



IT Doesn't Matter. Creative IT Does!

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Technology

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October 9, 2008

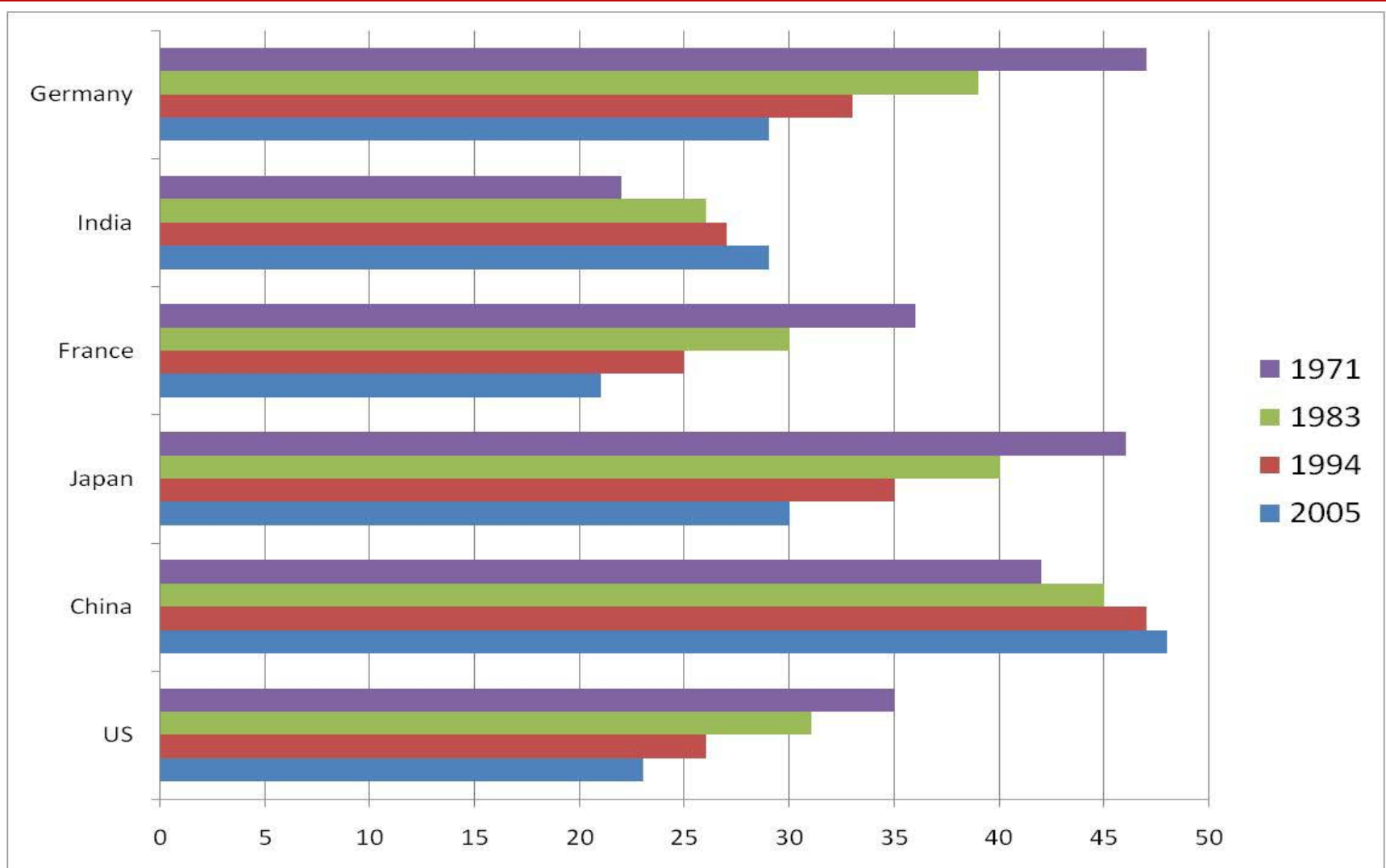
"In God we trust," she said. "All others,
bring data."

~Margaret Spellings~

Secretary of Education

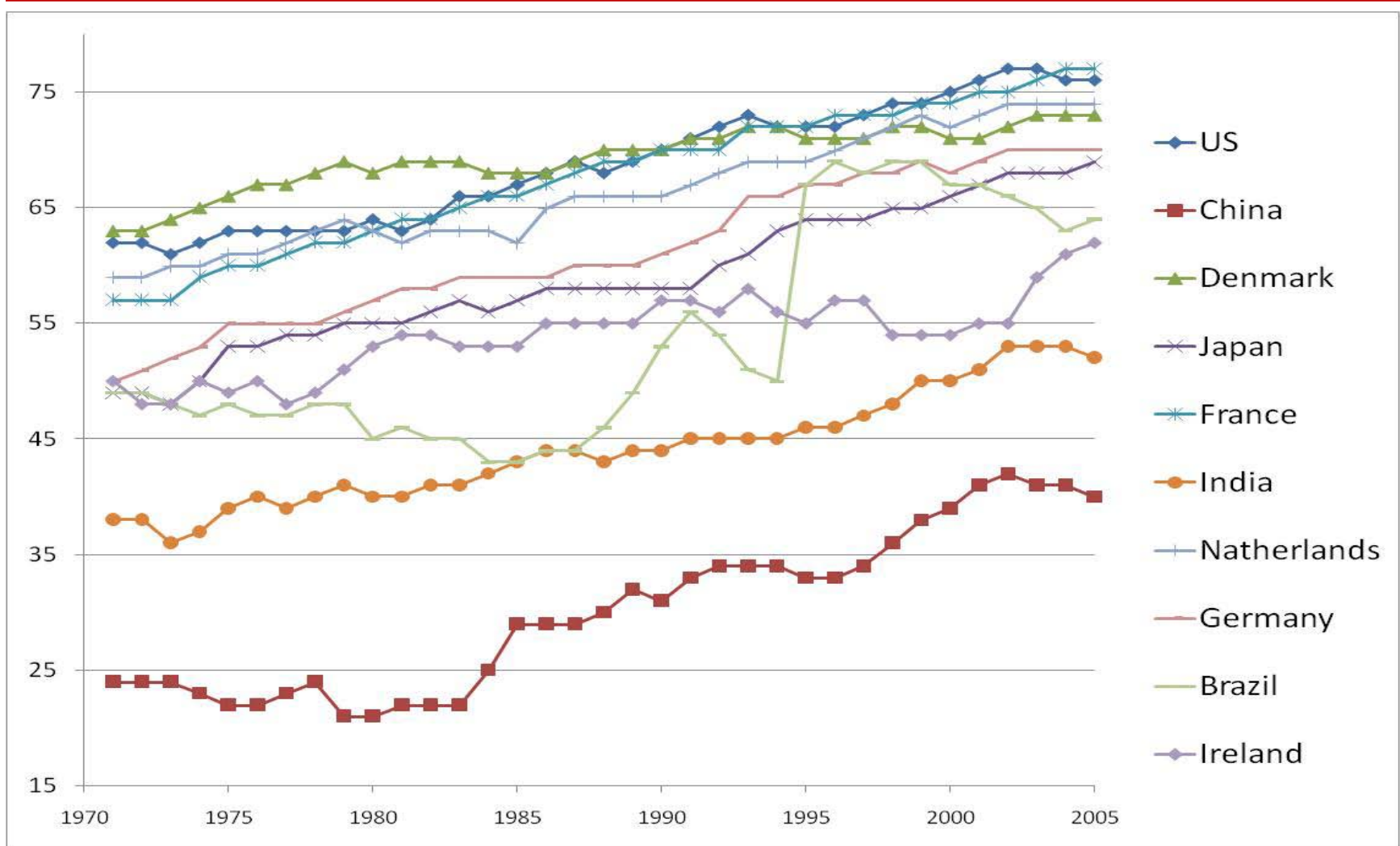
Industrial Value Added (% GDP)

From World Bank Data



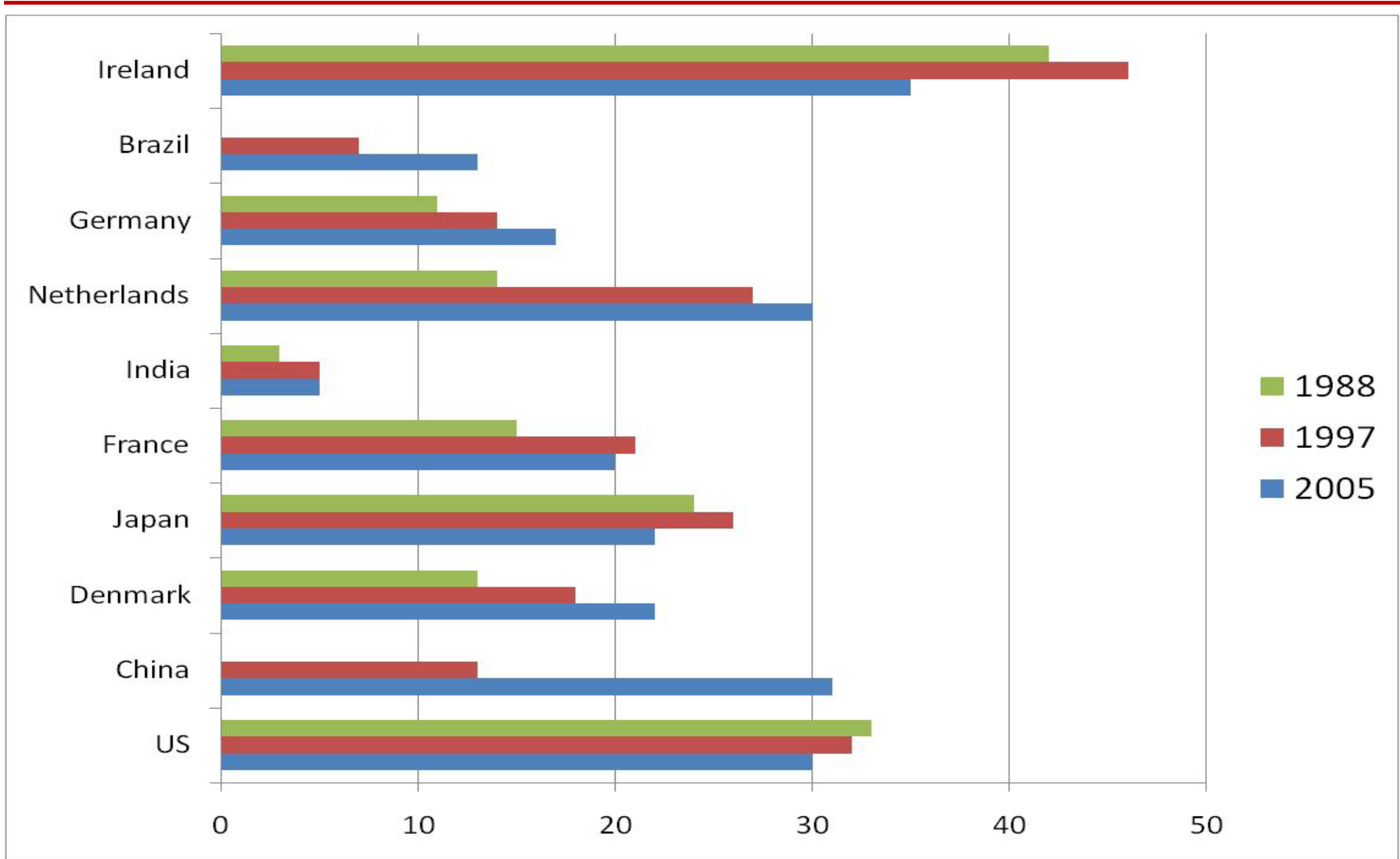
Service Value Added (% GDP)

