IG/17
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UNITED NATIONS
DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS
STATISTICS DIVISION

Seminar

Addressing Information Gaps in Business and Macro-Economic Accounts to Better Explain Economic Performance

New York, 23 – 24 June 2008
United Nations, Conference room C

Public sector intellectual property
Innovation and intellectual property

Martin Fleming

Innovation and Intellectual Property

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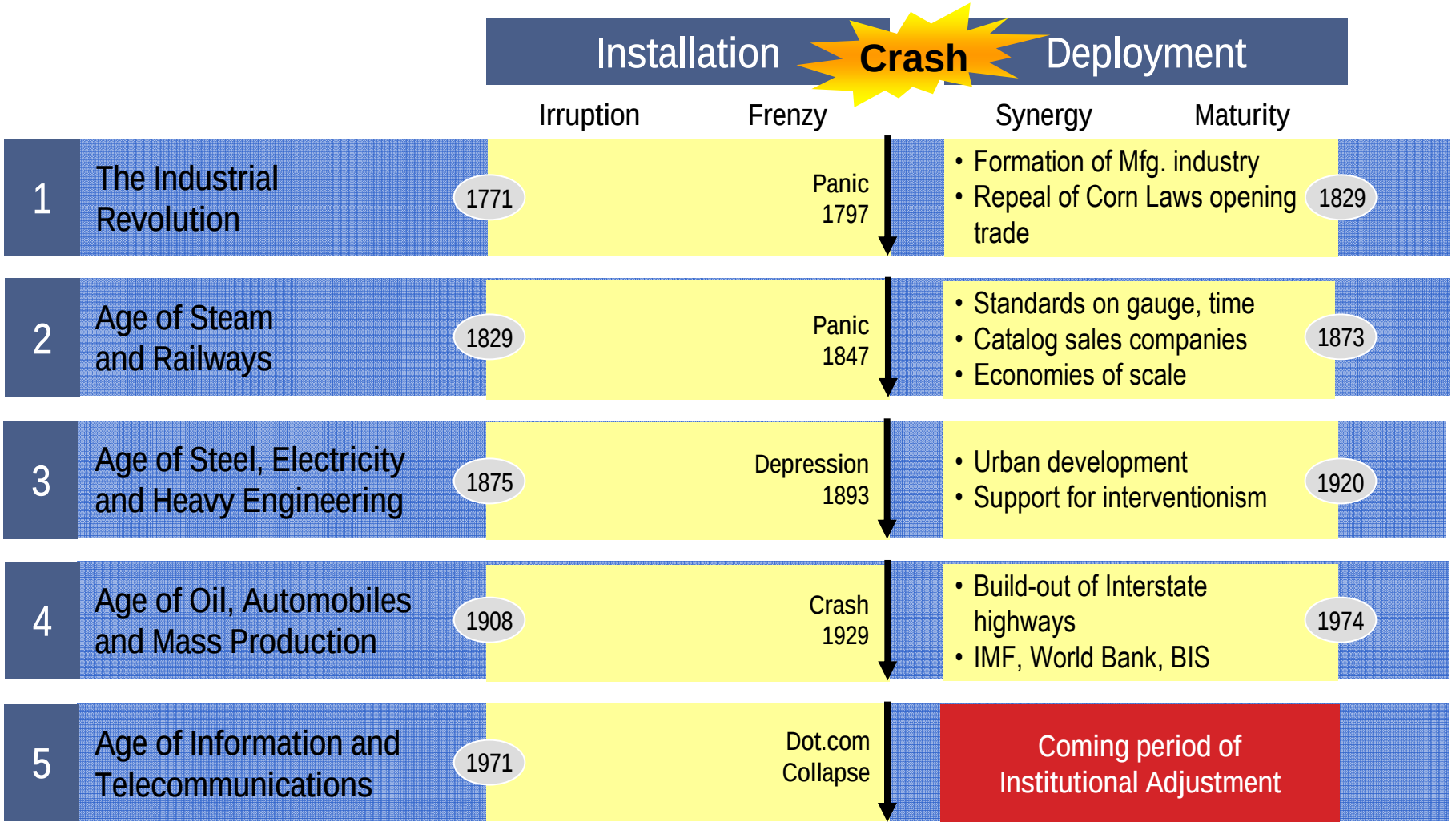
June 24, 2008

