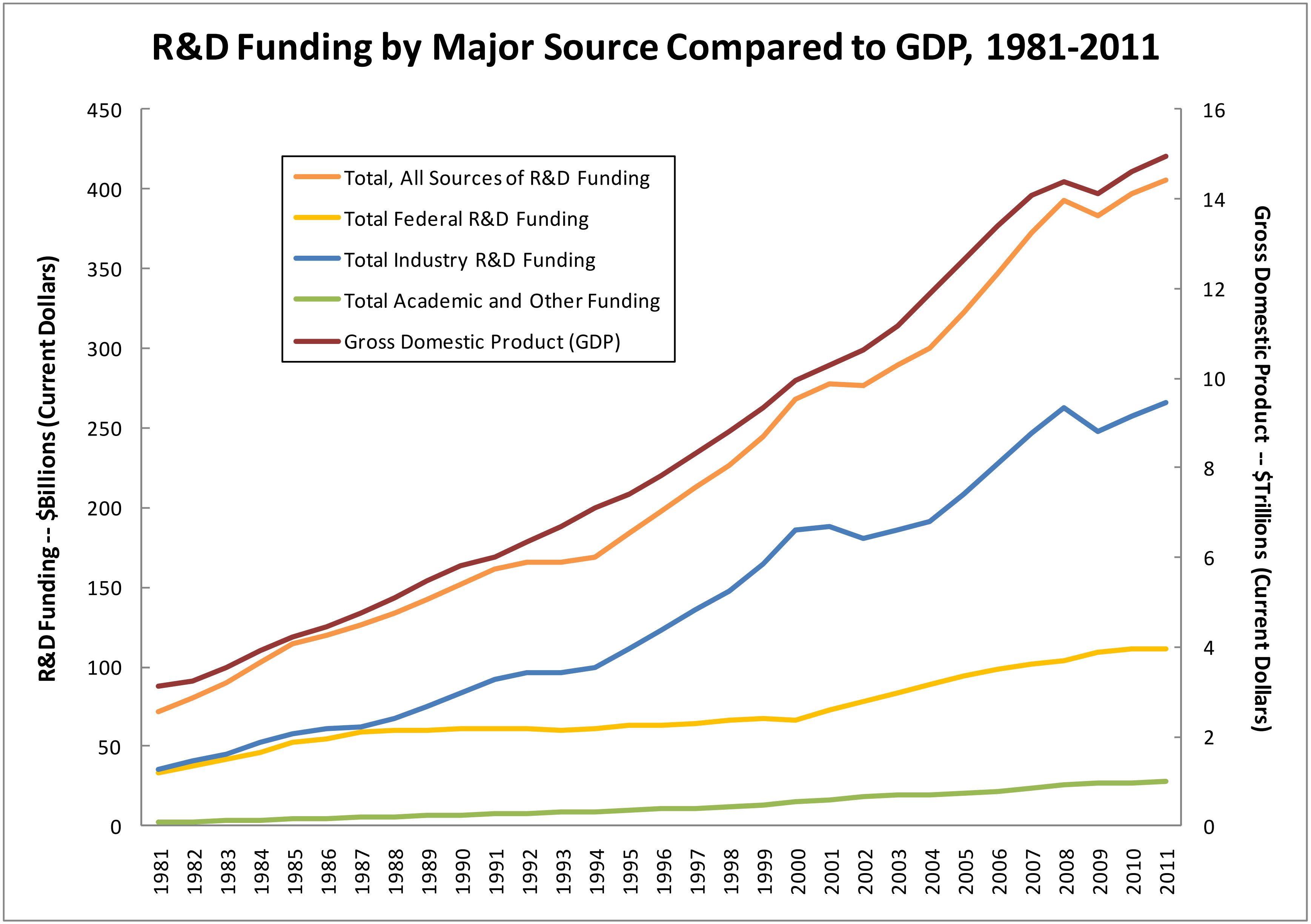


Comparison of U.S. R&D Funding Shares – 2011 and 1981





Long-term U.S. R&D Funding Trends



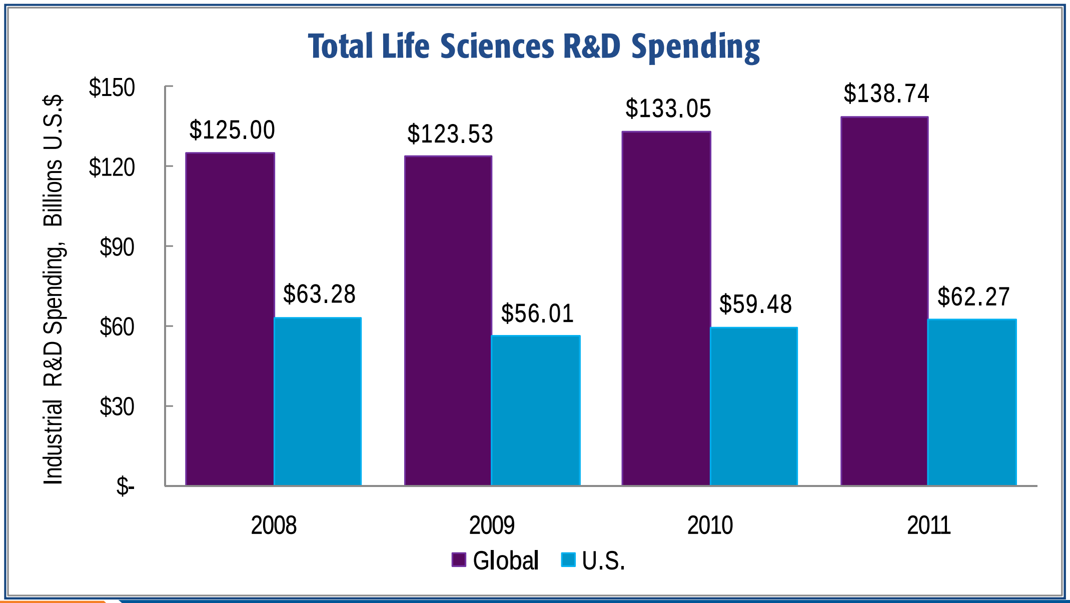
Recent Growth Cause for Concern?

- Average Annual Growth of U.S. R&D: **1981-2011**
  - Total U.S. R&D Funding: 5.9%
  - Total Federal R&D Funding: 4.1%
  - Total Industrial R&D Funding: 7.0%
  - R&D Share of GDP: 2.6%
- Average Annual Growth of U.S. R&D: **2006-2011**
  - Total U.S. R&D Funding: 3.2%
  - Total Federal R&D Funding: 2.6%
  - Total Industrial R&D Funding: 3.3%
  - R&D Share of GDP: 2.7%
- If total R&D grew by long-term average over last five years, it would be $57 Billion larger in 2011
- The "3.0% of GDP Goal" would make the 2011 amount $43 Billion larger

Industrial R&D

Life Sciences – Overview

- Key 2010-11 R&D Drivers
  - Continued M&A activity, with biotechs as pharma pipeline
  - Impending patent expirations
  - Rationalization of R&D activities – leading to significant job cuts
- 2008-2011 Growth: U.S. (-1.6%), Global (11.0%)