From World Bank Data



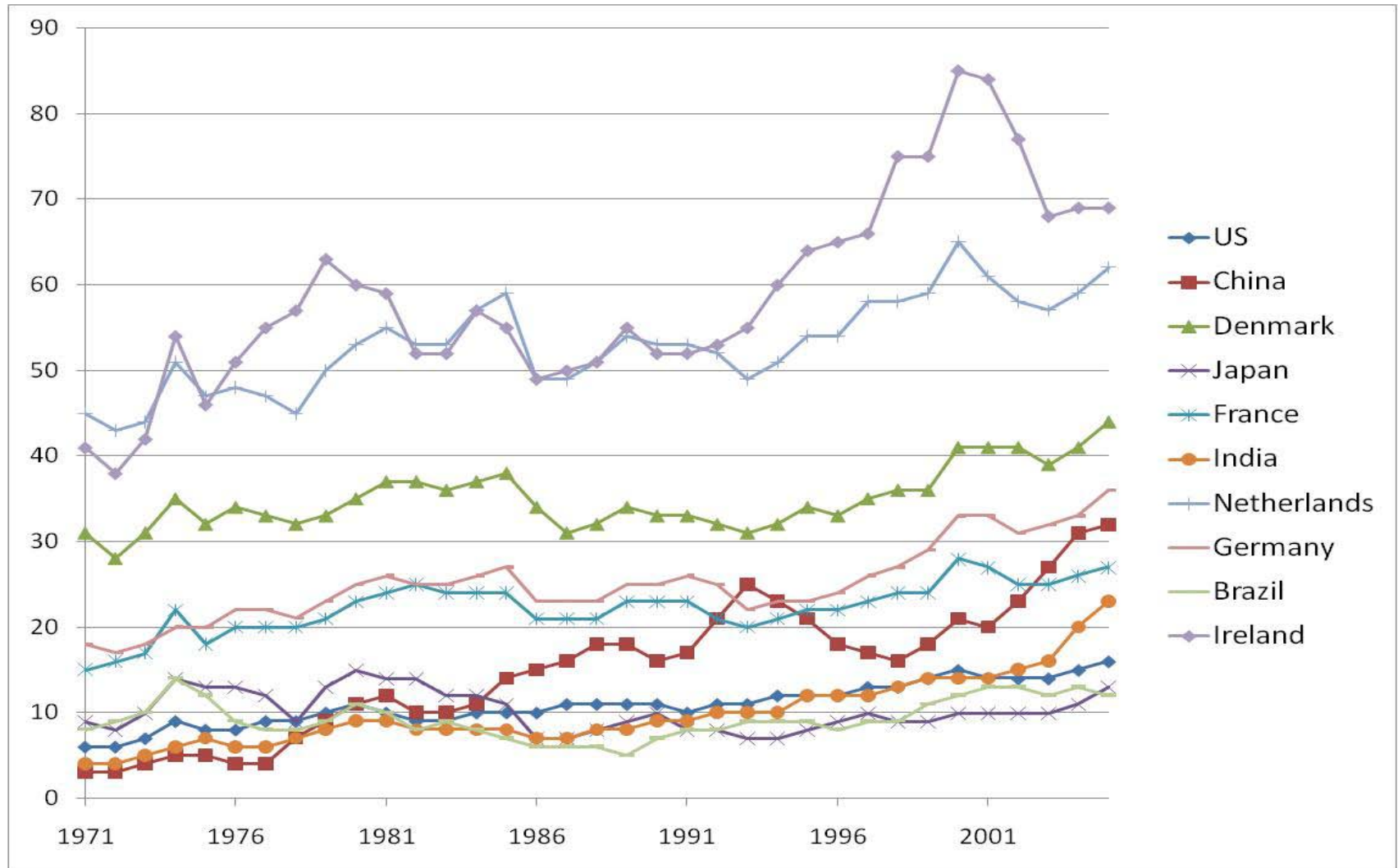
High Tech Exports (% Manufactured Exports)

From World Bank Data



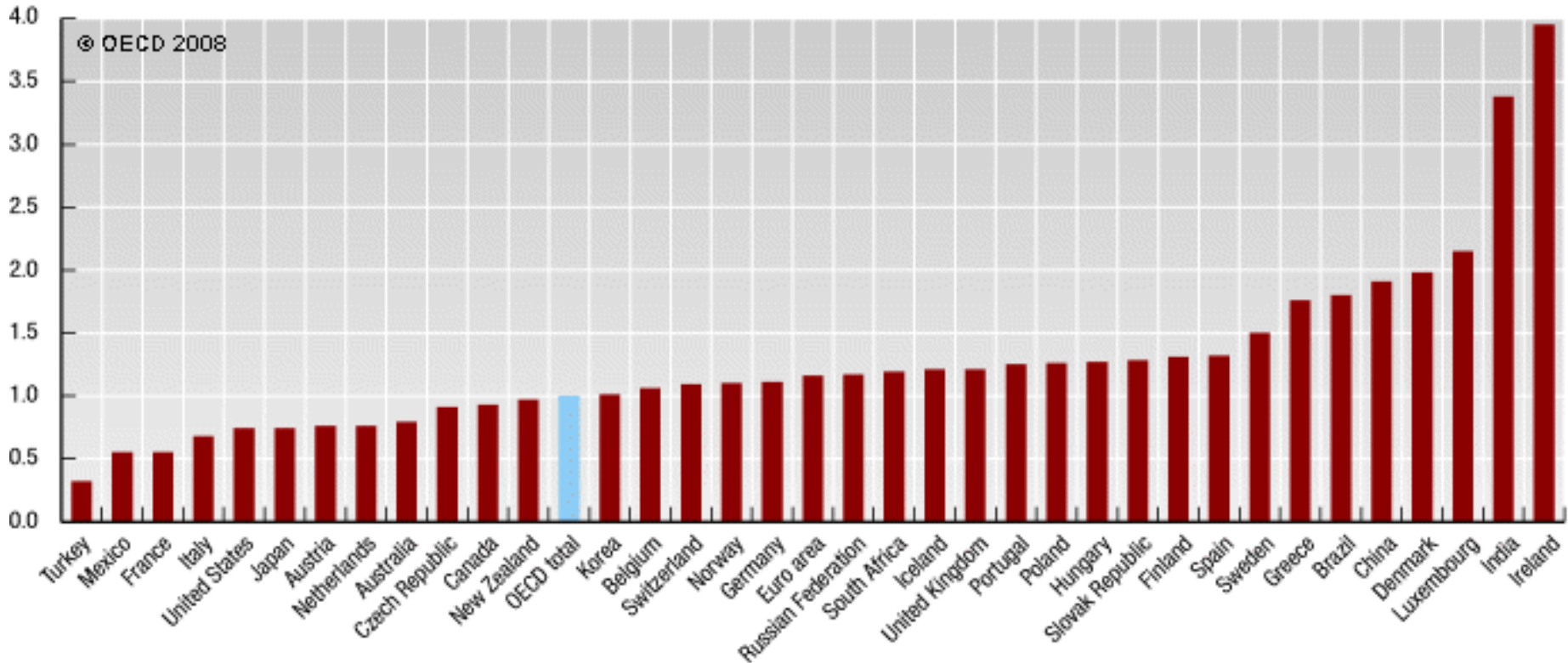
Import of Goods and Services (% GDP)

From World Bank Data



Relative annual growth in exports of services

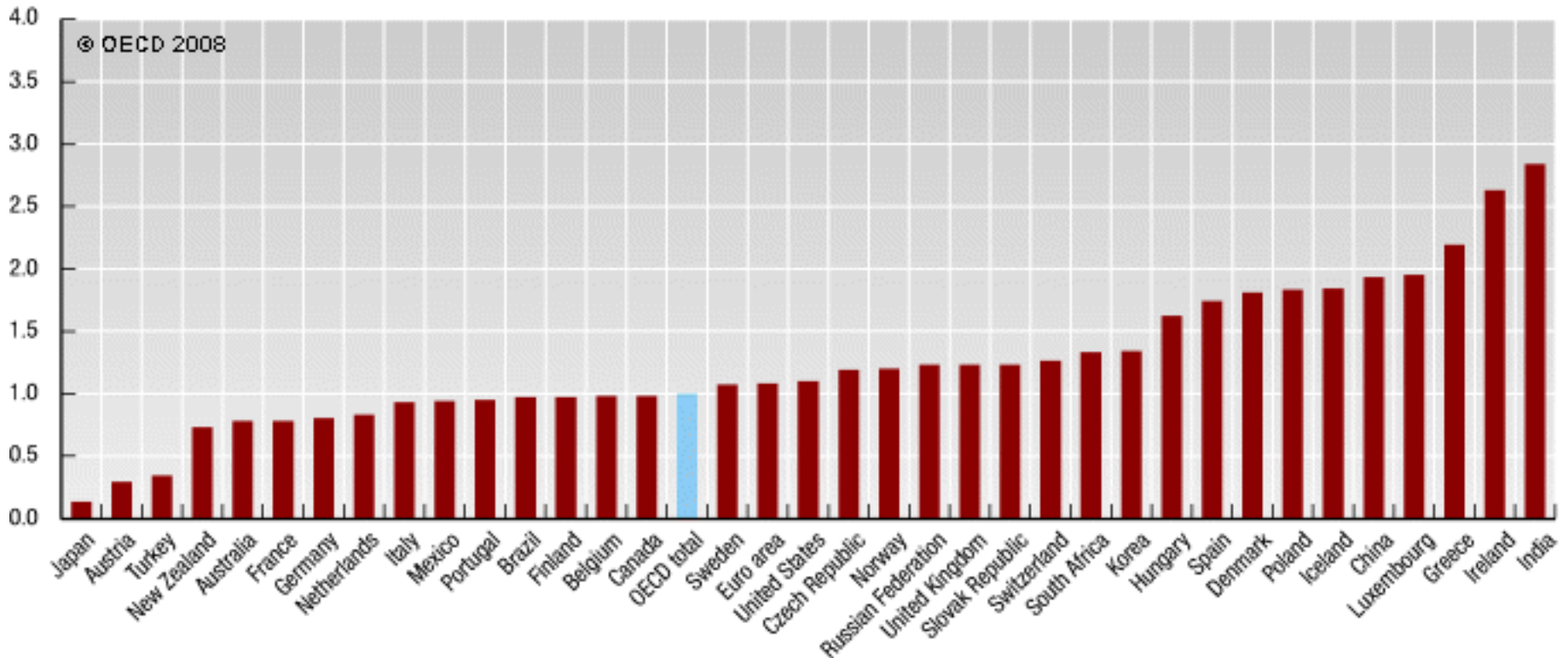
Growth over the period 1997-2006



From Organization for Economic Co-Operation and Development (OECD)

