KAPITAŁ LUDZKI
NARODOWA STRATEGIA SPÓJNOŚCI

UNIA EUROPEJSKA
EUROPEJSKI
FUNDUSZ SPOŁECZNY

ZAGADNIENIA INNOWACYJNOŚCI FUNKCJONOWANIA SYSTEMU BADANIA + ROZWÓJ W NAUCE

Redaktor naukowy
ANTONI MIKLEWSKI

Tom I

Projekt: „INNOWACYJNE ZARZĄDZANIE SYSTEMEM B+R W JEDNOSTKACH NAUKOWYCH" jest współfinansowany ze środków Unii Europejskiej w ramach Europejskiego Funduszu Społecznego 4.2. "Rozwój kwalifikacji kadr systemu B+R i wzrost świadomości roli nauki w rozwoju gospodarczym"

Wyższa Szkoła Informatyki Stosowanej i Zarządzania, 01-447 Warszawa, ul. Newelska 6, tel.: 22 3486523

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Projekt Programu Operacyjnego Kapitał Ludzki.

„Innowacyjne zarządzanie systemem B+R w jednostkach naukowych"

Priorytet IV Szkolnictwo Wyższe i Nauka.

Działanie 4.2. Rozwój kwalifikacji kadr systemu B+R i wzrost świadomości roli nauki w rozwoju gospodarczym.

Podnoszenie umiejętności pracowników systemu B+R w zakresie zarządzania badaniami naukowymi i pracami rozwojowymi oraz komercjalizacji rezultatów prac badawczych – w tym również w zakresie ochrony własności intelektualnej i przemysłowej.

Projekt POKL.04.02.00-00-059/08

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Artykuły gości zagranicznych

Science, Technology and Innovation in the U.S.: Academic Research and Technology Transfer Perspectives

David L. Gulley
University of Illinois at Chicago U.S. Federal Research Priorities

Introduction

These stories of research, discovery, commercialization, and impact highlight the role of academic technology transfer in improving quality of life and building social and economic well-being. Current thrusts of the Administration will fuel new research programs, resulting in new discoveries, and – with academic-industry partnerships – these discoveries will contribute to a stronger economy, support new research and encourage future breakthroughs.

1. U.S. Federal Research Priorities

The Obama administration began in 2009 with a series of policy statements, communicated through the White House Office of Science and Technology Policy (OSTP) [1]. OSTP's work is organized around a set of priorities as described in more detail below.

Investing in the Sciences for a Prosperous America

Basic research is focused upon both understanding and generating new knowledge. For more than 50 years, the U.S. federal government has been a strong supporter of this type of research and its impacts have led the U.S. in its economic growth. Further, even though unpredictable, results have allowed for many new developments in fields as diverse as telecommunications and medicine, and have created entirely new industries. The Obama administration has presented plans to double federal support for basic research over the next 10 years, in three key federal agencies: the National Science Foundation, the Department of Energy's (DOE's) Office of Science, and the laboratories of the Department of Commerce's National Institute of Standards and Technology.

Clean Energy Future

The Administration would like to see the United States lead the world in clean energy technology. It believes that key investments in clean energy R&D will result in a new energy economy, reduce oil dependence, create new green jobs, and reduce the impact of climate change. The 2010 federal budget follows substantial investments from the Recovery Act and will support renewable and efficiency technologies such as advanced batteries, solid-state lighting, solar, biomass, geothermal, and wind power in addition to carbon capture and storage technologies.

Healthy Lives for All Americans

Federal R&D investments in this area target the promotion of longer, healthier lives through healthy living and disease prevention. The 2010 budget funds biomedical and health research and policies that intend to impact health outcomes.

A Safe and Secure America

New developments in science and technology offer hope of predicting and preventing destabilizing or paralyzing natural and manmade threats, as well as minimizing their impacts and recovering from them as quickly as possible. The Budget accelerates the development of new medicines, vaccines, and production capabilities for biodefense by investing in countermeasures development. The Budget also invests in the technological capabilities necessary to monitor nuclear non-proliferation compliance and to prevent weapons of mass destruction from entering the country.

2. U.S. Policy Thrusts

As with priorities, the Obama administration organized its policy thrusts into four distinct themes: science; technology; energy and environment; national security and international affairs. Within each theme there are distinct statements encompassing goals and areas of impact and benefit. The four themes are outlined in more detail below.

Science [2]

The Administration's vision includes substantial increases in funding for biomedical research, physical sciences and engineering; and increased support for high-risk/high-reward research. To support continued private investment, the Administration supports a permanent R&D tax credit and elimination of all capital gains taxes on start-up and small businesses. The Administration also supports STEM (science, technology, engineering and mathematics) education initiatives.