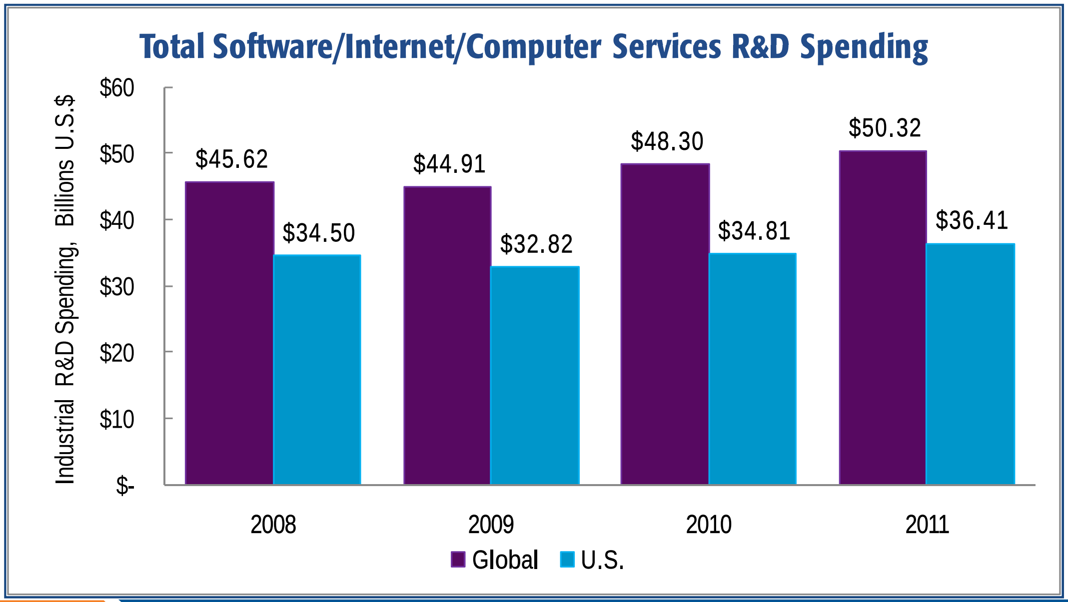


Life Sciences – Company Performance

Life Sciences	2008	2009	Q1-Q3 2010
Top U.S. R&D Spenders	Millions, U.S.$		
Merck & Co	8,334.3	8,425.0	6,474.0
Pfizer, Inc.	7,945.0	7,845.0	6,607.0
Johnson & Johnson	7,577.0	6,986.0	4,862.0
Lilly (Eli) & Co	3,840.9	4,326.5	3,446.1
Bristol-Myers Squibb Co	3,512.0	3,647.0	2,556.0
Amgen, Inc.	3,030.0	2,864.0	2,010.0
Abbott Laboratories	2,688.8	2,743.7	2,667.0
Medtronic	1,335.0	1,451.0	n/a
Biogen Idec Inc	1,072.1	1,283.1	957.8
Monsanto Co	1,033.0	1,113.0	938.0
Boston Scientific Corp	1,006.0	1,035.0	715.0
Gilead Sciences	721.8	939.9	680.2
Baxter International	868.0	917.0	653.0
Genzyme Corp	1,308.3	865.3	653.5
Celgene	931.2	794.8	801.0

Information Technologies – Overview

- Key 2010-11 R&D Drivers
  - Ubiquitous technology – software/IT-related R&D occurring in many industry segments
  - Big plays – cloud computing and wireless applications
- 2008-2011 Growth: U.S. (10.3%), Global (5.5%)

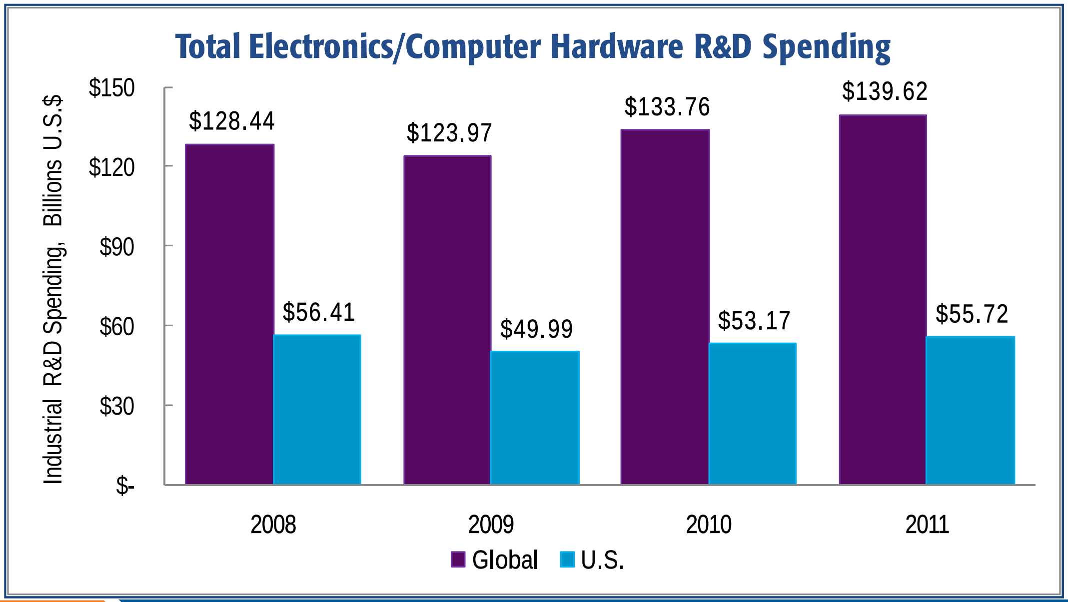


Information Technologies – Company Performance

Software/Internet/Computer Services	2008	2009	Q1-Q3 2010
Top U.S. R&D Spenders	Millions, U.S.$		
Microsoft Corp	9,015.0	8,581.0	6,766.0
International Business Machines Corp	6,337.0	5,820.0	4,448.0
Google Inc	2,793.2	2,843.0	2,710.0
Oracle Corp	2,776.0	2,775.0	2,989.0
Electronic Arts Inc	1,343.0	1,250.0	863.0
Yahoo Inc	1,221.8	1,210.2	804.4
Symantec Corp	868.3	865.5	632.0
Activision Blizzard	592.0	627.0	366.0
Intuit	561.7	567.0	n/a
Adobe Systems Inc	662.1	565.1	509.9
CA	494.0	481.0	376.0
Autodesk	576.1	457.5	n/a

Electronics/Computer Hardware – Overview

- Key 2010-11 R&D Drivers
  - Global production with significant U.S. intellectual base
  - Agile R&D as a Strategic Advantage
  - Moving beyond commodities– often requires collaborative R&D efforts
- 2008-2011 Growth: U.S. (-1.2%), Global (8.7%)

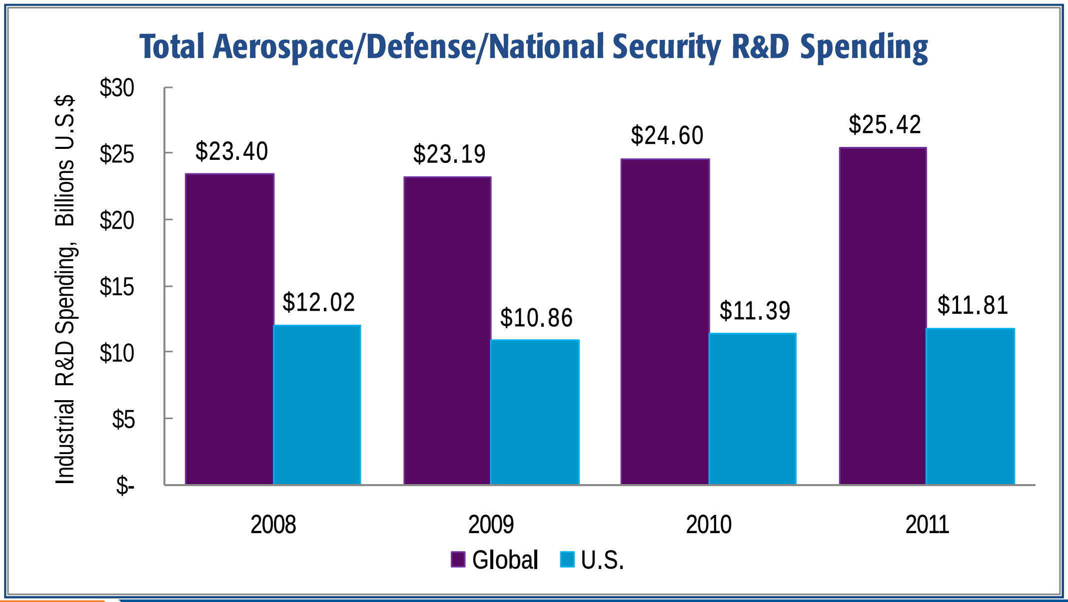


Electronics/Computer Hardware – Company Performance

Electronics/Computer Hardware	2008	2009	Q1-Q3 2010
Top U.S. R&D Spenders		Millions, U.S.$	
Intel Corp.	5,722.0	5,653.0	4,905.0
Cisco Systems Inc	5,518.0	4,994.0	4,233.0
Motorola, Inc.	4,109.0	3,183.0	2,156.0
EMC Corp	3,006.9	2,829.6	1,395.9
Hewlett-Packard Co	3,185.0	2,768.0	n/a
Qualcomm Inc	2,373.0	2,432.0	1,953.0
Advanced Micro Devices	1,848.0	1,721.0	1,053.0
Broadcom	1,497.7	1,534.9	1,290.1
Texas Instruments Inc	1,940.0	1,476.0	1,178.0
Apple, Inc.	1,178.0	1,416.0	1,384.0
Applied Materials Inc	1,060.4	973.6	n/a
NVIDIA Corp	855.9	908.9	n/a
Freescale Semiconductor Inc	1,140.0	833.0	582.0
Juniper Networks	731.2	741.7	662.9
Agilent Technologies	692.0	622.0	n/a