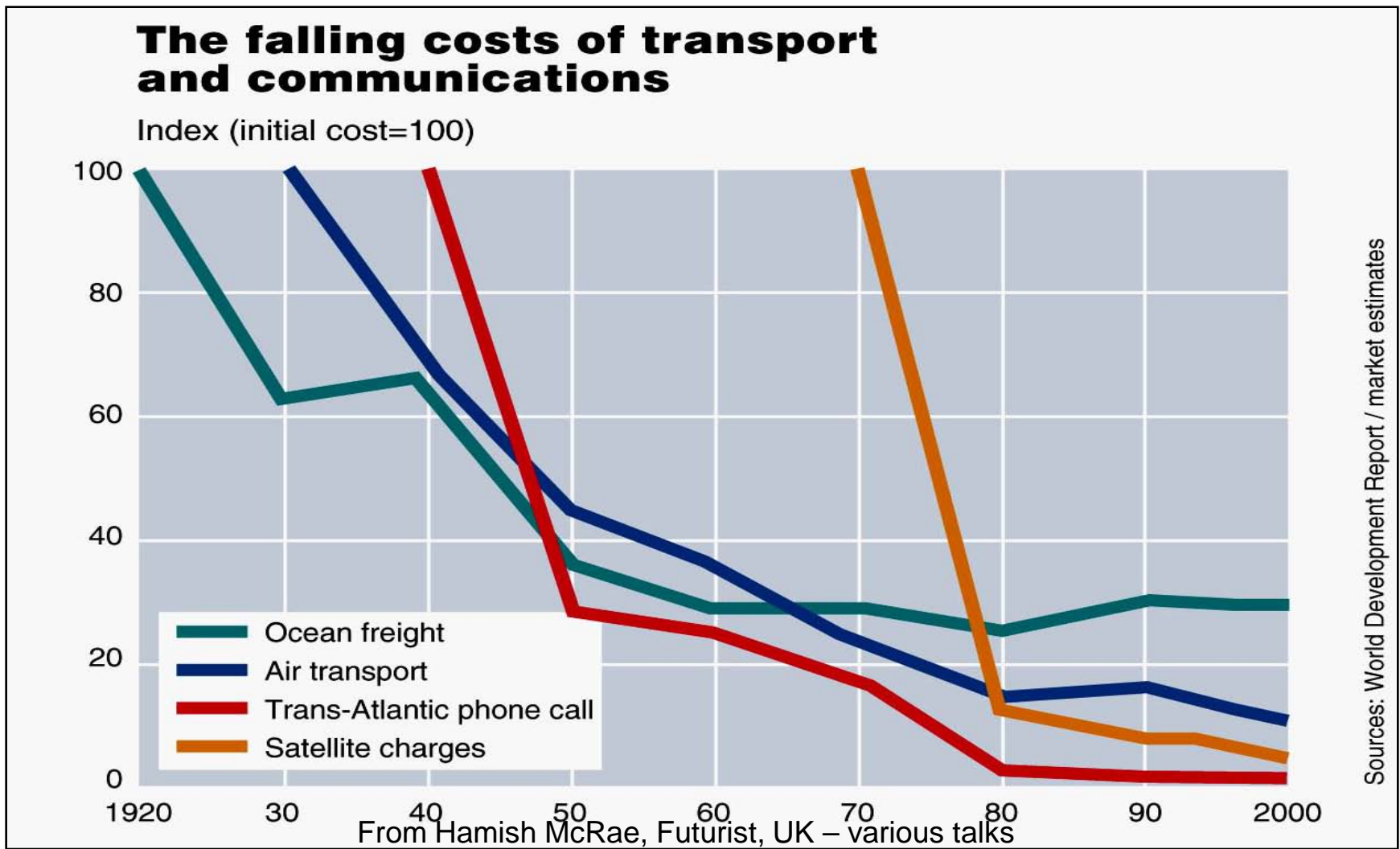
Relative annual growth in imports of services

Growth over the period 1997-2006



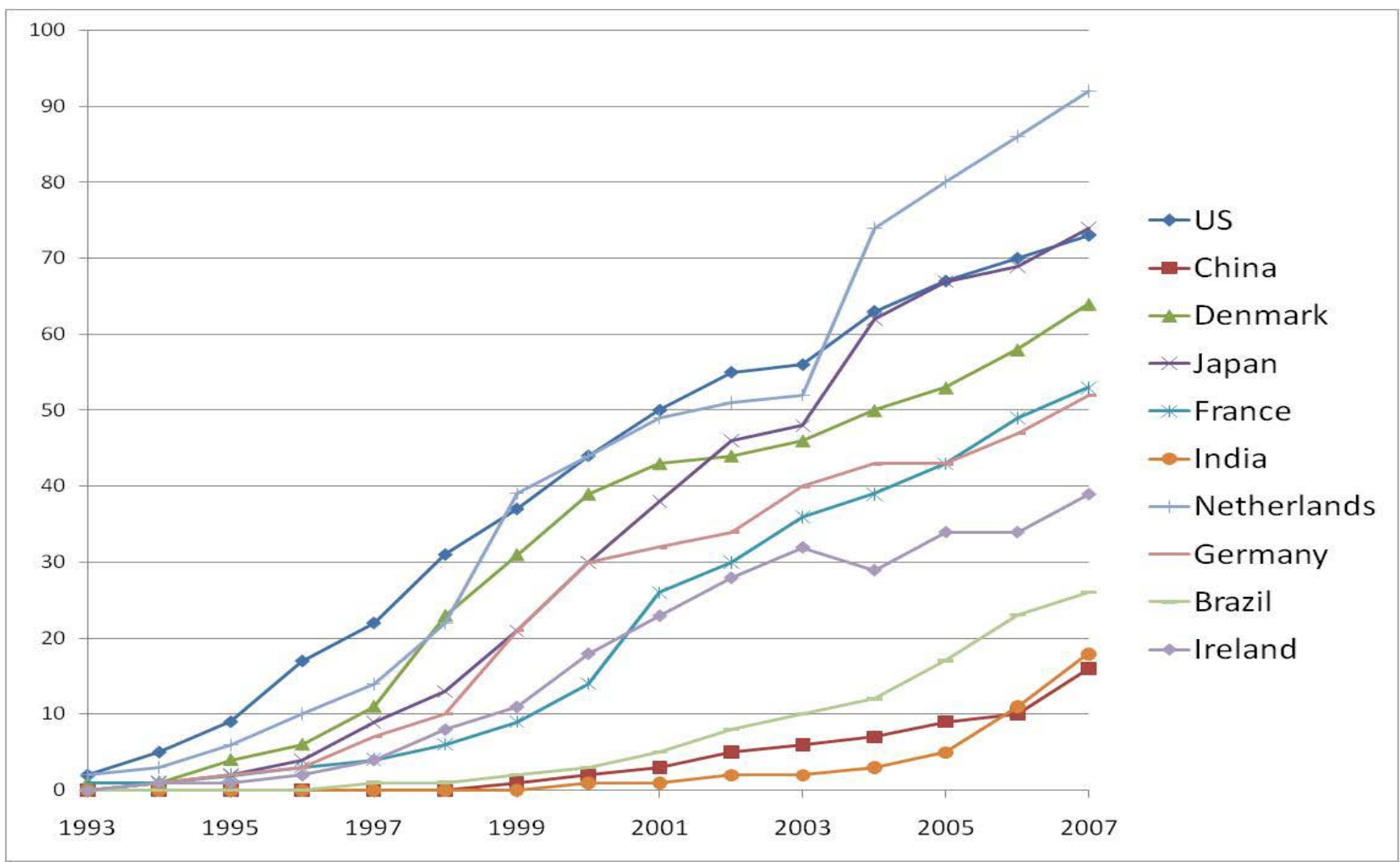
From Organization for Economic Co-Operation and Development (OECD)