With this support for science and science education, the expected results documented include:

1. Enhanced Competitiveness in the Global Marketplace. Science will contribute to the economy and is a key to recovery from the global financial downturn.
2. Longer, Healthier Lives for all Americans. This will be the result of funding focused upon better and more efficient therapies and treatments, including the use of human embryonic stem cells.
3. Improved American Agricultural Productivity. Modern techniques can address global problems such as climate change, fewer fresh water reserves, and the need to reduce the substantial energy inputs and carbon dioxide emissions caused by agriculture.
4. Cultivation of a New Generation of Skilled, Educated, Science-savy Americans. Improving STEM education will impact the next generation and prepare them to face future challenges and a stronger, greener and more sustainable economy.

Technology [3]

Policy leadership is critical in advancing economic growth through technology and innovation. Effective policy and subsequent impacts can result in new jobs, improved environment, address the energy crisis, reduce health care costs, provide for economic growth and opportunities, and broadly result in a safer and more secure country.

With this support for technology, the expected results documented include:

1. Connect Americans to a Modern Broadband Communications Infrastructure.

   Broadband networks will reach into all households, schools and libraries, hospitals and public safety offices. Support will come through new investments, a reform of the Universal Service Fund, the leverage of the existing wireless networks, development of next-generation facilities, technologies and applications, and new tax and loan incentives.

2. Lower Health Care Costs by Advancing Health IT.

   A networked system of electronic medical records will be implemented and result in lower healthcare costs and improved patient care.

3. Modernize Public Safety Communications.

   Modern interoperable public safety communications networks will be implemented to increase the safety and security of the U.S.

4. Upgrade Education To Meet The Needs Of The 21st Century New educational technologies will transform teaching and learning to ensure that all public school children are capable in the areas of science, technology and math.
5. Develop New Clean Energy Sources.

New and cleaner energy sources will be developed in order to create new markets for U.S. energy products abroad.

6. Develop Next Generation Manufacturing Technologies
   New manufacturing methods will be developed and adopted to increase the U.S. world share of products and to create jobs in the domestic market.

The Administration views technology as a way to provide a window into government functions and provide transparency. It also has the potential to increase public participation and make use of the shared knowledge of all U.S. citizens.

The following are initiatives and expected results:

1. Bring government into the 21st Century.
2. The Executive Office of the President will establish a Chief Technology Officer position to ensure that all governmental units have appropriate infrastructure, policies and services.
3. Create an Open and Transparent Democracy.
4. Deploy cutting-edge technologies that will provide a new level of transparency, participation, and collaboration. This will engage U.S. citizens and enhance scientific integrity in government decision-making.
5. Protect America's Cyber Networks.
6. Initiation of new and powerful protection strategies to ensure that America's cyber network remains safe from espionage and disruption while at the same time increasing the Federal Trade Commission's enforcement budget so it can step up efforts to track down cyber criminals.

Increased investments in these technologies require a strong intellectual property framework that promotes innovation and investment while protecting the rights of inventors. In addition, private information must be protected. The Obama administration and OSTP are advancing policies to:

1. Safeguard individual privacy through stronger digital security systems while holding governments and businesses accountable for violations of personal privacy.
2. Promote innovation and investment by updating and reforming the patent and copyright systems to ensure intellectual property owners are protected in the U.S. as well as abroad.

Energy and Environment [4]

The most pressing energy problems in the U.S. are climate change, sustainable development and new and developing cleaner sources

of energy. Confronting these issues requires addressing past failed policies and, at the same time, strengthening the economy and national security.

The Obama Administration has set a goal of reducing greenhouse gas emissions 80 percent below 1990 levels by 2050. To accomplish this requires the best science and technology and policy decision based upon evidence. The following represent the major efforts to achieve this goal:

1. Implement a market-based cap-and-trade system; invest $150 billion over 10 years in advanced energy technologies.
2. Establish a national low carbon fuel standard and a national portfolio standard that requires 25 percent of electricity to come from renewable sources by 2025.
3. Double fuel economy standards within 18 years; set a goal of 1 million plug-in hybrid cars on the road by 2015.
4. Set a demand that the federal government use renewable sources of electricity and by making federal buildings "zero-emission" by 2025.
5. Establish U.S. incentives that reward forest owners, farmers, and ranchers when they plant trees, restore grasslands, or undertake farming practices that capture carbon dioxide from the atmosphere.