High Level Summary

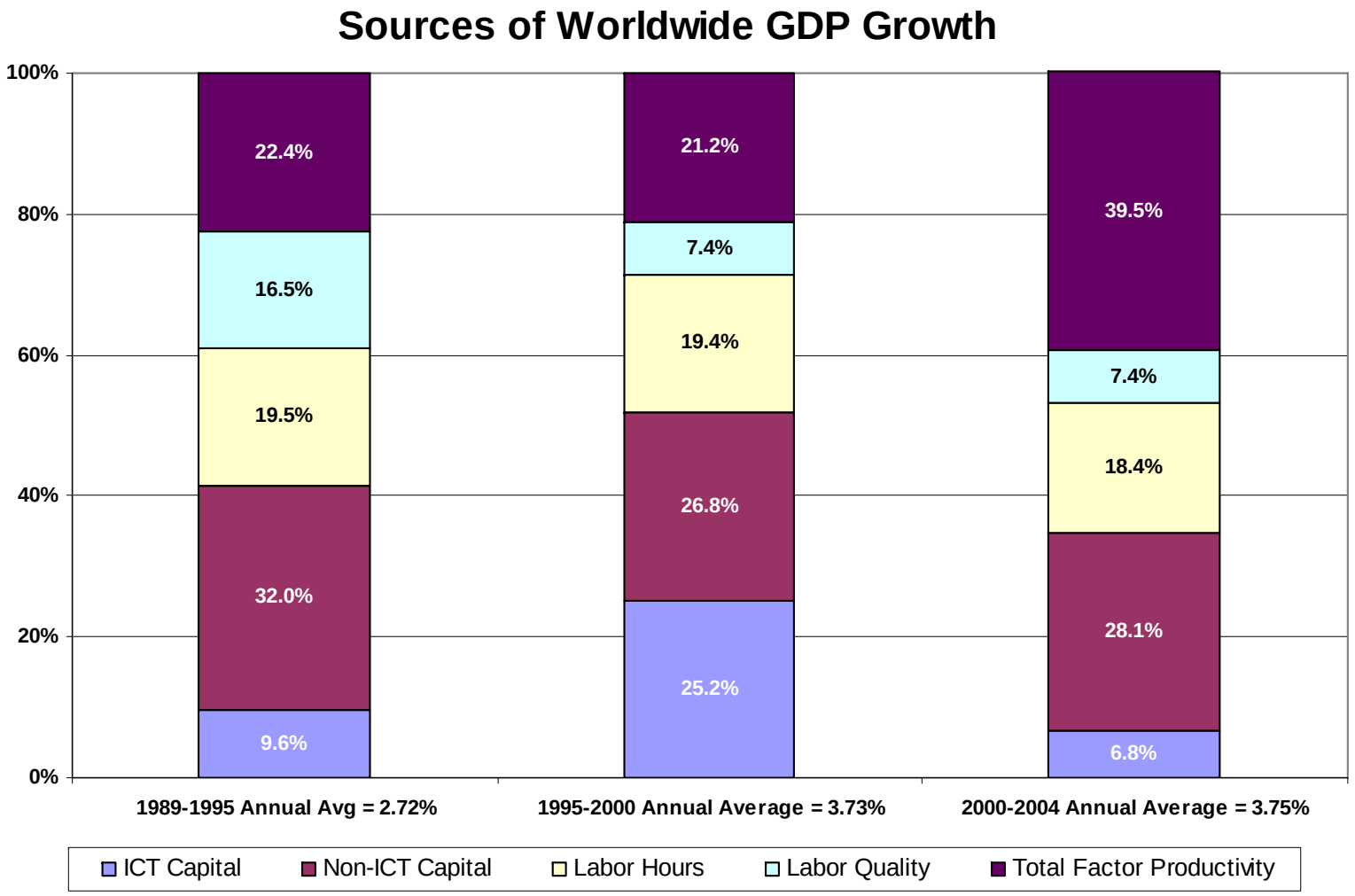
- **The economics of business have fundamentally changed**
- **Global economic transformation brings increased market size, service sector development and emergence of open source software**
- **Early evidence suggests that IP assets are priced in alignment with the products they support**

Five Historical Waves of Economic & Social Transformation



Source: Carlota Perez, Technological Revolutions and Financial Capital: The Dynamics of Bubbles and Golden Ages; (Edward Elar Publishers, 2003).