Communication Costs Essentially Zero

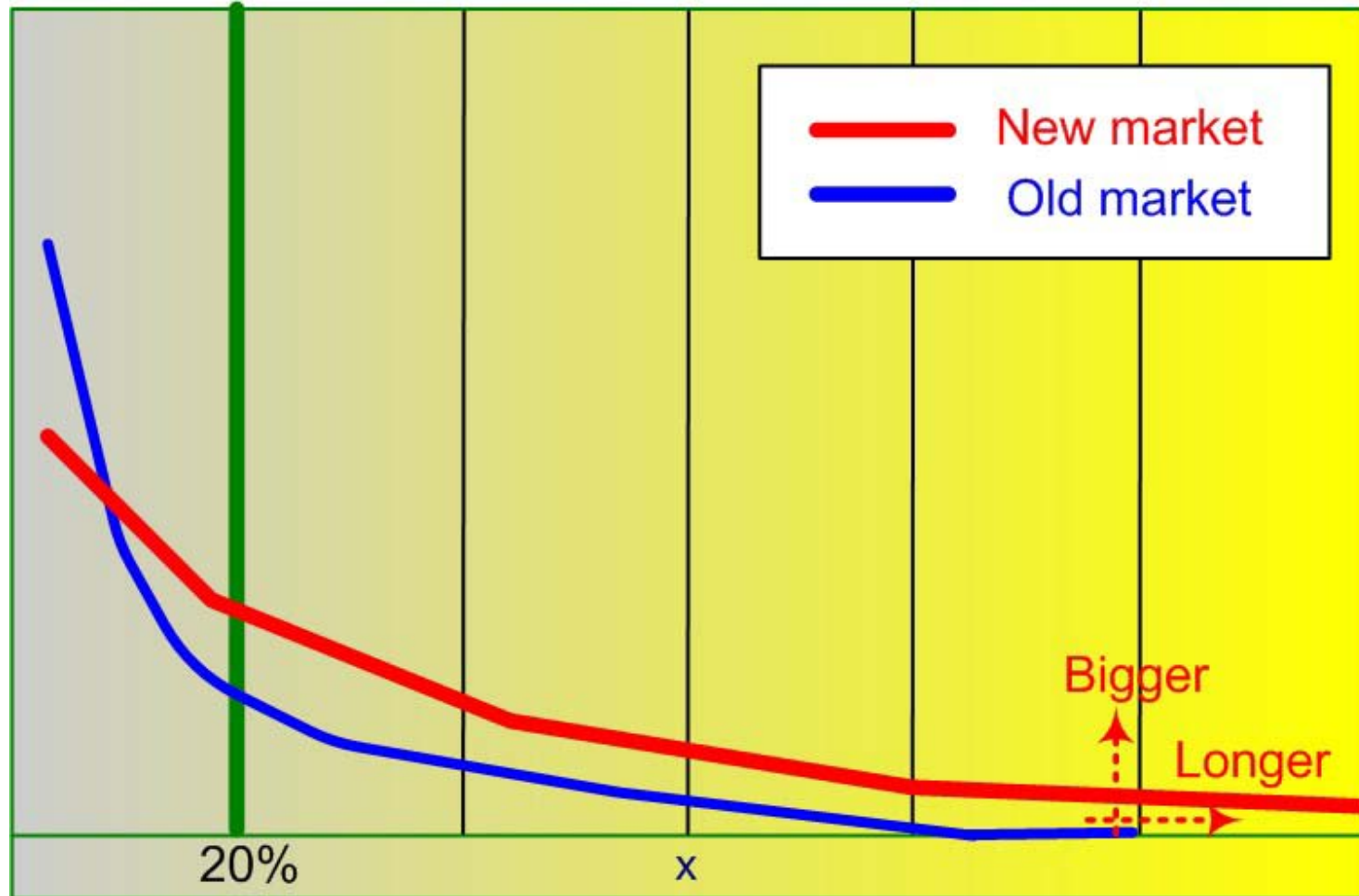


Percent Internet Users

From World Bank Data



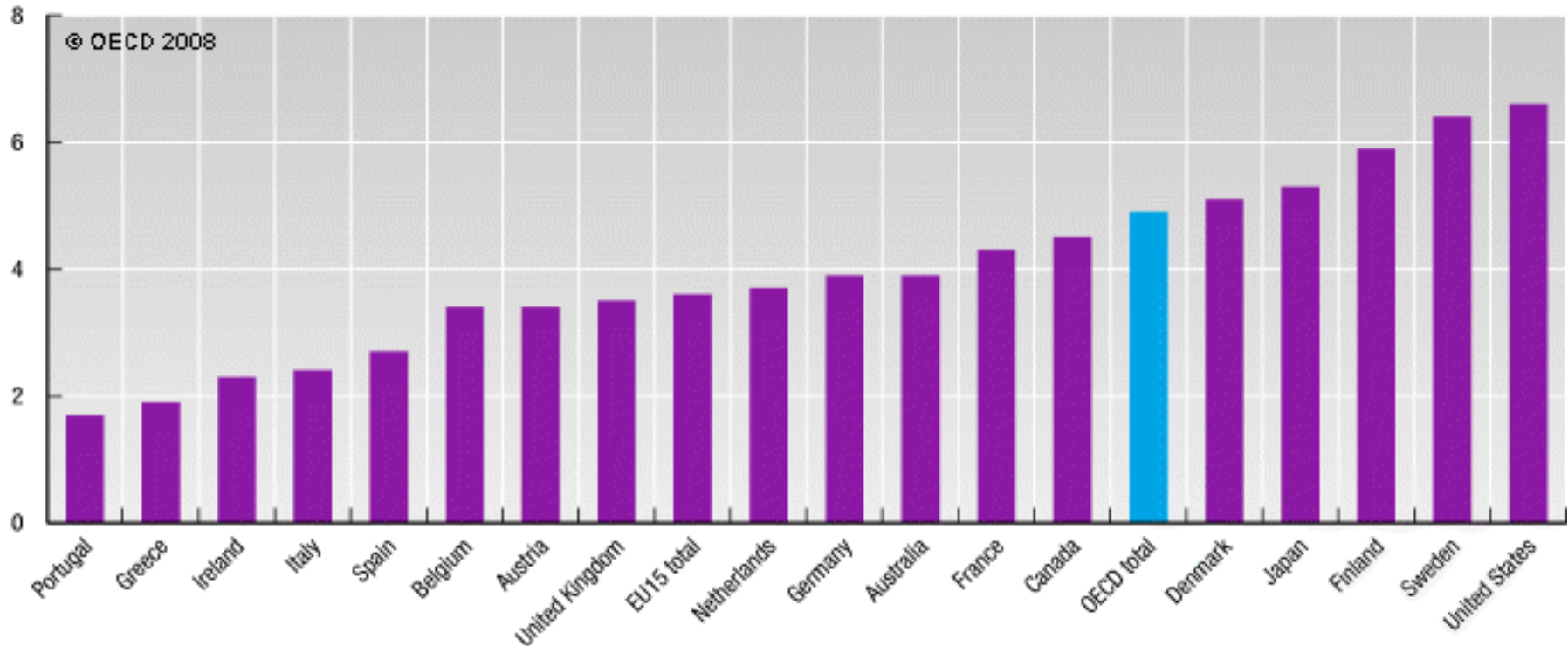
The Long Tail Effect in Sales



The Long Tail. (2008, September 6). In *Wikipedia, The Free Encyclopedia*

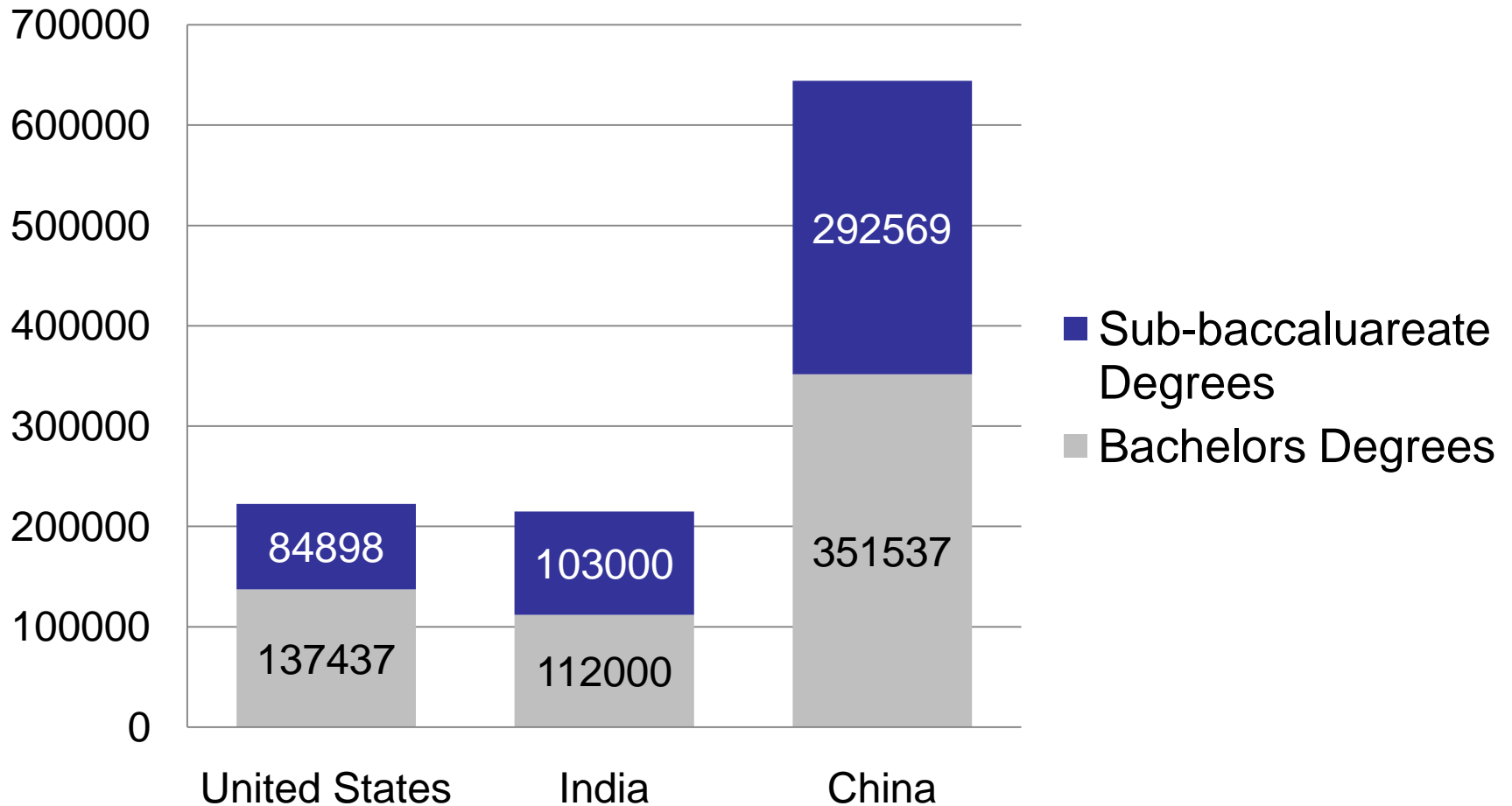
Investment in knowledge (% GDP)

(Expenditure on R&D, Higher Ed, Software)