The Administration's policy thrusts also recognize that oceans play a key role as a buffer of climate change as well as a source of biodiversity and economic stability. Several policy priorities focus up the U.S. role as a steward in this area:

1. Ratify the Law of the Sea Convention, supported by more than 150 countries, in order to protect U.S. economic and security interests.
2. Boost regional and bilateral research and oceans preservation efforts with other nations and reauthorize the Coastal Zone Management Act in ways that strengthen the collaboration between federal agencies and state and local organizations.
3. Strengthen and reauthorize the National Marine Sanctuaries and the Oceans and Human Health Acts.

Overall, the Administration has a goal of transferring the benefits of these various initiatives to U.S. citizens and the economy. This includes:

- New job creation in the "green" sector.
- Improved quality of fresh water (lakes, rivers, and drinking water), which includes more strict monitoring and regulation of pollution from large Concentrated Animal Feeding Operations.
- Improved public safety, especially from impacts of nuclear material.
- Increased organic and sustainable agriculture.

3. National Security and International Affairs [5]

New developments in science and technology can predict and prevent many manmade threats and, when unavoidable, minimize societal and economic impacts. The Obama administration and the OSTP support realistic assessment and financial resources to support research on these risks. The areas of focus are:

1. Provide strong research leadership for the defense, homeland security and intelligence agencies. Ensure adequate funding to pursue breakthrough scientific research and subsequent conversion to new capabilities.
2. Plan for a doubling of basic defense research funding; revitalize applied defense research programs; strengthen defense research management; and renew the Defense Advanced Research Projects Agency (DARPA).
3. Protect the U.S in cyberspace through a more productive research program.
4. Strengthen U.S. intelligence collection overseas, especially in the areas of bioterrorism, and expand the federal bioforensics program.

The Administration also proposes to use science to reduce the risks of nuclear proliferation. The objectives are:

1. Secure all loose nuclear materials worldwide by 2014.
2. Strengthen the Nuclear Non-Proliferation Treaty.
3. Achieve the goal of "a world without nuclear weapons".

4. Trends in U.S. Federal R&D [6]

Overall federal R&D financial support trends are shown in the following chart. The total is comprised of research (basic funding), development (applied funding) and facilities. Of note is the peak in FY2009 which reflects American Reinvestment and Recovery Act (ARRA) funding.

When considering trends by federal agency, the National Institutes of Health (NIH) tops the list, with the Departments of Energy (DOE), Defense (DOD), and Science (NSF) following. The U.S. Department of Agriculture (USDA) also has a substantial and consistent federal budget. Again, of note are the peaks in FY2009 when the ARRA funding investments were implemented.

The Obama administration has targeted a doubling of basic research funding. Projections are included below for select agencies, including NSF, DOE and the NIST (National Institute of Standards and Technology) labs. Again, ARRA is a noticeable peak in FY2009.

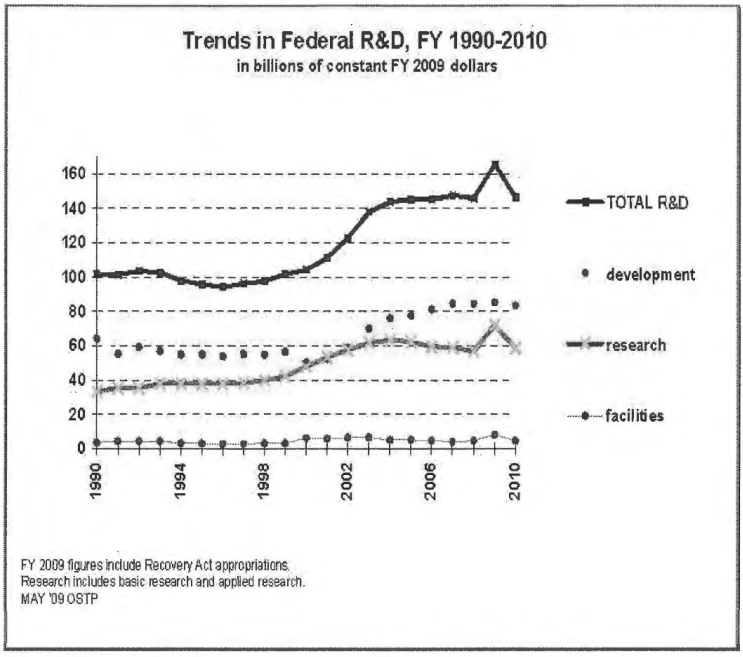

Trends in Federal R&D, FY 1990-2010
in billions of constant FY 2009 dollars
160
140
120
100
80
60
40
20
0
1990
1994
1998
2002
2006
2010
TOTAL R&D
development
research
facilities
FY 2009 figures include Recovery Act appropriations.
Research includes basic research and applied research.
MAY '09 OSTP

Fig. 1.