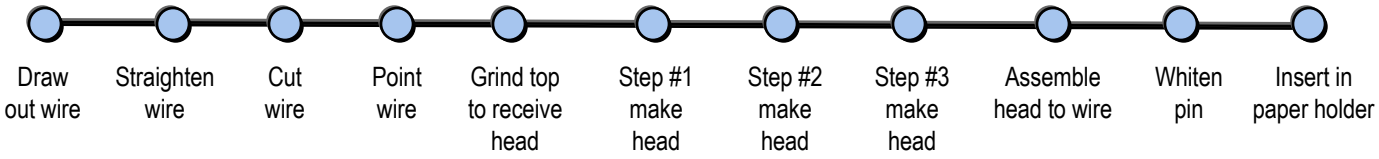
Since 2000 Global Gains in GDP Growth have been Driven by End-Users of Technology



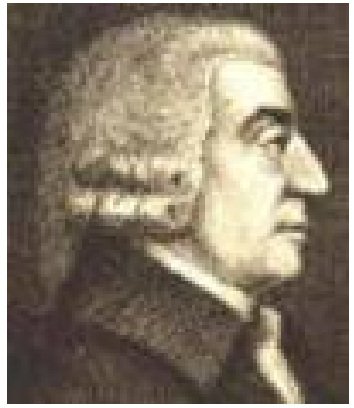
See: Dale W. Jorgenson and Khuong Vu; "Information Technology And The World Growth Resurgence;" Scandinavian Journal of Economics, Vol. 107, Issue 4, December 2005.

In the *Wealth of Nations*, Adam Smith shows that specialization in "The Pin Factory" depends on the size of the market

- **A visit to a 1776 pin factory shows a process under one roof in which the unschooled worker, with no access to its special machines, would be lucky to turn out a single pin a day.**