Aerospace/Defense/Security – Overview

- Key 2010-11 R&D Drivers
  - Funding pressure ahead – will defense cuts reach R&D?
  - Changing nature of defense R&D?
  - Are collaborative requirements the answer?
- 2008-2011 Growth: U.S. (-1.8%), Global (8.6%)

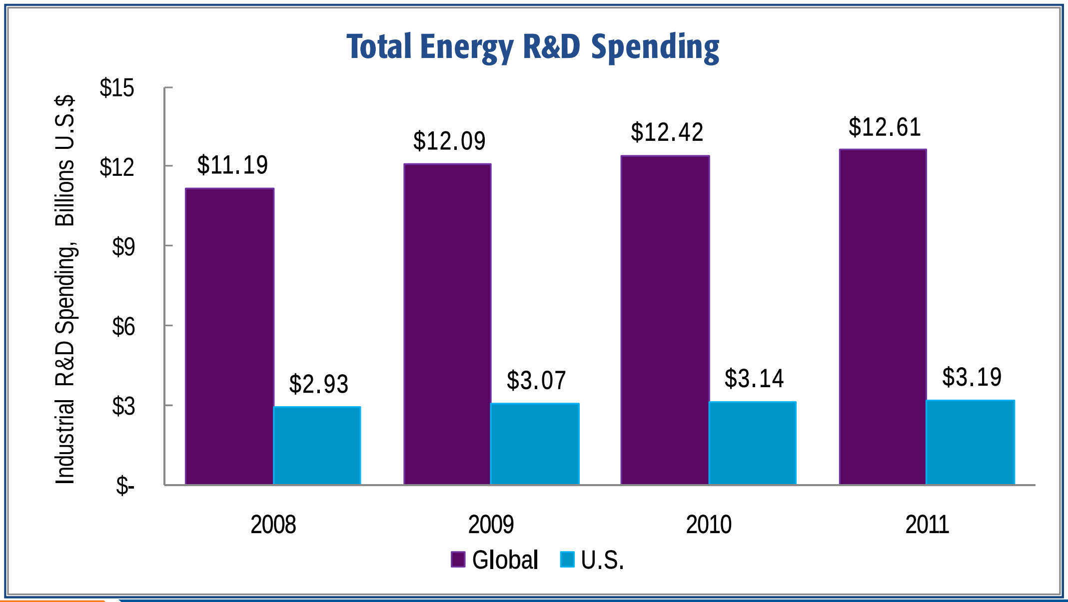


Aerospace/Defense/Security – Company Performance

Aerospace/Defense/National Security	2008	2009	Q1-Q3 2010
Top U.S. R&D Spenders	Millions, U.S.$		
Boeing Co	3,768.0	6,506.0	2,987.0
Textron	966.0	844.0	n/a
Lockheed Martin	719.0	750.0	n/a
Northrop Grumman Corp	564.0	610.0	n/a
Raytheon	517.0	565.0	n/a
General Dynamics	474.0	520.0	n/a
Rockwell Collins	393.0	355.0	n/a
L-3 Communications	254.0	257.0	n/a
Goodrich	284.0	239.0	n/a
Orbital Sciences	51.4	109.8	95.8
BE Aerospace	131.4	102.6	81.2
Moog	111.0	98.8	78.7
FLIR Systems	90.0	91.3	81.6
Esterline Technologies	82.6	65.9	n/a
Alliant Techsystems	87.2	65.6	58.2

Energy – Overview

- Key 2010-11 R&D Drivers
  - Limited corporate R&D investment – leaves significant and defining role for federal energy R&D
  - U.S. seen by foreign "energy" companies as having significant market potential
  - Smart grid development attracting major R&D players
- 2008-2011 Growth: U.S. (9.0%), Global (12.8%)

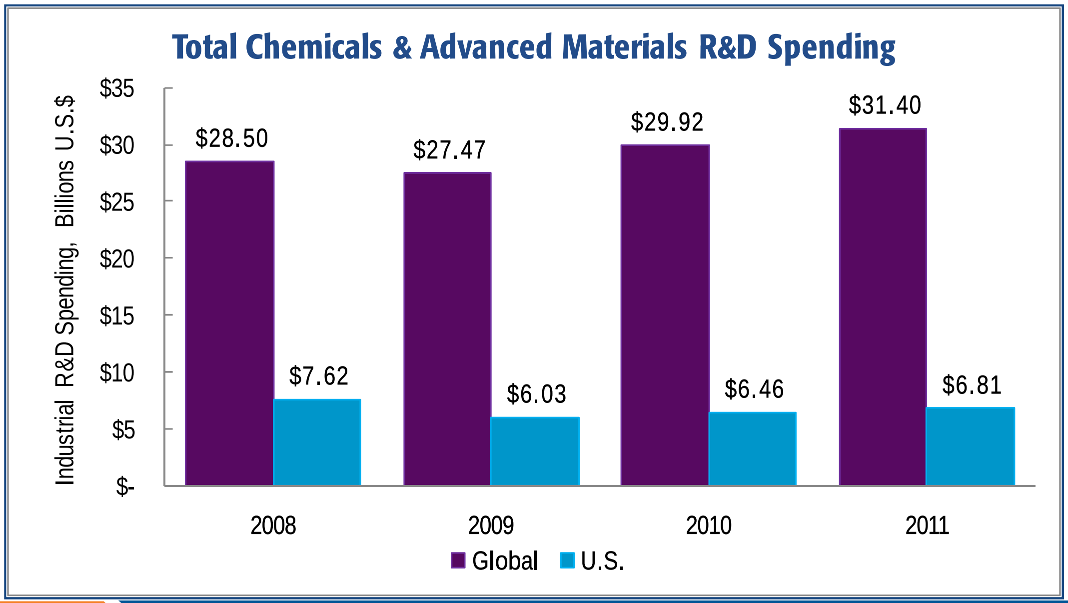


Energy – Company Performance

Energy	2008	2009	Q1-Q3 2010
Top U.S. R&D Spenders		Millions, U.S.$	
Exxon Mobil	847.0	1,050.0	n/a
Chevron	702.0	603.0	n/a
ConocoPhillips	209.0	190.0	n/a
USEC	110.2	118.4	80.3
First Solar	33.5	78.2	67.2
Cree	66.9	75.1	66.6
McDermott International	40.1	54.2	n/a
A123	37.0	48.3	27.9
SunPower	21.5	31.6	n/a
GT Solar International	17.7	21.5	14.1
FuelCell Energy	21.6	20.2	n/a
Evergreen Solar	22.0	18.1	15.1
Ascent Solar Technologies	10.1	15.5	16.9
DayStar Technologies	17.7	14.7	n/a
Ormat Technologies	4.6	10.5	8.1
Energy Conversion Devices	8.0	10.2	n/a
EnerNOC	6.1	7.6	n/a

Chemicals & Advanced Materials – Overview

- Key 2010-11 R&D Drivers
  - Like IT, often difficult to draw line between advanced material companies and other segments
  - Customer applications continue to drive R&D
  - Federal funds still critical to Nanotech-related R&D path
- 2008-2011 Growth: U.S. (-10.6%), Global (10.2%)