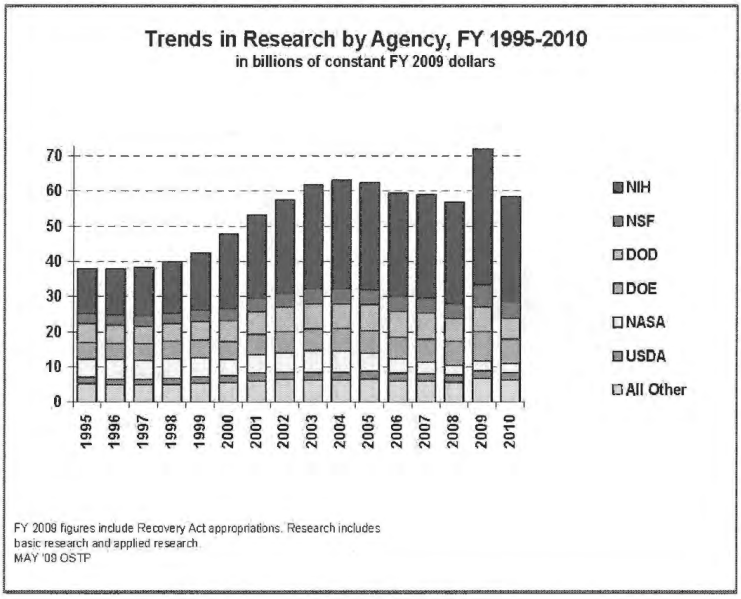

Trends in Research by Agency, FY 1995-2010
in billions of constant FY 2009 dollars
70
60
50
40
30
20
10
0
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
NIH
NSF
DOD
DOE
NASA
USDA
All Other
FY 2009 figures include Recovery Act appropriations. Research includes
basic research and applied research.
MAY '09 OSTP

Fig. 2.

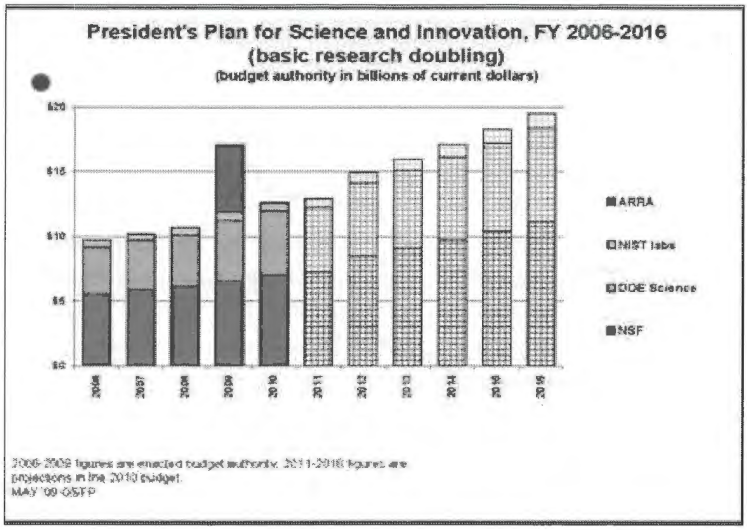


Fig. 3 [7].

As mentioned and shown above, the NIH is one of the most well-funded federal agency when considering R&D. Within the NIH, several key "Institutes" receive a considerable amount of research funding as shown below. These include: National Cancer Institute, NIAID (National Institutes of Allergy and Infectious Diseases) and the National Heart, Lung, and Blood Institute. ARRA funding peak is also show for FY2009.

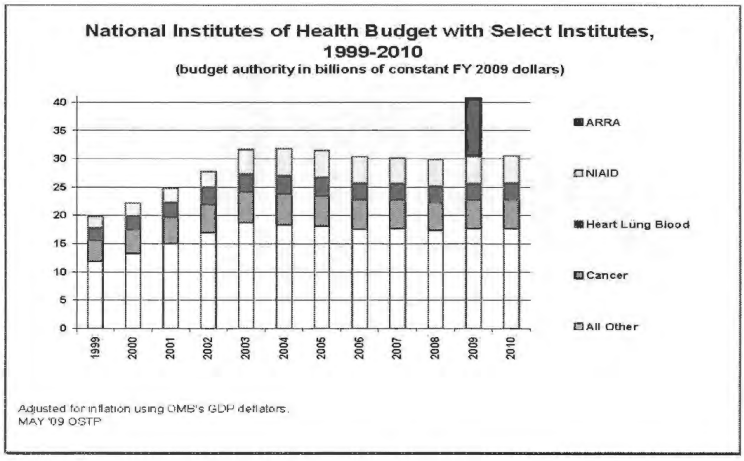


Fig. 4.

5. Future Thrusts of U.S. Federal R&D

There are two broad areas which will benefit most from the Obama administration's policy and funding thrusts: technology (broadly) and STEM (Science, Technology, Engineering, and Mathematics) education. Below are brief descriptions of focus and support.