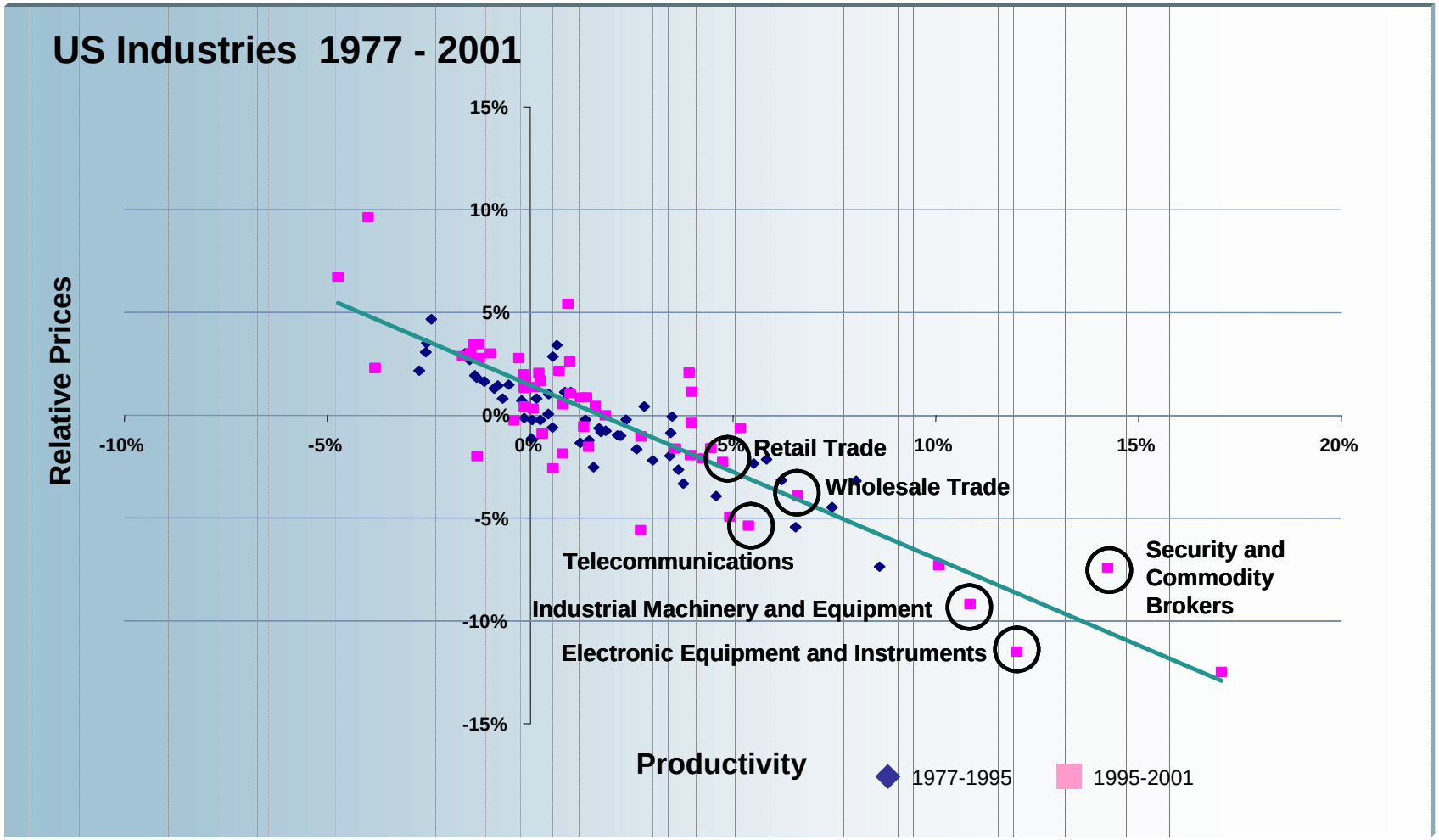


- **With specialization, ten to fifteen men can make twelve pounds in a day.**
  - There may be 4,000 pins to a pound; therefore ten men can make 48,000 pins a day, or nearly 5,000 pins apiece. Every two weeks; a million pins.
- **Because the business must cover its fixed costs, the extent of the market, the scale of the business, and how much the business can sell determines the degree of specialization.**
- **To Adam Smith, this had mainly to do with transportation costs.**
- **"The division of labor is limited by the extent of the market."**



Source: David Warsh; Knowledge and the Wealth of Nations, A Story of Economic Discovery; (W.W. Norton & Company, New York, 2006)

Industry Transformation in Response to Economic Pressures Drives Productivity Growth