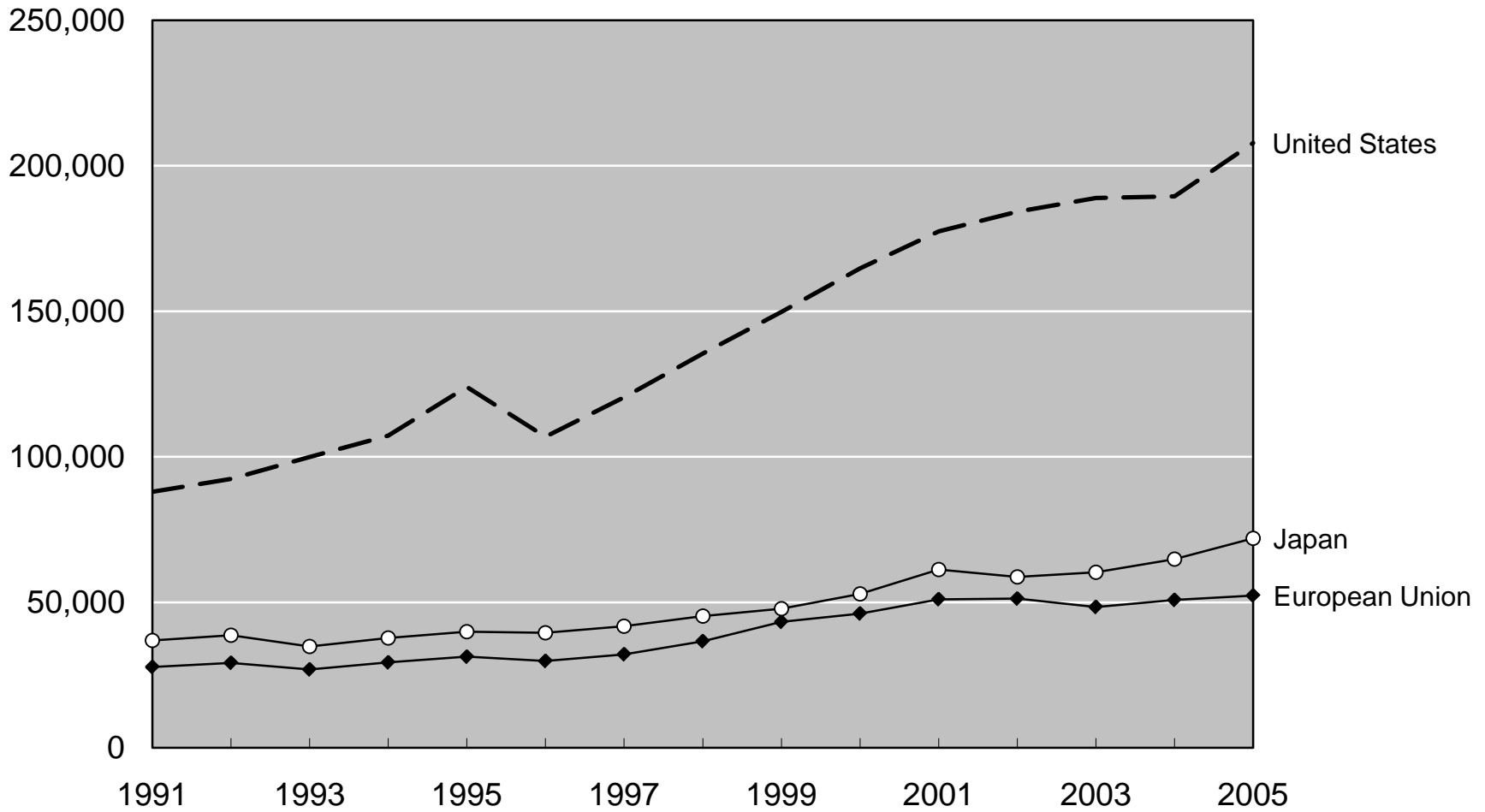


From Organization for Economic Co-Operation and Development (OECD)

Engineering Degree Comparisons

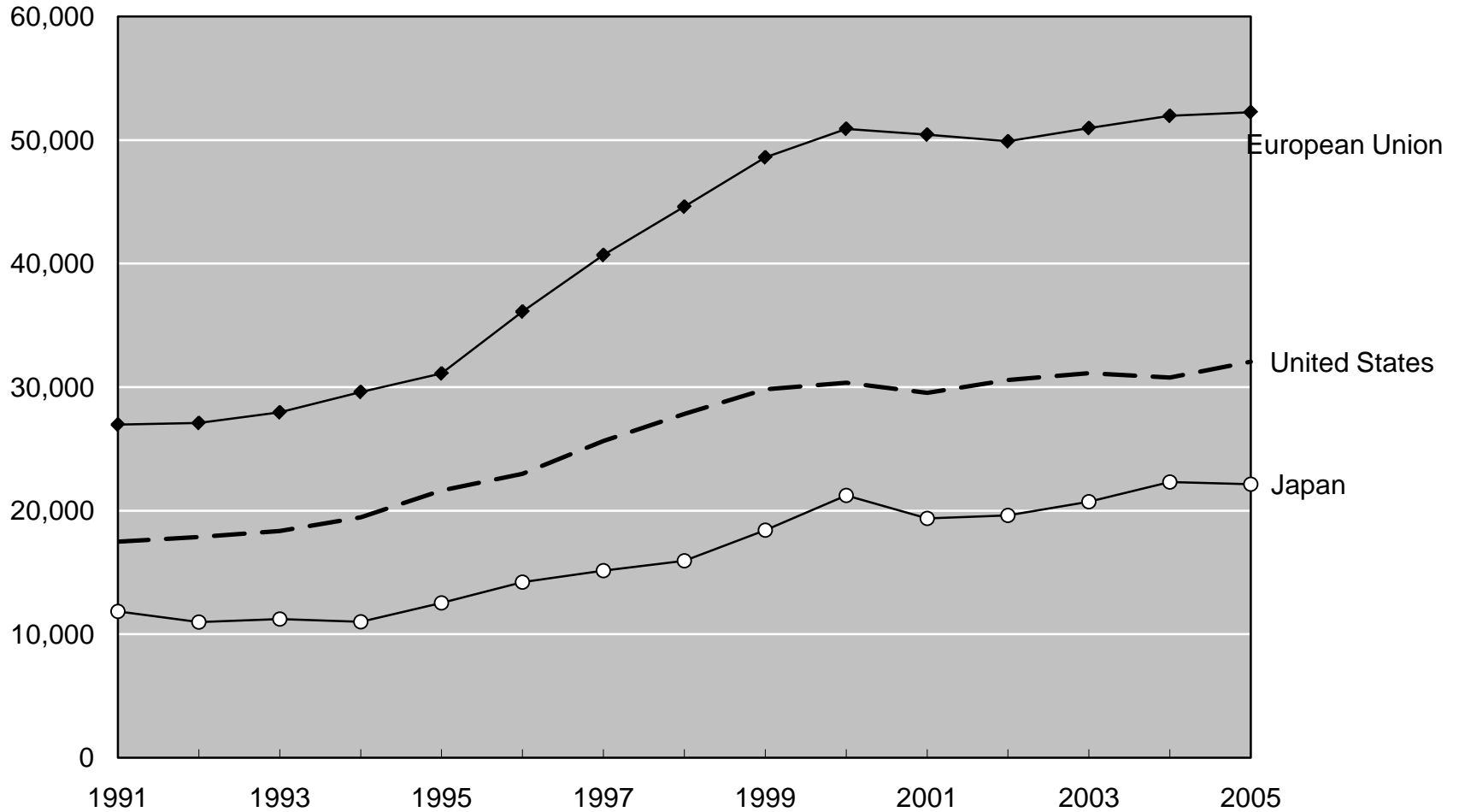


Patent Applications to the USPTO



From: Organization for Economic Cooperation and Development (OECD)

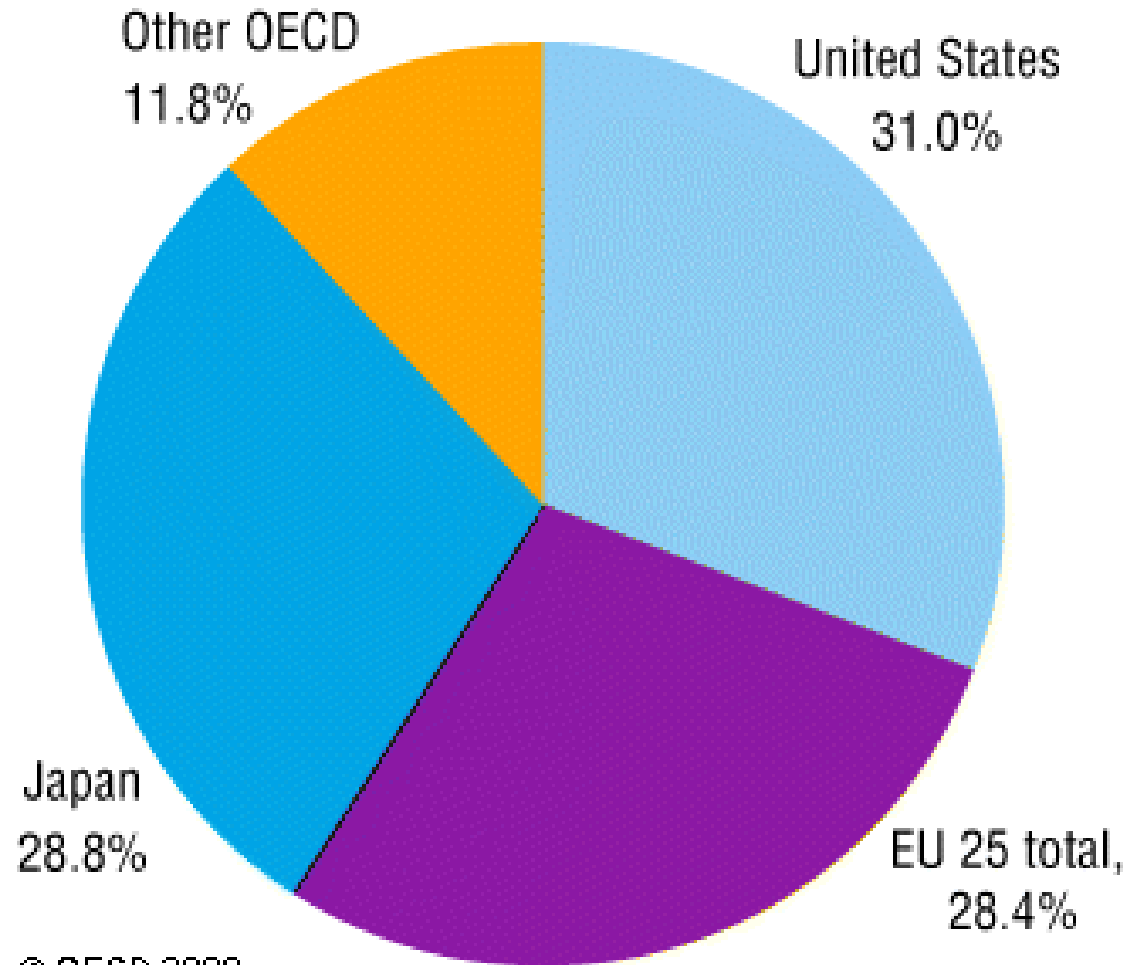
Patent Applications to the EPO



From: Organization for Economic Cooperation and Development (OECD)

Triadic patent families (Europe, Japan & US PTO)