Technology [8]

Broadband Technology

In 2009, the Administration targeted $7.2 billion in the Recovery Act to the Departments of Agriculture and Commerce for broadband, and implementation will continue through 2010. In 2010 an additional $82 million will continue to support USDA rural broadband, distance learning, and telemedicine services, an increase of 39 percent over the 2009 level.

Health Information Technology

The Recovery Act included $19 billion for HIT to further the adoption and implementation of health IT as an essential tool to modernize the health care system. It is extended over time, with $2 billion in 2010, followed by $17 billion, starting in 2011, as temporary incentive payments to physicians and hospitals participating in Medicare for using certified electronic health records.

Education Technology

Throughout 2010-2011, $650 million in Recovery Act funding for Education Technology State Grants (ED-TECH) will be provided and the 2010 budget adds an additional $100 million. Other programs supported include Title I Grants and Teacher Quality State Grants. Throughout the budget and programs there are themes of support for cutting-edge educational technology, science laboratories, and new way to form partnerships to improve the use of science and technology in classrooms.

Clean Energy Technology

In addition to funding energy R&D, the 2010 budget provides $3.1 billion for clean energy technologies, which includes deployment, demonstration, and commercialization assistance. This builds upon the $31 billion in Recovery Act funds. These extraordinary investments reflect the Administration's position on supporting innovation in this sector.

Federal Information Technology

The President's Open Government Agenda calls for greater transparency, accountability, and public participation. New technology has the potential to drive innovation in government. The 2010 budget of $75.8 billion for federal IT management is 7.2 percent more than the 2009. As there are new directions for federal IT and Recovery Act investments, estimates will change as plans are made to address the Administration's goal of greater openness in government, wider participation by citizens in government, and a more collaborative, cost-effective federal IT enterprise.

Next-Generation Manufacturing Technologies
The 2010 budget provides $125 million for the Hollings Manufacturing Extension Partnership (MEP) a program of the National Institute of Standards and Technology (NIST). The President's plan is to double MEP funding between 2008 and 2015. Also in 2010, NIST's Technology Innovation Program (TIP) is funded at $70 million; funds manufacturing research in the NIST laboratories, and the Recovery Act provides $2 billion for grants to support manufacturing of advanced batteries. The Economic Development Administration (EDA), although not specifically directed at the manufacturing sector, the 2010 budget includes $50 million to promote regional innovation clusters and $50 million to support business incubator networks.

6. STEM Education (Science, Technology, Engineering, and Mathematics) [9]

Graduate Research Fellowships (GRF)
The Administration plans to triple the number of GRFs at the National Science Foundation (NSF) to 3,000 by 2013. The 2010 budget provides $122 million for the NSF GRF program.

Math and Science Partnerships (MSPs)
Support in 2010 is sustained at $179 million for the Department of Education, and $58 million for the NSF component. Both components facilitate partnerships between local school districts and higher education institutions to improve math and science education.

Department of Energy (DOE)
A new joint DOE-NSF intends to attract students to STEM careers. This RE-ENERGYSE (REgaining our ENERGY Science and Engineering Edge) program will receive 2010 Budget provides $115 million for DOE to launch this program in 2010.

National Science Foundation (NSF)
The Advanced Technological Education (ATE) program is focused on two-year colleges and promotes partnerships between higher education and employers to educate technicians in important fields. The 2010 budget includes $64 million, an increase of $12 million over 2009.

National Institutes of Health (NIH)
The Ruth L. Kirschstein National Research Service Award (NRSA) program which provides training for next generation biomedical researchers will receive $798 million in the 2010 budget, an increase of $8 million.

Department of Defense's (DOD)

In 2010 $37 million will expand the Science, Mathematics and Research for Transformation (SMART) program for physical sciences and engineering graduate scholarships with a government service component. This is an increase from $28 million in 2009.

7. Trends in U.S. Academic R&D

Overall

The U.S. R&D system includes a variety of performers and funding sources with a mix of performing and funding role. Organizations that perform R&D often receive significant levels of outside funding; those that fund R&D may also be significant performers. These include the federal government, businesses, universities and colleges, other (non-federal) government agencies, and non-profit organizations,

The National Science Foundation (NSF) [10] reported, in preliminary data, that that U.S. expenditure to perform research and development (R&D) grew by 6.7% in 2008 over the 2007 level, or a total of $397.6 billion in 2008, up from $372.5 billion in 2007. This growth rate exceeded the pace of growth in U.S. gross domestic product (GDP) over the same year, which was 3.3%.