Chemicals & Advanced Materials – Company Performance

Chemicals & Advanced Materials	2008	2009	Q1-Q3 2010
Top U.S. R&D Spenders	Millions, U.S.$		
Dow Chemical	1,310.0	1,492.0	1,217.0
DuPont	1,393.0	1,378.0	1,178.0
3M Co	1,404.0	1,293.0	1,046.0
PPG Industries	451.0	388.0	290.0
Lubrizol	220.9	212.1	160.3
ALCOA	246.0	169.0	124.0
Huntsman International LLC	154.0	145.0	111.0
Eastman Chemical Co	158.0	137.0	115.0
Air Products & Chemicals Inc	134.2	110.3	87.5
Avery Dennison	94.0	90.7	n/a
Ashland (incl Hercules)	27.0	89.0	66.0
Celanese	80.0	75.0	56.0
Praxair	97.0	74.0	56.0
W R Grace	83.0	70.0	44.9
Owens Corning	69.0	61.0	55.0
Hexion Specialty Chemicals	73.0	61.0	n/a
Sherwin-Williams Co	37.5	40.4	n/a
MEMC Electronic Materials	40.8	40.4	36.6

Global Research Competitiveness

Perspectives From The Global Researcher Community

- Unique survey of global research community – focused on those involved in industrial and collaborative research
- Results consist of 378 respondents from 38 different countries – including U.S., UK, Japan, India, Russia, and China
  - 53% of respondents were from U.S.
- Majority of respondents from life science, energy, chemicals & advanced materials, electronics, IT firms

Most critical R&D challenges in 2011?

Challenges	U.S. Researchers	Non-U.S. Researchers	All Researchers
Limited Budget	41%	33%	37%
Development Time	37%	30%	34%
Competition	35%	31%	33%
Collaboration	31%	33%	32%
Cost-Savings Requirements	30%	28%	29%
Intellectual Property	22%	24%	22%
Skilled Worker Shortages	16%	19%	17%
Technology Solutions	17%	18%	17%
Globalization	15%	14%	15%
Outsourcing	17%	10%	13%
Product Prioritization	13%	15%	13%
Product Qualification	9%	11%	10%
Legal Issues	12%	6%	9%
Cost of Instrumentation	6%	9%	7%
Product Safety	6%	8%	7%
Energy Use	6%	6%	6%
Inflation Costs	2%	5%	3%

Key Global Issues Impacting Future R&D Efforts

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U.S.

- Healthcare for the Aging
- Demand for Renewable/Sustainable Energy
- Global Population Growth
- Growth in Consumerism in Emerging Markets
- Threat of Global Pandemics

Non-U.S.

- Demand for Renewable/Sustainable Energy
- Global Population Growth
- Climate Change/Global Warming
- Healthcare for the Aging
- Environmental Clean-up/Remediation

U.S. Competitive Position

Agriculture & Food Production	Composite, Nanotech, & Other Adv. Materials	Energy Generation & Efficiency	Healthcare, Medical, Life Science & Biotech	Instruments, Electronics & Computer Hardware	Military, Defense & Security	Software & Information Management	Automotive/ Other Motor Vehicle	Aerospace, Rail, and Other Non-Automotive Transport
USA	USA	USA	USA	USA	USA	USA	Japan	USA
China	Japan	Germany	UK	Japan	Russia	India	USA	Japan
India	Germany	Japan	Germany	China	China	China	Germany	China
Brazil	China	China	Japan	South Korea	Israel	Japan	China	Germany
Japan	UK	UK	China	Germany	UK	Germany	South Korea	France

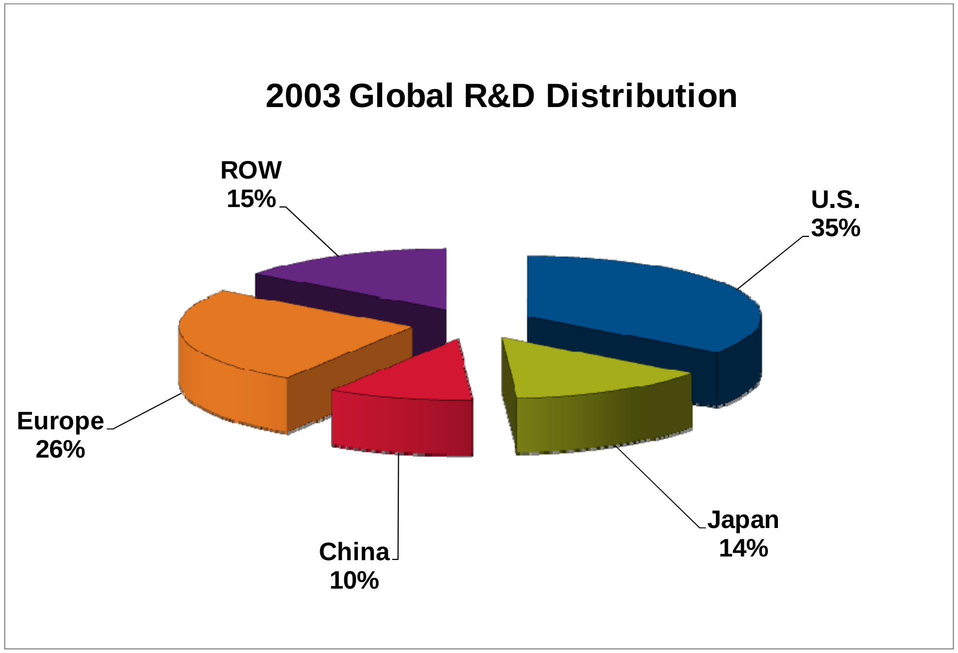
Global R&D Situation

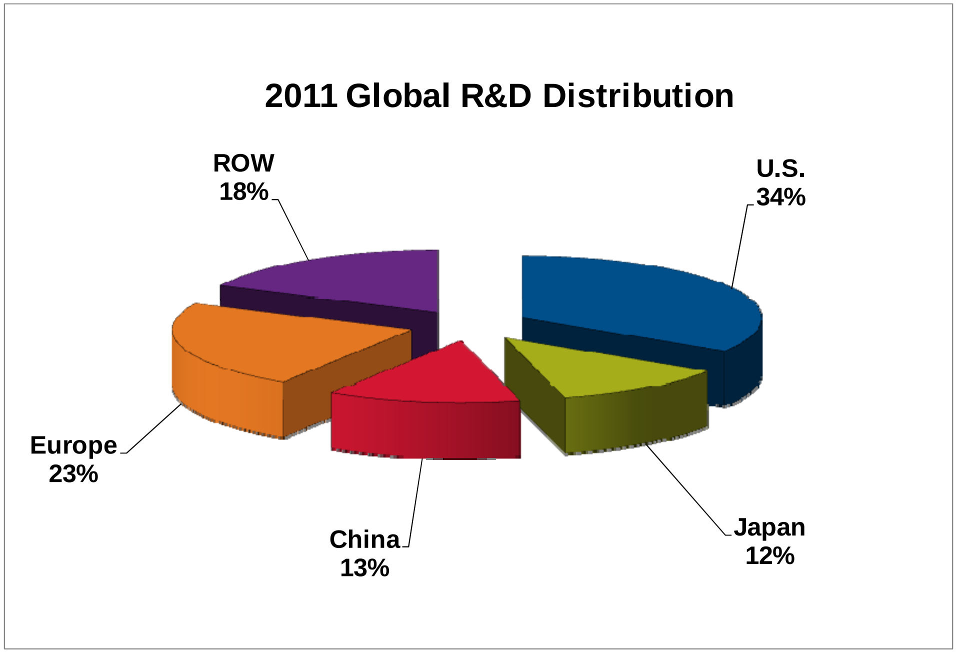
Global R&D Spending Forecast

	2009 GERD PPP Billions, U.S.$	2009 R&D as % of GDP	2010 GERD PPP Billions, U.S.$	2010 R&D as % of GDP	2011 GERD PPP Billions, U.S.$	2011 R&D as % of GDP
Americas	433.2	2.2%	446.7	2.2%	458.0	2.2%
U.S.	*383.6*	*2.7%*	*395.8*	*2.7%*	*405.3*	*2.7%*
Asia	372.5	1.9%	400.4	1.9%	421.1	1.8%
Japan	*139.6*	*3.4%*	*142.0*	*3.3%*	*144.1*	*3.3%*
China	*123.7*	*1.4%*	*141.4*	*1.4%*	*153.7*	*1.4%*
India	*28.1*	*0.8%*	*33.3*	*0.9%*	*36.1*	*0.9%*
Europe	267.0	1.7%	268.6	1.6%	276.6	1.7%
Rest of World	34.2	1.2%	34.8	1.2%	36.3	1.2%
Total	1,107.0	1.9%	1,150.6	1.9%	1192.0	1.9%
GERD, Gross Expenditures on R&D PPP, Purchasing Power Parity						