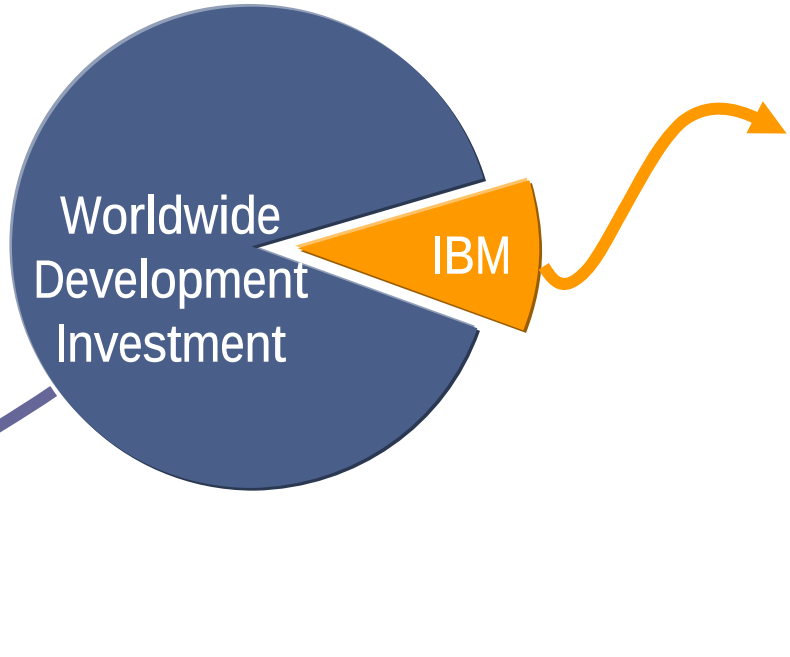


Source:http://www.research.ibm.com/people/f/fleming1/

Create National Service Innovation Roadmaps

Emerging Demand	Define the Domain	Vision and Gaps	Bridge the Gaps
Service Innovation	Service Systems	Service Science	Stakeholder Priorities
▪ Growth in service GDP and jobs ▪ Service quality & productivity ▪ Sustainability ▪ Demographics ▪ Globalization ▪ Opportunities for businesses, governments and individuals	▪ Customer interactions enabling value creation ▪ Dynamic configurations of resources ▪ Increasing scale, complexity and connectedness of service systems ▪ Service Networks	▪ Discover principles of complex service systems ▪ Systematically create, scale and improve systems ▪ Foundations laid by existing disciplines ▪ Progress in academic studies and practical tools	▪ Education ▪ Research ▪ Business ▪ Government

The Sum of Community Innovations with the Linux Operating System far exceed what any Single Vendor could create

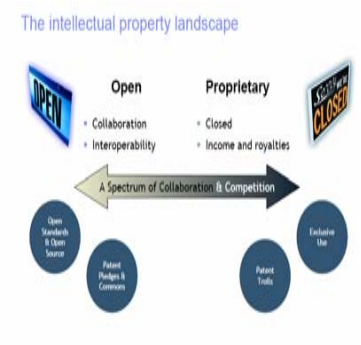


- Leverage investment to meet unique needs
  - Share investments within company
  - Invest for particular products

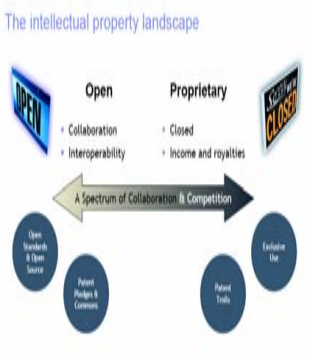
- Enterprise Linux Investments
  - IBM, Intel, HP, Red Hat, Novell, and many more
- Academia, Research
- Tailored Industry Investment
- Hobbyist Investment

- Investments are matched many times over
  - Development model is not free
  - Small investments can be highly leveraged
  - Multiple hierarchies of leverage

The Intellectual Property Landscape



OPEN	PROPRIETARY
▪ Collaboration	▪ Closed
▪ Interoperability	▪ Income and Royalties



A Spectrum of Collaboration and Competition

Open Standards and Open Source

Patent Pledges and Commons

Royalty Income

Exclusive Use

Open Collaborative Research Program Success

More than 20 Scientific Publications

IPCO 2008
The 13th Conference on Integer Programming and Combinatorial Optimization

ACM/IEEE International Conference on Software Engineering (ICSE)

acm

siam Association for Computing Machinery
ACM-SIAM Symposium on Discrete Algorithms

VLDB 2007

OOPSLA

12+ Open Source Contributions

COIN-OR

eclipse

WALA
T. J. WATSON LIBRARIES FOR ANALYSIS

Talent Pipeline / Recruiting

- **PhD pipeline**
- **Faculty as academic visitors to IBM research**
- **Research Staff Member hiring**