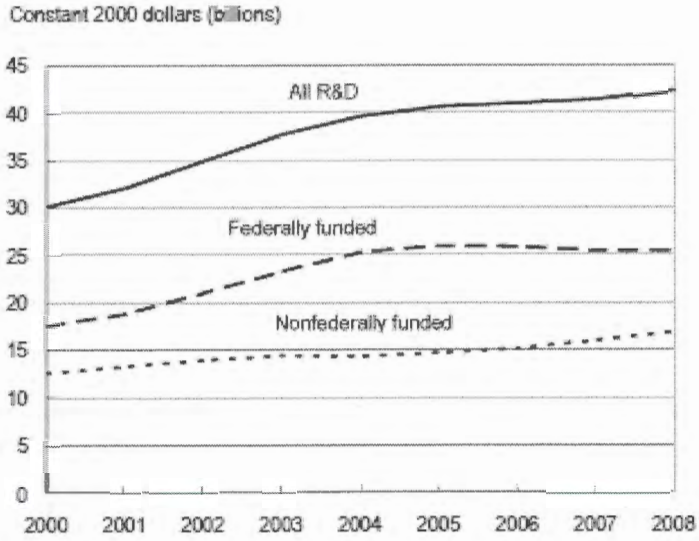
The 2008 distribution of expenditures among performers is similar to 2003 in which the business sector performed 69.6%; universities and colleges, 14.0%; federal government, 12.1%; and other non-profit organizations, 4.2%.

In 2008, the business sector continued to be the largest performer, conducting $289.1 billion, or 72.7%, of the preliminary total. Of the overall $25 billion increase in 2008, business was responsible for $20 billion. The rate of annual growth in business R&D has outpaced that of total U.S. R&D each year since 2005.

R&D at universities and colleges totaled $51.2 billion, or 12.9%, of estimated U.S. R&D performance in 2008. The federal government conducted $41.8 billion, or 10.5%, (including federal intramural, $27.0 billion, and federally funded research and development centers, $14.8 billion). Other non-profit organizations performed $15.6 billion, or 3.9%.

There are differences among the sectoral rates of growth. From 2003 to 2008, total U.S. R&D, adjusted for inflation, expanded at an average annual rate of 3.7%. The business sector grew at an average annual rate of 4.6%. Whereas the federal government, universities and colleges, and non-profit organizations lagged, with average annual growth rates, respectively, of 0.7%, 1.9%, and 2.3%.

As shown in Fig. 5, the federal government is the largest source of academic R&D funding. Its share dropped from 64% in FY 2005 to 60% in FY 2008.



SOURCE: National Science Foundation, Division of Science Resources Statistics, Survey of Research and Development Expenditures at Universities and Colleges: FY 2008.

Fig. 5.

This level is similar to the federal share throughout the late 1980s and 1990s. In current dollars, federally funded academic R&D expenditures rose 2.5% in FY 2008 to $31.2 billion. After adjusting for inflation, this represents a 0.2% increase from FY 2007 and follows 2 years of real declines since FY 2005 (Fig. 5).

U.S. Academic R&D: Trends by Science Area

In 2009, more than 50 percent of all R&D are in the area of medical sciences ($17.3 billion) and biological sciences ($9.8 billion) (Table 1).

Each had modest increases from 2007: 4.3% for medical sciences and 5.9% for biological sciences. There were seven fields that showed double-digit percentage increases between FY 2007 and 2008, led by astronomy.

Table 1. R&D expenditures at universities and colleges, by S&E field: FY 2007-08.

(Millions of current dollars)

Field	FY 2007	FY 2008	% change 2007–08
All S&E R&D expenditures	49,554	51,909	4.8
Computer sciences	1,421	1,468	3.3
Environmental sciences	2,724	2,800	2.8
Atmospheric sciences	492	422	-14.2
Earth sciences	909	956	5.1
Oceanography	996	1,051	5.5
Environmental sciences, nec	327	371	13.4
Life sciences	29,838	31,215	4.6
Agricultural sciences	2,916	2,994	2.7
Biological sciences	9,229	9,769	5.9
Medical sciences	16,562	17,271	4.3
Life sciences, nec	1,131	1,180	4.4
Mathematical sciences	573	621	8.3
Physical sciences	3,859	3,933	1.9
Astronomy	463	537	15.9
Chemistry	1,461	1,486	1.7
Physics	1,616	1,604	-0.8
Physical sciences, nec	320	307	-4.0
Psychology	872	929	6.5
Social sciences	1,798	1,940	7.9
Economics	349	398	14.0
Political science	348	337	-3.0
Sociology	397	403	1.5
Social sciences, nec	703	801	13.9
Sciences, nec	943	1,046	10.9
Engineering	7,525	7,957	5.7
Aeronautical/astronautical engineering	471	538	14.2
Bioengineering/biomedical engineering	540	604	11.8
Chemical engineering	601	658	9.5
Civil engineering	869	922	6.0
Electrical engineering	1,632	1,708	4.7
Mechanical engineering	1,129	1,159	2.7
Metallurgical/materials engineering	634	643	1.4
Engineering, nec	1,650	1,725	4.6

nec = not elsewhere classified; S&E = science and engineering.