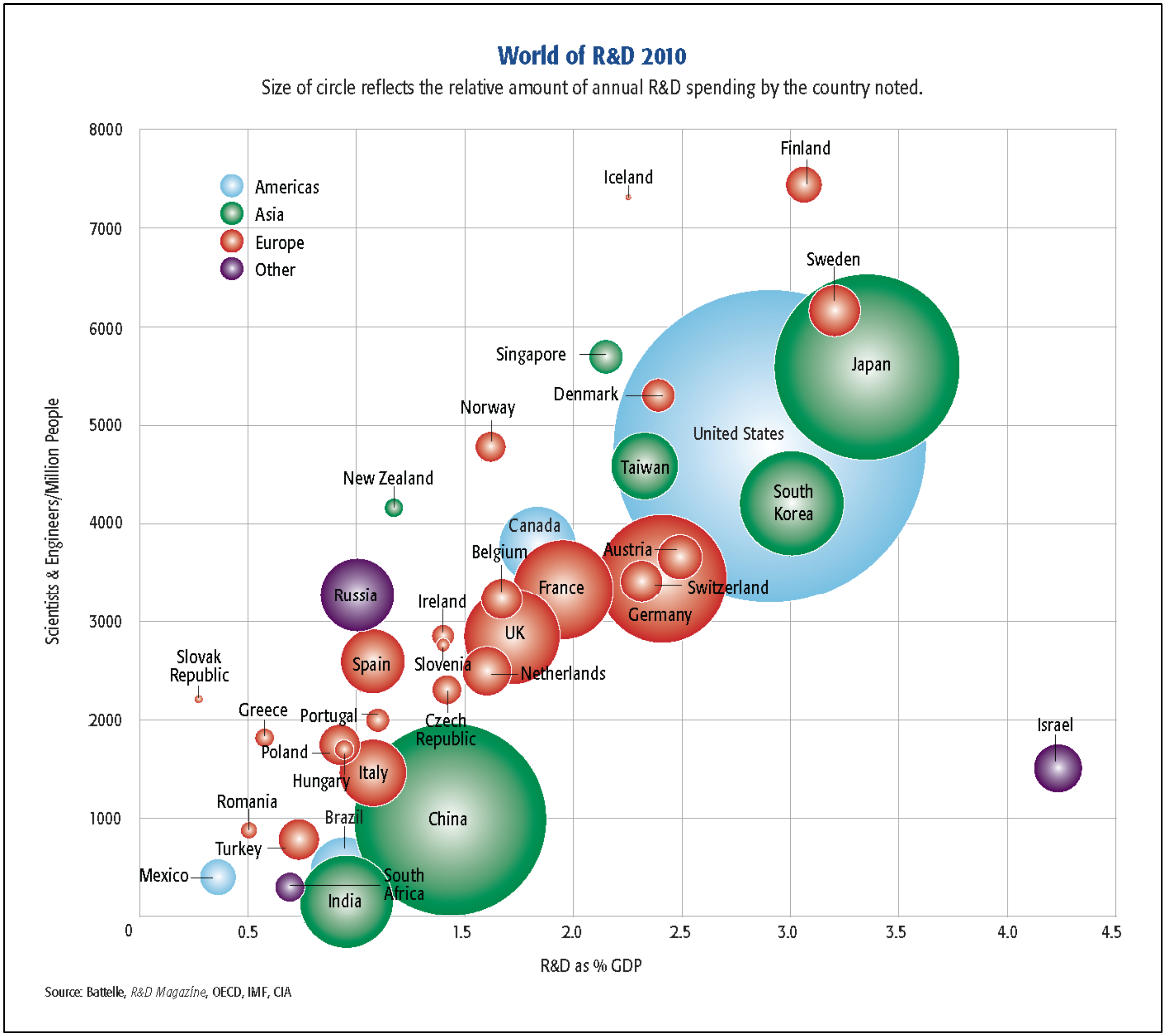
Source: Battelle, *R&D Magazine*

Global R&D Spending Forecast





Snapshot of Most Recent Global R&D Performance Data



U.S. R&D "Leadership" Still Strong, Yet Major Global Shifts On Near Horizon

Forecast Gross Domestic Expenditures on R&D (GERD)
Billions of U.S. Dollars

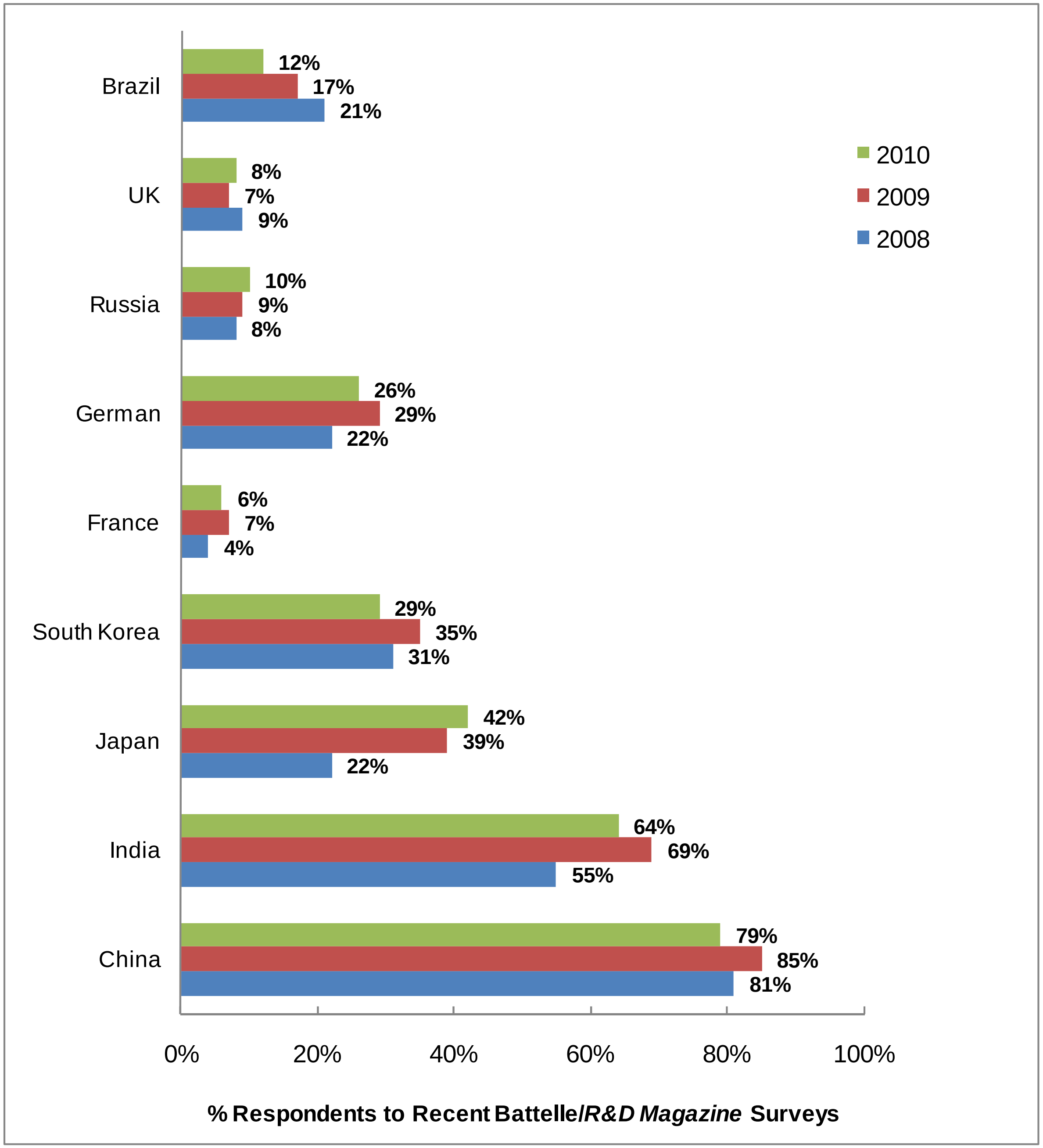
Global Rank	Country	2009 GERD PPP Billions, US$	2009 R&D as % of GDP	2010 GERD PPP Billions, US$	2010 R&D as % of GDP	2010-11 GDP Growth	2011 GDP PPP Billions, US$	2011 GERD PPP Billions, US$	2011 R&D as % of GDP
1	United States	383.6	2.7%	395.8	2.7%	2.3%	14,963	405.3	2.7%
2	China	123.7	1.4%	141.4	1.4%	9.0%	10,747	153.7	1.4%
3	Japan	139.6	3.4%	142.0	3.3%	1.5%	4,339	144.1	3.3%
4	Germany	68.0	2.4%	68.2	2.4%	2.0%	2,957	69.5	2.3%
5	South Korea	41.4	3.0%	42.9	3.0%	4.5%	1,512	44.8	3.0%
6	France	41.1	2.0%	41.5	1.9%	1.6%	2,176	42.2	1.9%
7	United Kingdom	37.2	1.7%	37.6	1.7%	2.0%	2,218	38.4	1.7%
8	India	28.1	0.8%	33.3	0.9%	8.4%	4,193	36.1	0.9%
9	Canada	23.2	1.8%	23.7	1.8%	2.7%	1,357	24.3	1.8%
10	Russia	21.8	1.0%	22.1	1.0%	4.3%	2,288	23.1	1.0%
11	Brazil	18.0	0.9%	18.6	0.9%	4.1%	2,253	19.4	0.9%
12	Italy	18.7	1.1%	18.7	1.1%	1.0%	1,775	19.0	1.1%
13	Taiwan	17.6	2.4%	18.2	2.3%	4.4%	839	19.0	2.3%
14	Spain	17.3	1.3%	17.2	1.3%	0.7%	1,366	17.2	1.3%
15	Australia	15.0	1.8%	15.3	1.8%	3.5%	907	15.9	1.7%
16	Sweden	11.5	3.4%	11.6	3.3%	2.6%	366	11.9	3.3%
17	Netherlands	10.5	1.6%	10.6	1.6%	1.7%	681	10.8	1.6%
18	Israel	8.8	4.3%	9.1	4.2%	3.8%	223	9.4	4.2%
19	Austria	8.2	2.5%	8.2	2.5%	1.6%	339	8.3	2.5%
20	Switzerland	7.3	2.3%	7.4	2.3%	1.7%	327	7.5	2.3%
21	Belgium	6.8	1.7%	6.8	1.7%	1.7%	402	6.9	1.7%