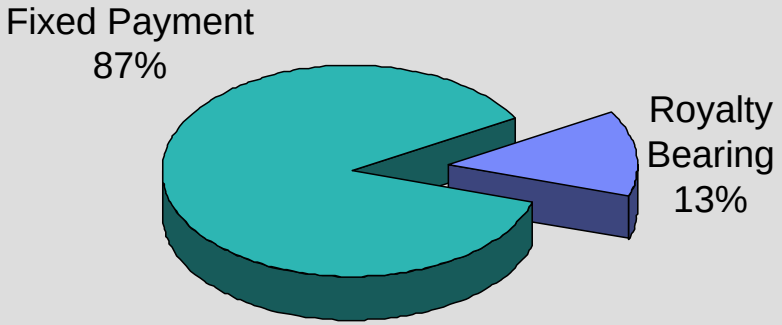
Improved Collaborations

- **New partnerships**
- **Improved efficiency**

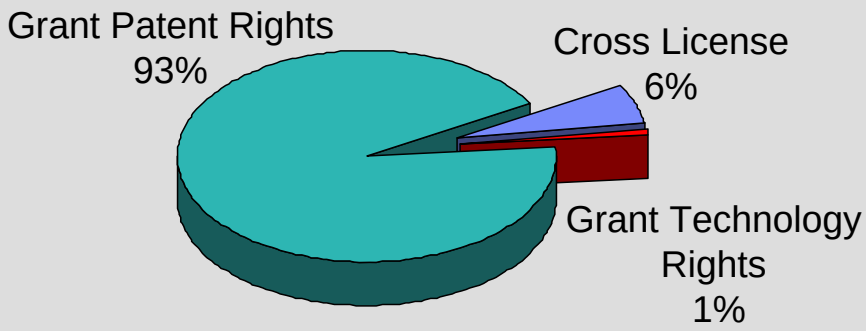
The Determination Of Pricing In An Intellectual Property Marketplace

Database Of IP Transactions Established In 1999, Containing 4823 Observations Of Which 350 Licensed PC Patent Rights