NOTE: Percentages are calculated on unrounded data.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Research and Development Expenditures at Universities and Colleges: FY 2008.

8. Economic Impact of Academic Technology Transfer

U.S. Bayh-Dole Act

Enacted on December 12, 1980, the Bayh-Dole Act (P.L. 96-517, Patent and Trademark Act Amendments of 1980) created a uniform patent policy among the many federal agencies that fund research, enabling small businesses and non-profit organizations, including universities, to retain title to inventions made under federally-funded research programs. This legislation was co-sponsored by Senators Birch Bayh of Indiana and Robert Dole of Kansas. The Bayh-Dole Act was especially instrumental in encouraging universities to participate in technology transfer activities.

Major provisions of the Act include:

- Non-profits, including universities, and small businesses may elect to retain title to innovations developed under federally-funded research programs.
- Universities are encouraged to collaborate with commercial concerns to promote the utilization of inventions arising from federal funding.
- Universities are expected to file patents on inventions they elect to own.
- Universities are expected to give licensing preference to small businesses.
- The government retains a non-exclusive license to practice the patent throughout the world.
- The government retains march-in rights.

The Act has been, and continues to be, debated in the U.S. Congress and has been analyzed, studied, and served as background for other nation's efforts to promote commercialization of academic or government-supported research discoveries. According to *The Economist*, "*Innovation's Golden Goose*," an opinion published in the Dec. 12, 2002, edition, stated it is "perhaps the most inspired piece of legislation to be enacted in America over the past half-century." Further:

> "Together with amendments in 1984 and augmentation in 1986, this unlocked all the inventions and discoveries that had been made in laboratories throughout the United States with the help of taxpayers' money. More than anything, this single policy measure helped to reverse America's precipitous slide into industrial irrelevance."

U.S. Bayh-Dole Act: Rationale

> ***The Association of University Technology Managers (AUTM) is a professional association of over 3,000 technology transfer professionals who work in academic, research, government, legal and commercial settings. AUTM (www.autm.net) is the largest such organization that promotes, supports and improves academic technology transfer worldwide and demonstrates its benefits globally through education, advocacy, networking and communication.***

AUTM continues to be an active supporter of Bayh-Dole. Below are some of the key points AUTM Espouses [11]:

1) It's Good Policy:

- Allows universities and small companies to own inventions they make with federal funding.
- Funding agencies can use these discoveries royalty-free for their own purposes.

- Universities are allowed to partner with industry to translate research results into products benefiting the public.
- Preference is given to small businesses and to those making products in the U.S.
- Resulting university licensing income is invested in more research, rewarding university scientists and supporting technology transfer offices.
- Operation under the Act keeps the inventors actively engaged in the technology transfer process which is critical for companies to enable products for public use.

2) It's Good for the U.S. Economy:

- The U.S. is the leader in basic and applied research and is a leader in applying research and innovation to improve economic performance.
  - *The Gathering Storm, National Academy of Sciences, (Feb. 2006).*
- University research helped create whole new industries, such as biotechnology, where the U.S. enjoys a leadership role.
- Since enactment, more than 5,000 new companies have formed around university research results – the majority located in close proximity to the university.
- University patenting has exploded from just 495 issued patents in 1980 to 3,278 in 2005.
- In 2005 alone, universities helped introduce 527 new products to the marketplace. Between 1998 and 2005, 3,641 new products were created.
- University technology transfer creates billions of dollars of direct benefits to the U.S. economy every year.
- According to the former President of the NASDAQ Stock Market, an estimated 30% of its value is rooted in university-based, federally funded research results, which might never have been commercialized had it not been for the Bayh-Dole Act.

U.S. Academic Technology Transfer: Metrics

Each year, AUTM surveys its members' institutions in the U.S. on a variety of topics [12].

In 2008, the Annual Licensing Survey (released in early 2009) showed that the commercialization of university-generated technology continued to increase, even though most economic indicated fell rapidly. High level metrics and performance of the U.S. universities and research hospitals showed:

- 648 new commercial products introduced into the market,
- 5,039 total license and options executed,
- 595 new start-up companies formed, based upon university technology,

- about 72 percent of new companies were formed with the primary place of business in the institution's home state,
- 3,381 start-up companies were still operating as of the end of FY2008,
- $51.47 billion in total sponsored research expenditures,
- 20,115 disclosures of new inventions.