22	Turkey	6.4	0.7%	6.7	0.7%	3.6%	983	6.9	0.7%
23	Poland	3.5	0.5%	3.6	0.9%	3.7%	738	6.9	0.9%
24	Mexico	5.8	0.4%	6.0	0.4%	3.9%	1,599	6.4	0.4%
25	Finland	6.1	3.2%	6.1	3.1%	2.0%	200	6.3	3.1%
26	Singapore	5.7	2.4%	6.0	2.2%	4.5%	287	6.3	2.2%
27	Denmark	4.9	2.4%	4.9	2.4%	2.3%	213	5.1	2.4%
28	Norway	4.1	1.6%	4.1	1.6%	1.8%	263	4.2	1.6%
29	Czech Republic	3.7	1.4%	3.7	1.4%	2.2%	273	3.8	1.4%
30	South Africa	3.6	0.7%	3.6	0.7%	3.5%	526	3.7	0.7%
31	Portugal	2.8	1.2%	2.8	1.2%	0.0%	239	2.8	1.2%
32	Argentina	2.6	0.4%	2.6	0.4%	4.0%	641	2.7	0.4%
33	Ireland	2.6	1.4%	2.6	1.4%	2.3%	191	2.6	1.4%
34	Greece	1.8	0.5%	1.8	0.6%	-2.6%	318	1.7	0.6%
35	Hungary	1.7	0.9%	1.7	0.9%	2.0%	201	1.7	0.9%
36	New Zealand	1.3	1.2%	1.4	1.2%	3.2%	123	1.4	1.2%
37	Romania	1.3	0.5%	1.3	0.5%	1.5%	269	1.3	0.5%
38	Slovenia	0.8	1.3%	0.8	1.4%	2.4%	60	0.8	1.4%
39	Slovak Republic	0.5	0.4%	0.5	0.4%	4.3%	129	0.5	0.4%
40	Iceland	0.3	2.3%	0.3	2.3%	3.0%	13	0.3	2.3%

Source: International Monetary Fund, *R&D Magazine*, Battelle

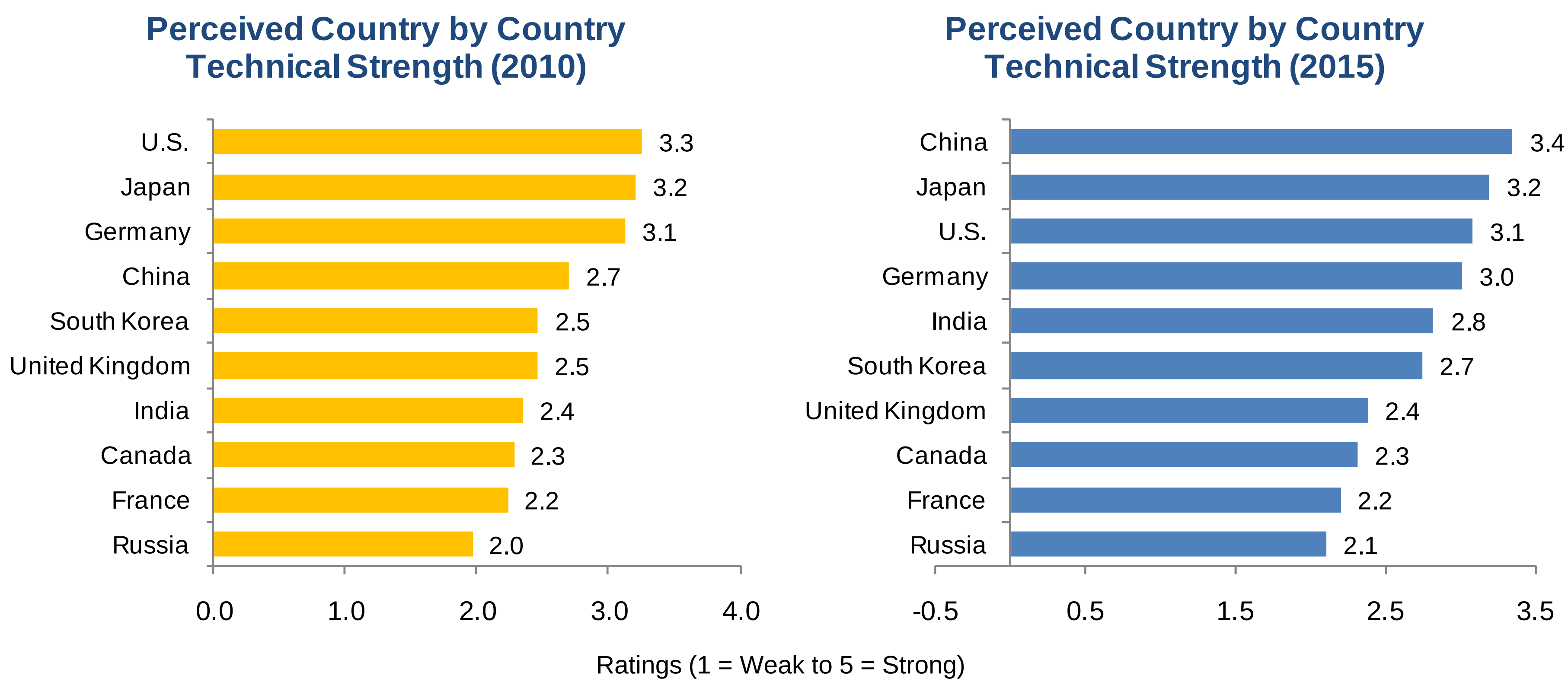
Closer Look At The Leaders

	Gross Expenditures on R&D (GERD)					
	2009 Billions, $US	2010 Billions, $US	2011 Billions, $US	Change '09-'10	Change '10-'11	2011 R&D as % GDP
United States	383.6	395.8	405.2	3.2%	2.4%	2.7%
China	123.7	141.4	153.7	14.3%	8.7%	1.4%
Japan	139.6	142.0	144.1	1.7%	1.4%	3.3%
Germany	68.0	68.2	69.5	0.3%	1.9%	2.3%
South Korea	41.4	42.9	44.8	3.6%	4.4%	3.0%
France	41.1	41.5	42.2	0.9%	1.7%	1.9%
United Kingdom	37.2	37.6	38.4	0.9%	2.1%	1.7%
India	28.1	33.3	36.1	18.2%	8.4%	0.9%
Canada	23.2	23.7	24.3	2.1%	2.6%	1.8%
Russia	21.8	22.1	23.1	1.5%	4.5%	1.0%

Which Non-U.S. Countries Will Make the Largest Tech Gains by 2015?