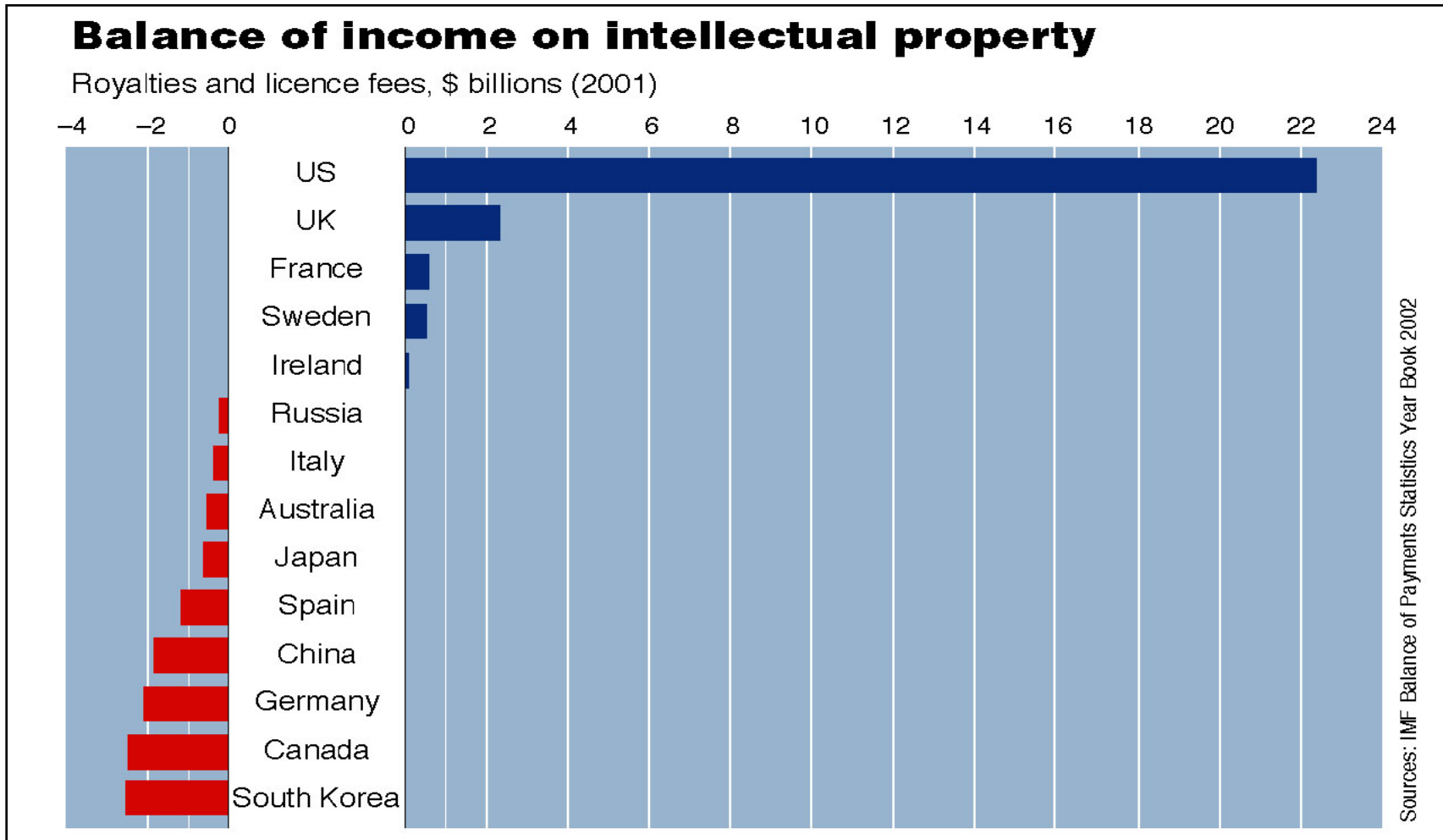
Share of total for 2005



© OECD 2008

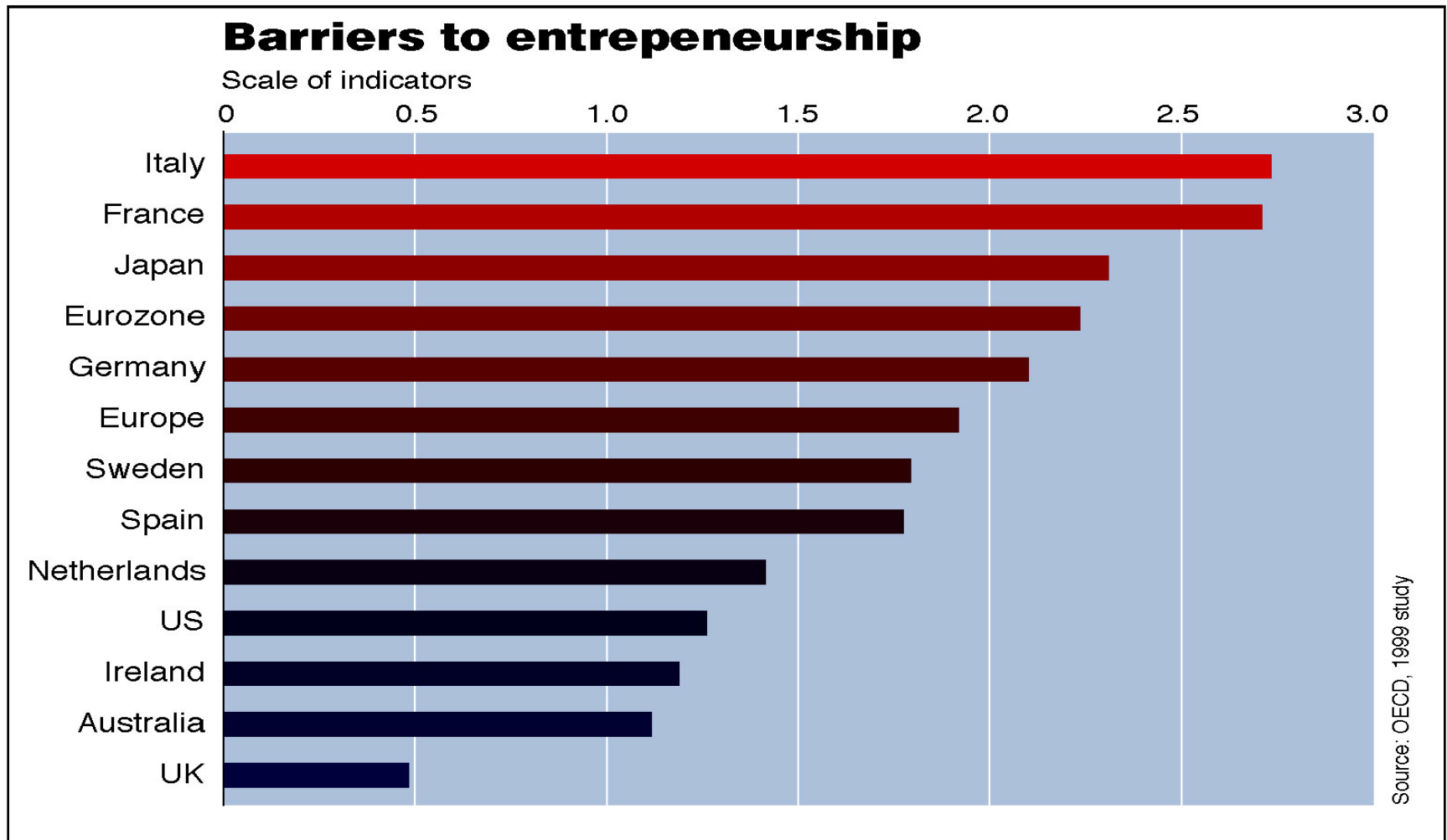
From Organization for Economic Co-Operation and Development (OECD)

IP Generation by Country



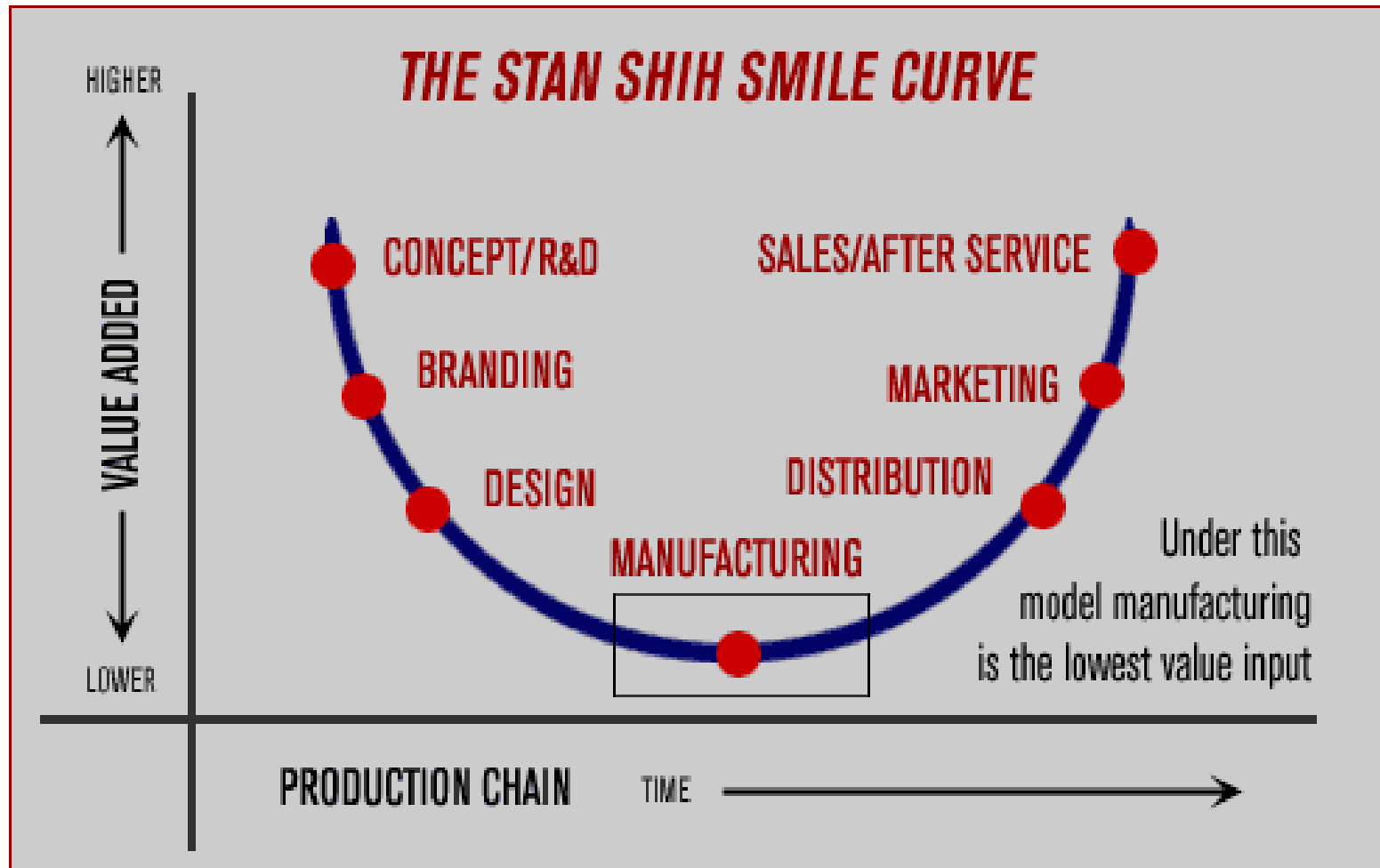
From Hamish McRae, Futurist, UK – various talks