Patents filed:

- 18,949 total U.S. patent applications,
- 12,072 new U.S. patent applications,
- 848 non-U.S. patent applications.

Patents issued:

- 3,280 issued U.S. patents.

Arundeep S. Pradhan, AUTM president, said that "The data in this survey show a steady increase in the amount of technology transfer activity. This includes more patent filings, new licenses signed and more new startup companies, a good indicator that the Bayh-Dole act is working as intended."

U.S. Academic Technology Transfer: Public Benefits

Metrics are performance indicators, but since 2005 AUTM also gathers and publishes success stories that detail real-world contributions derived from academic technology transfer. These are compiled in *The Better World Report* [13] (Series) and promote public understanding of the benefits of academic research and technology transfer. The series includes:

2006 Technology Transfer Stories: 25 Innovations That Changed the World and Technology Transfer Works: 100 Cases from Research to Realization.

2007 Building a Stronger Economy and Technology Transfer Works: 100 Innovations from Academic Institutions.

2008 The Art of Collaboration and Technology Transfer Works.

2009 Innovations from Academic Research That Positively Impact Global Health.

References

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[10] NSF 10-312, January 2010 InfoBrief.

[11] http://www.autm.net/Content/NavigationMenu/TechTransfer/BayhDoleAct/BDTalkPts031407.pdf

[12] http://www.autm.net/Surveys.htm

[13] http://www.betterworldproject.org/

Program Operacyjny Kapitał Ludzki **Priorytet IV Szk**

Działanie 4.2: Rozwój kwalifikacji kadr systemu B+R i wzrost świadomoś
gospodarczym. Podniesienie umiejętności pracowników systemu B+R w zakres
naukowymi i pracami rozwojowymi oraz komercjalizacji rezultatów prac bada
w zakresie ochrony własności intelektualnej i przemysłowej.

Projekt POKL.04.02.00-00-059/08:
Innowacyjne zarządzanie systemem B+R w jednostkach naukowych.
Projekt wpisuje się w realizację unijnej strategii wzrostu Europa 2020.

W zmieniającym się świecie UE potrzebna jest inteligentna i zrównoważona gospodarka sprzyjająca włączeniu społecznemu.

Inteligentny rozwój oznacza uzyskanie lepszych wyników w dziedzinie:

- **edukacji** (zachęcanie do nauki, studiów i podnoszenia kwalifikacji),
- **badań naukowych/innowacji** (stworzenie nowych produktów i usług, które wpłynęłyby na zwiększenie wzrostu gospodarczego i zatrudnienia oraz pomogłyby w rozwiązywaniu problemów społecznych),
- **społeczeństwa cyfrowego** (wykorzystanie technologii informacyjnych i komunikacyjnych).

Unijne cele służące zapewnieniu inteligentnego rozwoju obejmują:

1. zwiększenie łącznego poziomu **inwestycji publicznych i prywatnych do wysokości 3 proc. unijnego PKB**, a także zapewnienie lepszych warunków dla badań i rozwoju oraz innowacji,
2. **podwyższenie wskaźnika zatrudnienia kobiet i mężczyzn w wieku 20–64 lat do 75 proc.** do 2020 r. poprzez wprowadzenie większej liczby osób na rynek pracy, zwłaszcza kobiet, młodzieży, osób starszych, pracowników niskowykwalifikowanych i legalnych imigrantów,
3. zapewnienie lepszego poziomu wykształcenia – zwłaszcza:

- sprowadzenie **odsetka młodych ludzi przedwcześnie porzucających naukę do poziomu poniżej 10 proc.,**
- dążenie do tego, by co najmniej 40 **proc. osób w wieku 30–34 lat miało wykształcenie wyższe** (lub równoważne).

Wniosek z artykułu K. Lityńskiego (Tom 1, str. 67):

Polityka zwiększania innowacyjności, która decyduje o konkurencyjności całej gospodarki, nie może podlegać nieskoordynowanym, a często wykluczającym się inicjatywom poszczególnych ministerstw.

Polityka proinnowacyjna nie polega jedynie na szybkim wydatkowaniu wszystkich dostępnych środków unijnych pod hasłem „innowacja", lecz także na wytyczaniu i monitorowaniu kierunków i problemów, które powinny być rozwiązane w skali kraju i poszczególnych regionów.

Idea utworzenia platformy koordynującej działania proinnowacyjne rządu i jego agend nie jest nowa, jako koncepcja Krajowego Systemu Innowacji wydaje się obecnie ze wszech miar na czasie.

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POLSKIEJ AKADEMII NAUK