Perceived Country Technical Strength

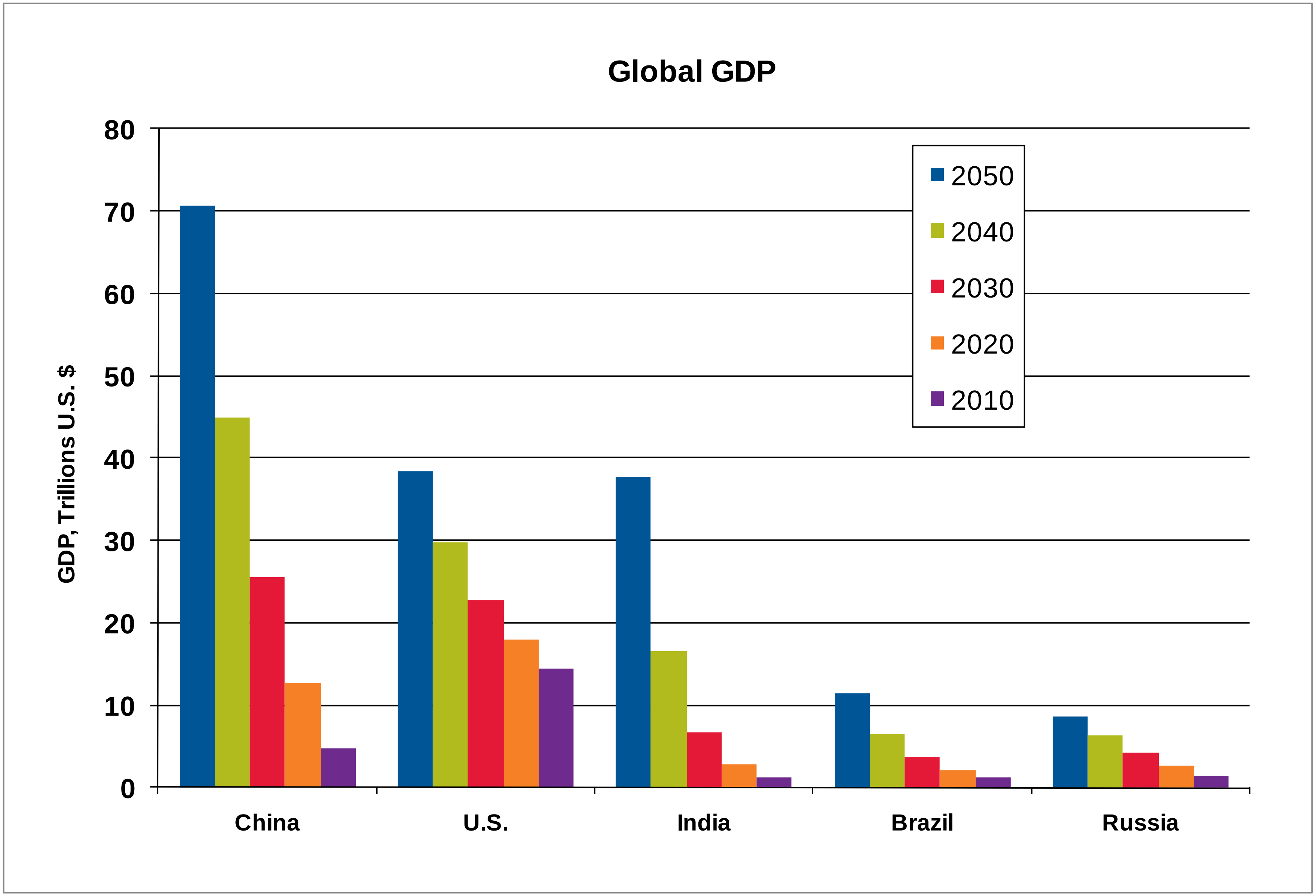


Respondents to Battelle/R&D Magazine Survey

Newly Emerging BRIC

BRIC Statistics				
	Brazil	**Russia**	**India**	**China**
Population	5th	9th	2nd	1st
GDP (PPP), trillions	$2.2	$2.3	$4.2	$10.7
GDP Rank	9th	7th	4th	2nd
GDP Growth	113th	206th	6th	3rd
GERD (PPP), billions	$19.4	$23.1	$38.4	$153.7
GERD Rank	11th	10th	8th	2nd
GERD Growth	4.3%	4.5%	8.4%	8.7%
Received FDI	11th	12th	29th	5th
BRIC, Brazil, Russia, India, and China				

Newly Emerging BRIC GDP



China's R&D Growth Engine

Chinese R&D Distribution			
	Industrial Firms	Research Institutes	Academia
R&D expenditures	63%	26%	11%
Basic research	9%	53%	38%
Applied research	26%	45%	29%
Technology development	77%	19%	4%
Patent applications	64%	14%	22%
Government funding	62%	20%	18%