Ease of Starting New Businesses



From Hamish McRae, Futurist, UK – various talks

Work Where the Value Is



Stan Shih, Founder of Acer, Taiwan, 1992

Summary of Global Trends

- “World is Flat”
 - WWW/Internet, Mobile Devices, Crowd Sourcing, SOA, Off-shoring
- Competition for technologically educated work force
 - Engineers: China: 600,00, India: 350,000, US: 70,00
- Communication cost are virtually zero
- New economy
 - IP generation, business start-up & service
 - “Hits” not required for success

IT as the Driver for Change

- Centralized service bureaus, controlled by few, limited access, monolithic system but automated activities
- Mini-computers give “departmental” independence to computing, beginning of connectivity and local inventiveness
- Personal computers break the paradigm, everyone has complete control (killer app – spreadsheets)
- Ubiquitous computing (phones, pda’s, notebooks, pervasive networking, wireless), distributed services, networked storage (locally)
- Services, social networking and interconnectivity rules (Broadband, SaaS, SOA, Blogs, SMS), data centers grow again (blades, racks, load balancing, distributed data)

Access to data, constant communications, and most importantly tools that allow people to shape information to fit their needs has and will continue to fundamentally change society

Work Style of “Digital Natives”

work from Prensky, 2001

Create	Find	Organize	Interact
Creating	Searching	Analyzing	Meeting
Learning	Collecting	Evaluating	Gaming
Evolving	Exchanging	Reporting	Socializing
Growing Up	Buying	Selling	
Programming			
Sharing			
Communicating			
Coordinating			

Gartner, Inc., “IT-Based Collaboration and Social Networks Accelerate R&D” by Carol Rozwell, January 2008

Culture Change: Digital Natives

- Millennial Generation has grown up with technology, it's use and on-demand access to information.
 - There is evidence that neurological changes are occurring
 - Gaming has shown improved creative thinking
- Newer generations have always adapted, taken it for granted and innovated new technologies
 - Telegraph, Dial a phone, wireless, typewriter
- Understanding of the underlying concepts of the technology and it's adaptation and applications has (and will always) be the generator of change
 - As these ideas are automated and simplified, they become usable by all under the rules from which they have been developed

Effect of Global Change on IT

- “IT Doesn’t Matter”
 - Nicholas G. Carr article in Harvard Business Review, 2003
- Much of information technology has become a commodity
- Many companies outsource their IT (including payroll, HR, billing, networking, storage,)
- Access to inexpensive IT is not a strategic advantage

So, what is “Creative IT”?

The Horizon Report 2008

The New Media Consortium and the EDUCAUSE Learning Initiative

- **Grassroots Video**
 - Virtually anyone can capture, edit, and share video clips.
- **Collaboration Webs**
 - Collaboration no longer calls for expensive equipment
- **Mobile Broadband**
 - Each year more than a billion new mobile devices are manufactured,
- **Data Mashups**
 - Multiple sources of data merged together provide new insight
- **Collective Intelligence**
 - Hive, crowd sourcing, open source,...
- **Social Operating Systems**
 - Organize around people not content

Network Research Options



Gartner, Inc., "IT-Based Collaboration and Social Networks Accelerate R&D" by Carol Rozwell, January 2008

Functionality and Objectives	Tool Category	Example
Private "sandbox" to develop concepts	Personal portal with RSS feeds and mashups	Google desktop
Guides to useful information from like-minded colleagues	Folksonomies (social tagging) and content analytics	Connotea, del.icio.us, digg, Flickr
Map of high-value relationships	Organizational and value network analysis	Decision Path, GenIsis, Inight, Visible Path, Visual Analytics
Just-in-time access to people who have been evaluated as having the knowledge they need	Expertise location, social software platforms and virtual presence	me.dium, Trampoline
Opportunities to contribute to projects that excite their imagination	Idea management, wikis and blogs	BrightIdea, Imaginatik, Sopheon
Confidence that their project will be judged using an unbiased set of criteria	Prediction markets and portfolio analysis	consensuspoint, longbets, SmartOrg
Recognition for actions and expertise, not just university Degrees	Content rating and reputation management	CiteULike
Maintaining the persona — the digital identity	Social networking sites	MyResearchSpace.com
The ability to work at any time	Mobile computing and video conferencing	Ex'ovision

Expect Increased Demands for Information Access and Malleability

- All time access to all your services
 - Phone browsing is just the beginning
- Easy to use technology (no users manual)
- Analytics rule – predictive modeling
 - Amazon “people who have ... also considered...”
- Shared Data
 - Interlinked/connected – Web services, Mash-ups, cloud
- Identity Management
 - Know who you are and trust it is you
 - Security & Compliance, Shibboleth, grid computing, true “cloud computing”
- Outsourced components as appropriate
 - Industry leads, Higher Ed embracing now – (SaaS, Google apps, MS Live, Facebook for collaboration,)

Knowledge, Not Information, The Coin of the Realm

- Edited/digested/summarized
- Verified/validated/assured
- Analyzed/interconnected/trusted
- Example “trusted” sources:
 - Blogs
 - Slashdot, Politico, Huffington Post, Gizmodo,...
 - Reviews
 - Cnet, Consumer Reports, KBB
 - Portals
 - Craig's list, Google, WebMD
 - Guides
 - Zagat (food), Travel (Fodors, Frommers)

Higher Ed: What does it mean for us?

- Electronic platform delivery (growth, on-campus, flexibility)
- Focus on advanced degrees
- Educate for the “Smile”
 - Creativity as fundamental education
 - Entrepreneurs – Need to foster cognitive diversity
 - Develop champions in science (biology, nano, physics)
 - Creation of new intellectual property (innovation)
- IT as an accelerator for research
 - Collaboration
 - High performance computing in all fields
- Increased expectations for service delivery

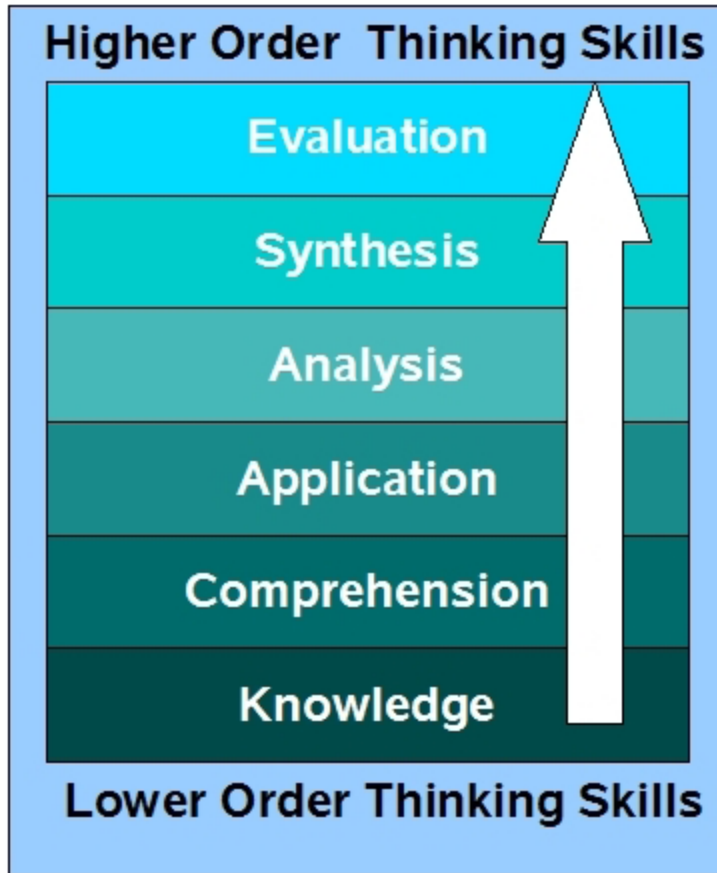
NC State Strategic Plan

- Build research and graduate and professional programs aggressively in proven and emerging areas
- Strengthen our commitment to a broader, more comprehensive range of disciplines
- Enrich undergraduates' educational experience through their active engagement with society
- Foster innovation-driven economic development
- Strengthen K-12 science and mathematics education in North Carolina
- Integrate global perspectives into our programs and functions

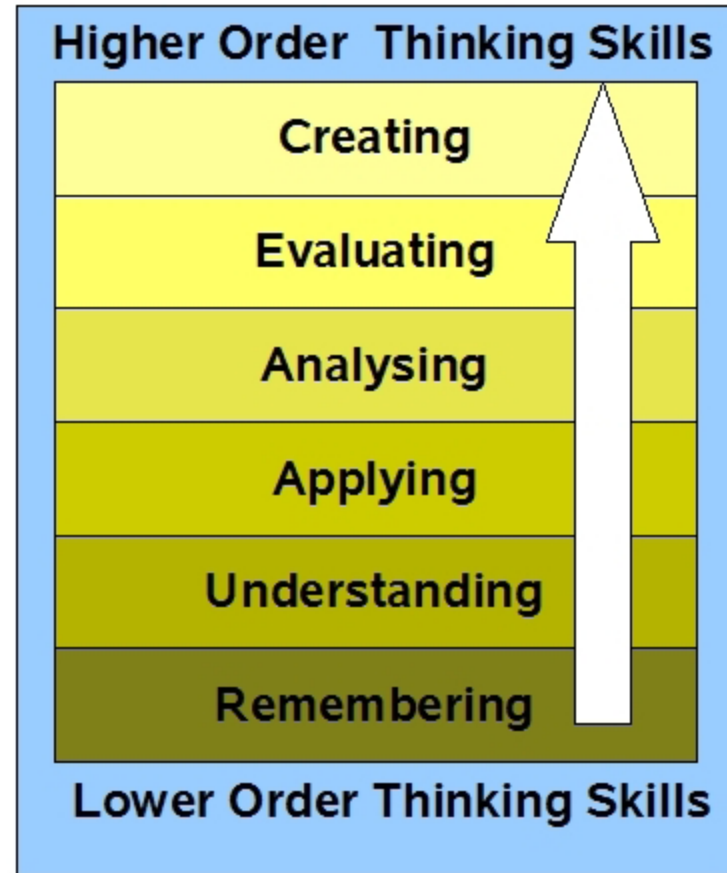
UNC Tomorrow: NC State Response

- Science in Support of our Economy, Citizens, Nation and World
- Transforming Graduate Education
- Communications across the Disciplines: Institute for Research and Instruction in Communication and Digital Media
- Increasing Access and Enriching Programs through Inter-institutional Collaboration
- William and Ida Friday Institute for Educational Innovation
- Center for Excellence in STEM Education
- Entrepreneurship, Industry Clusters and Economic Development