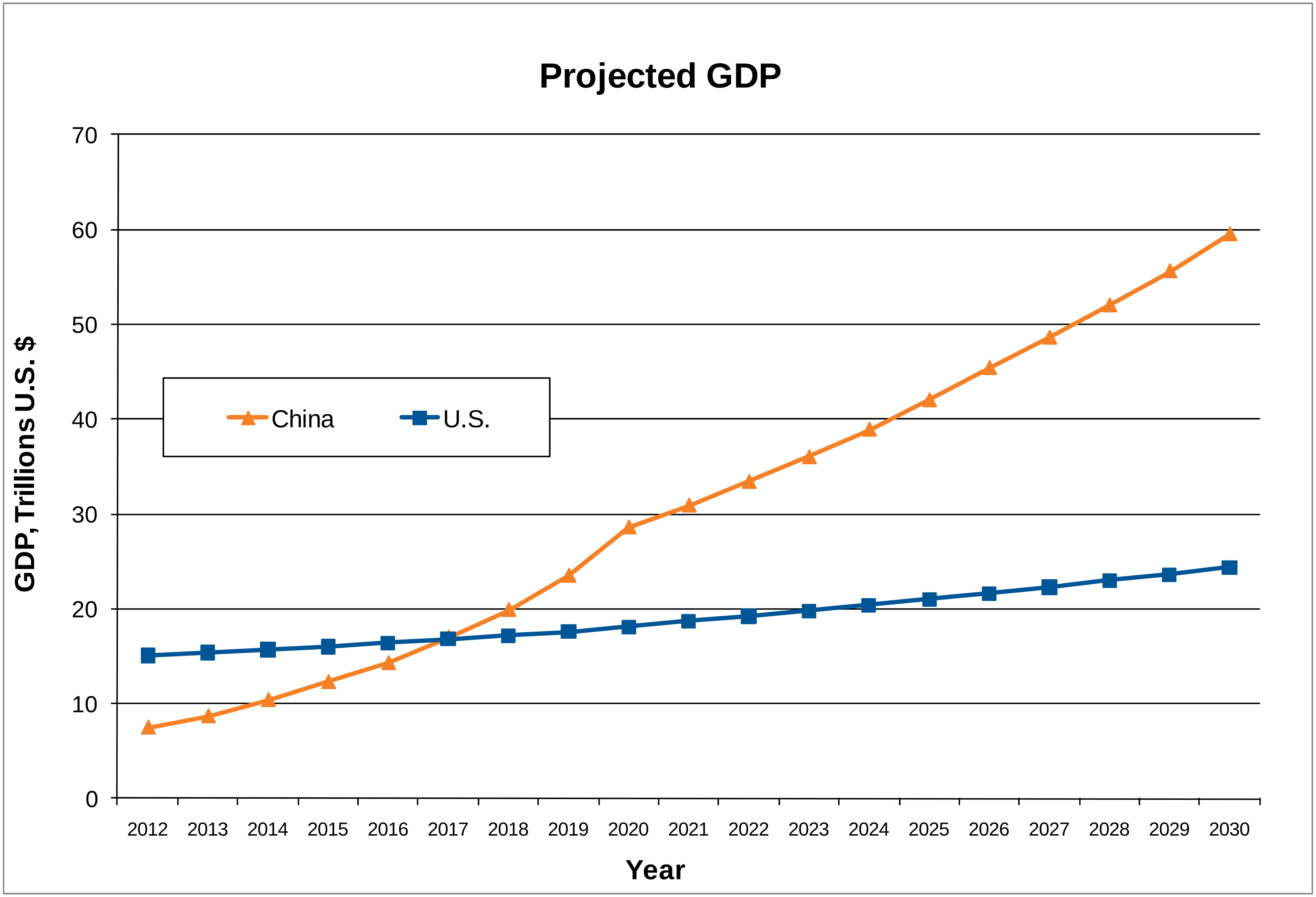
Source: OECD

Key Indicators on World Researchers

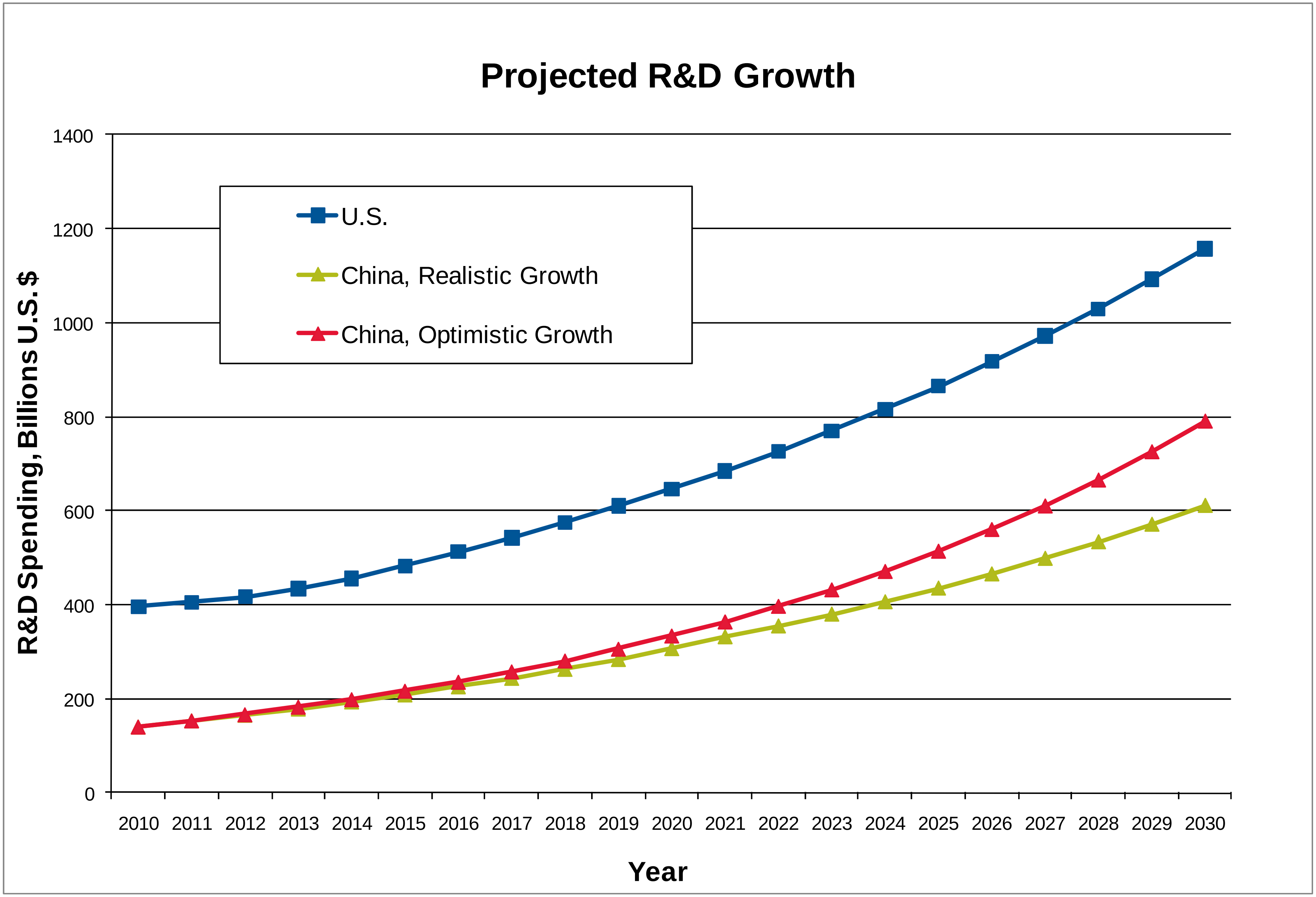
	Number of Researchers (thousands)		World Share (%) of Researchers	
	2002	2007	2002	2007
World	5,811	7,209	100.0%	100.0%
Developed countries	4,048	4,478	69.7%	62.1%
Developing countries	1,734	2,697	29.8%	37.4%
Americas	1,628	1,832	28.0%	25.4%
Asia	2,065	2,951	35.5%	40.9%
Europe	1,871	2,124	32.2%	29.5%
U.S.	1,342	1,426	23.1%	20.0%
China	810	1,423	13.9%	19.7%

Source: UNESCO Science Report 2010

U.S. - China Comparison – GDP



U.S. - China Comparison – R&D



U.S. - China Comparison – Historical R&D Spending

Battelle
The Business of Innovation

Year	U.S. R&D Billions, U.S. $	Change Percent		China R&D PPP Billions, U.S. $	Change Percent
2001	277	4.0%		32	16%
2002	276	-0.5%		38	19%
2003	288	4.4%		45	18%
2004	299	3.8%		51	13%
2005	322	7.7%		63	16%
2006	347	7.7%		75	19%
2007	372	7.3%		93	22%
2008	398	6.7%		113	20%
2009	389	-2.1%		124	10%
Total Increase	$112 billion			$92 billion	
Average		4.8%			17%
1991 to 2000		5.6%			

China's Education System is Maturing

Year	Number of Laborers (Millions)	Average Schooling (Years)	Education Shares		
			Primary	Middle	College
			Percent		
2000	714	8.0	32%	13%	5%
2005	744	8.5	29%	14%	6%
2010	771	9.1	25%	17%	9%
2015	779	9.7	20%	19%	14%
2020	749	10.3	14%	21%	18%
2025	726	10.8	9%	23%	23%

U.S. - China Comparison – U.S. R&D Disclaimers

- Average R&D increase based on historical average (~ 6%)
- Increasing Federal Budget deficit will have some effect on increases
- About 17% of U.S. R&D is DOD-based, which may decline
- Some amount of U.S. R&D is budgeted to support offshore sites (> 10%)
- Some amount of U.S. R&D is from offshore companies (< 5%)
- State government financial problems could affect Academic R&D

U.S. - China Comparison – China R&D Disclaimers

- Current economic momentum will drive growth for at least 10 years
- Continued strong GDP growth has strong impact on R&D growth
- Infrastructure problems could divert some R&D funds
- Political changes could alter R&D policy ⇨ new Chinese President in 2012
- Aging population could have stronger effect in China than in U.S.
- Industrial tech transfer in China still weak
- China moving from manufacturing-centric to knowledge-centric society

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For the 2011 Battelle/R&D Magazine Global R&D Funding Forecast see: www.battelle.org/aboutus/rd/2011.pdf