Bloom's Digital Taxonomy – Premium on Higher Order Skills



Bloom's Taxonomy



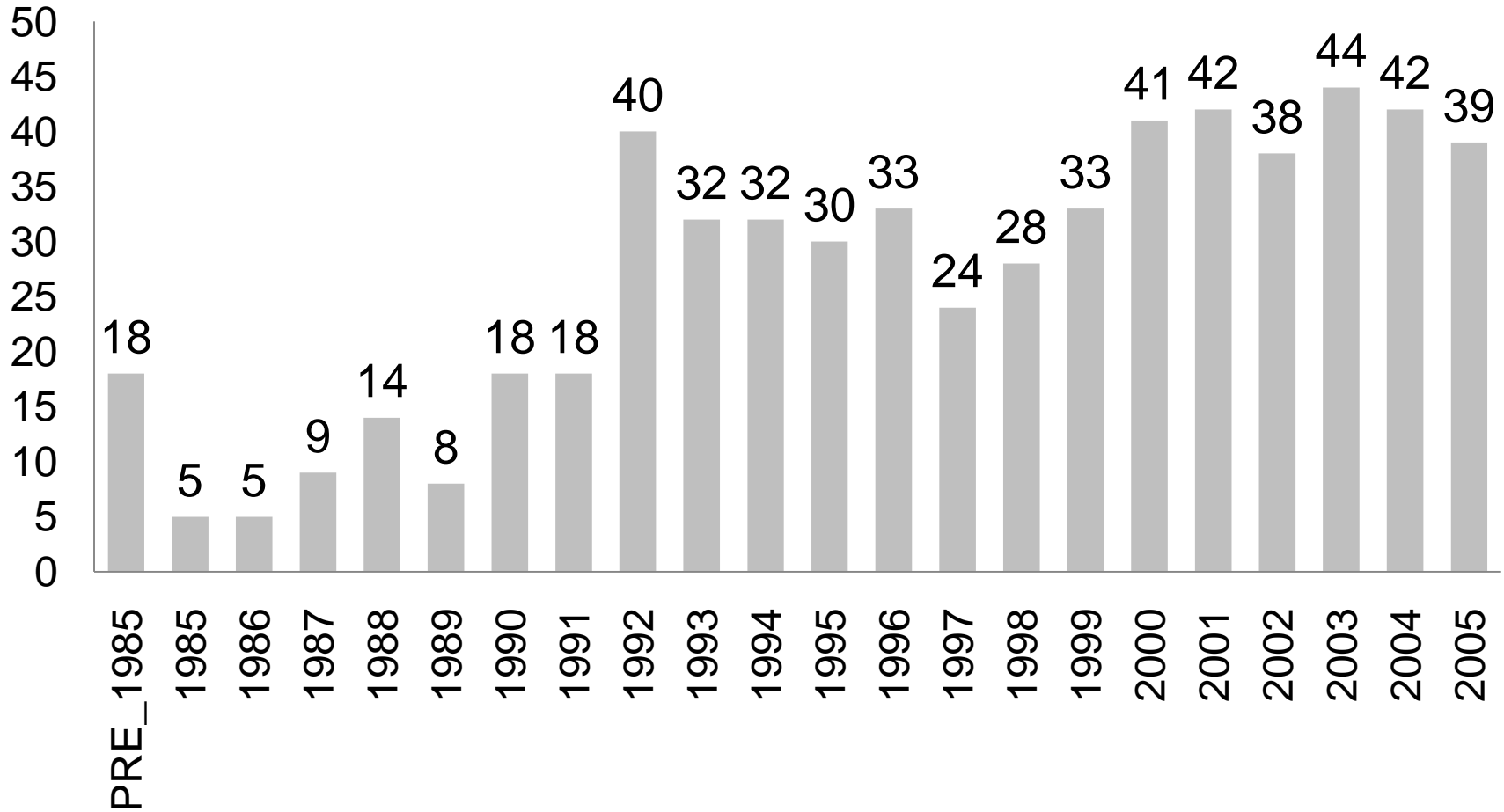
Bloom's Digital Taxonomy

From: Andrew Churches (<http://edorigami.wikispaces.com/file/view/bloom%27s+Digital+taxonomy+v2.12.pdf>)

Game Changing Educational Activities

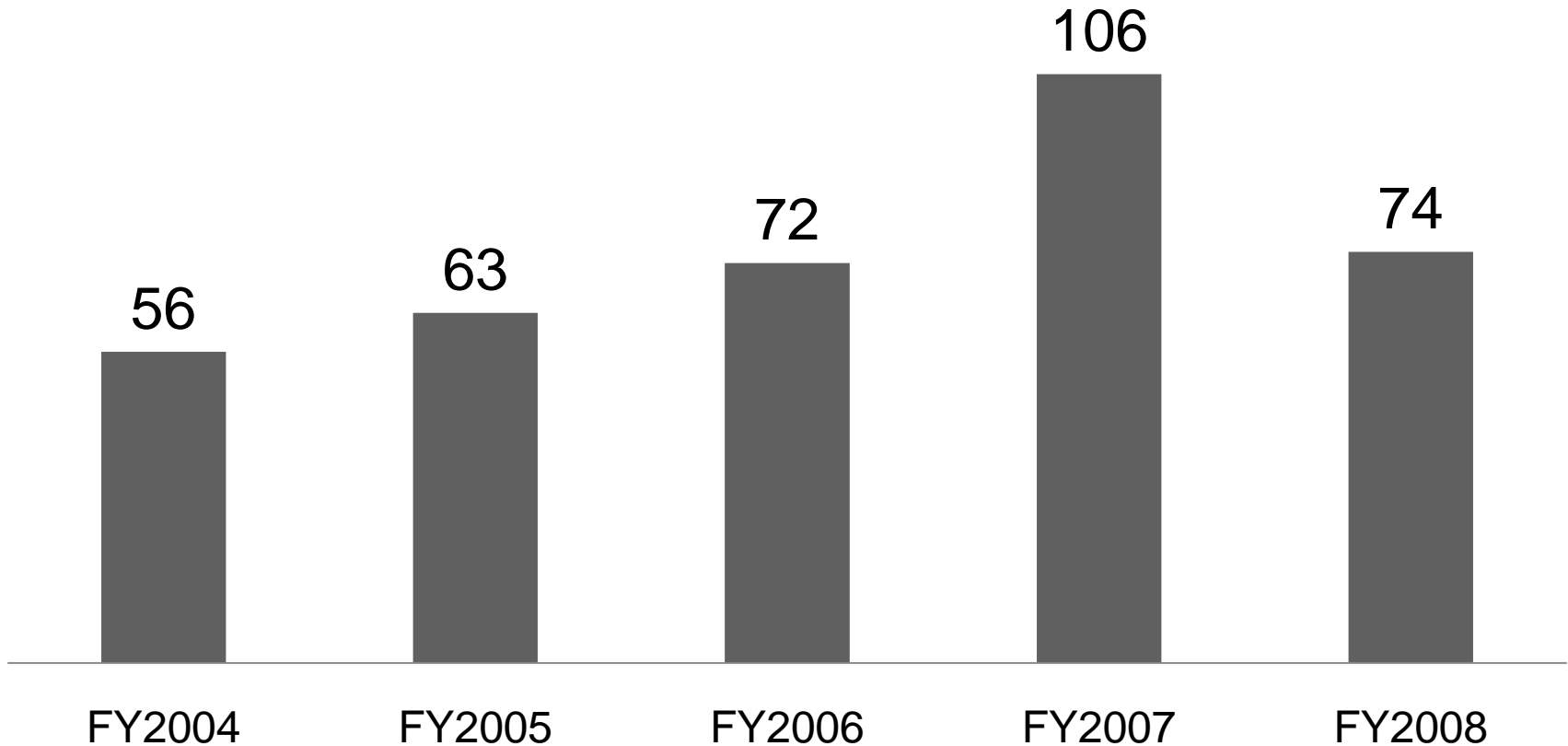
- Digital Games Research Center
 - Research in use of gaming for learning
- Entrepreneurs Program
 - Full-immersion educational environment for new product and business prototyping AND a company
- Friday Institute
 - Innovative approaches possible with multi-media and networked technologies
- Institute for Advanced Analytics
 - Unique Masters degree focusing on the use of analytics
- Learning in an Technology-Rich Environment (LITRE)
 - To improve student learning across the University through the use of technology
- Undergraduate Research
 - Provide research experiences (discovery, inquiry, and creativity based learning) gained from hands-on mentorship by NC State faculty

NC State Patents



NC State Commercialization History

Agreements



NC State – Delivering Innovation

- Technology Transfer Success
 - 623 Patents, 72 Start-up companies
- 3rd in "Patent Pipeline Power" of all universities in life sciences (The Scientist, June 2005)
- 9th among U.S. universities in patent production, quality and strength (IEEE Spectrum, Nov. 2006)
- Company Spin offs: Red Hat, Cree, VCL (Apache.org), ...
- Centennial Campus – A model for University/Industry partnership
- Research Triangle Park (Model for countries to build capacity)
- NC Government – understands and fosters Economic Development and Higher Ed linkage

NC State: Ready to Lead

- Well positioned with the elements for the university of the future
- Strong collaborative foundation and focus (colleges partner across disciplines and universities)
- Leading innovation and technology transfer programs
- Industry collaboration and economic development models mimicked around the world
- Service, outreach and extension part of the DNA

How where does a campus IT organization fit?

- Partner in the full university enterprise (not just provider of commodity infrastructure)
- Collaborate on strategies, services and solutions that allow people and teams to meet their strategic goals
- Be nimble, effective and efficient at providing services that meet campus needs
- Be a source of sought after knowledge on IT (from infrastructure to strategic)
- Be a national and state leader in IT as a representative of the University and it's mission and goals

OIT Vision *(Hoit's working version)*

Be the IT organization people seek out as a partner for providing visionary strategies, creative solutions, objective information and effective & efficient services in order to help them achieve their mission and goals.

OIT Mission *(Hoit's working version)*

Provide nimble, effective, efficient and collaborative IT services, solutions and strategies in a timely and helpful manner that assists the university, state and nation in achieving their strategic goals.

OIT Directions

- Create a Strategic Operations Plan by Dec 08
 - Focus on service, quality, reliability and meeting customer needs
 - Implementation over the following 18 months
- Develop an IT Governance structure
 - Framework that defines the input and decision process for IT
 - Build on existing committees and structures
 - Complete by Fall 09
- Develop a strategic IT plan for campus (future)
 - Integrate IT into the fabric of the university
 - Campus wide process and participation

"Our Age of Anxiety is, in great part, the result of trying to do today's jobs with yesterday's tools."

~Marshall McLuhan~