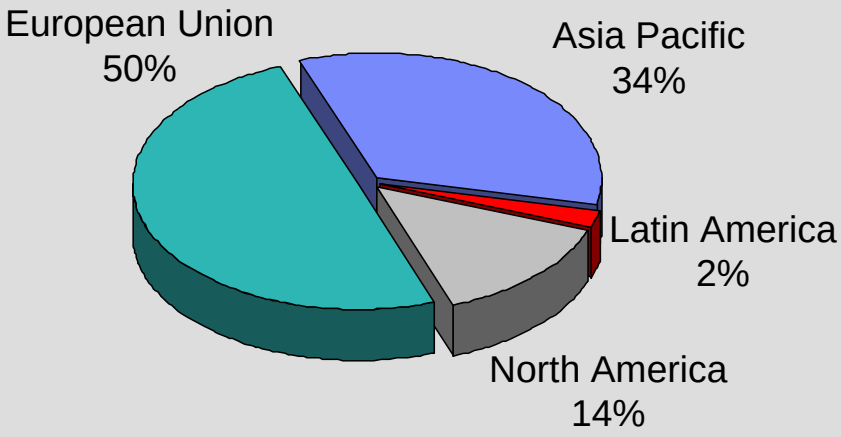
Payment Types



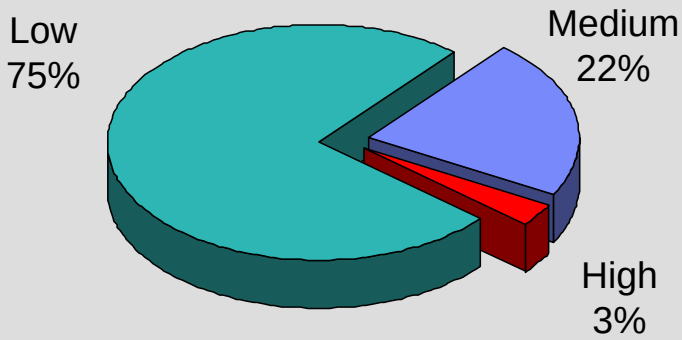
Transaction Types



Geography

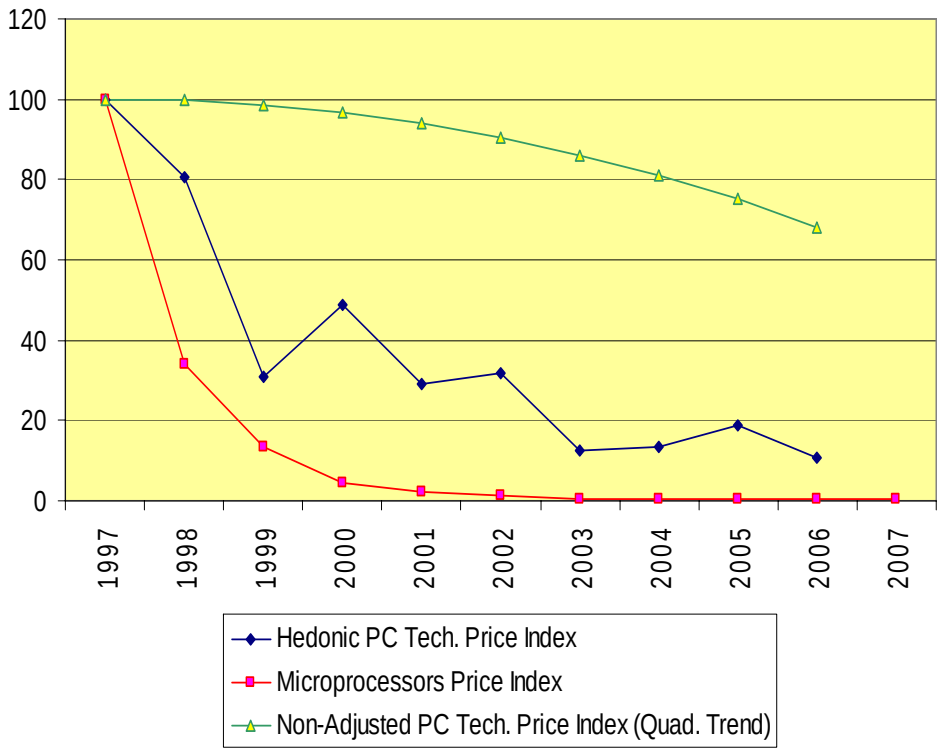


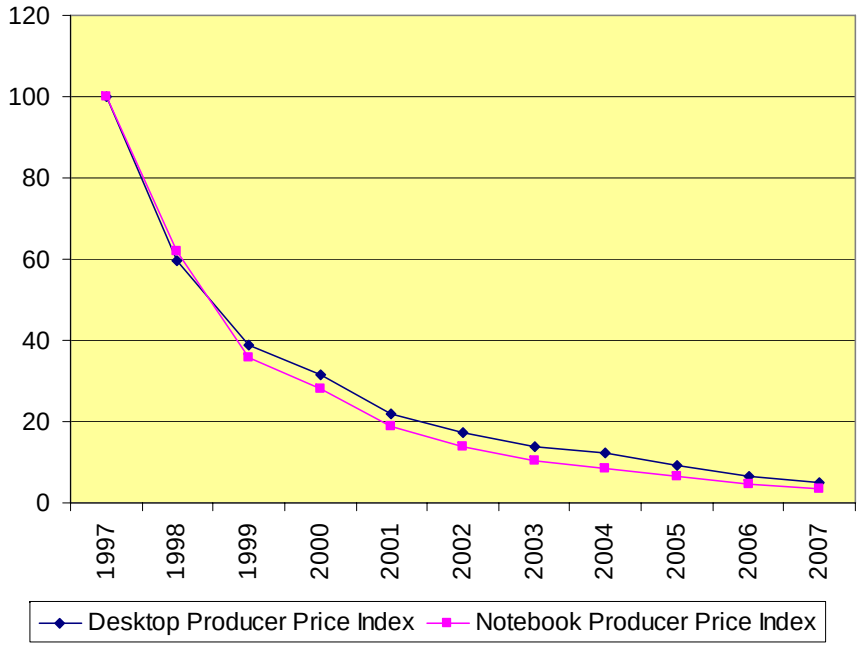
Patent Intensity



Price Index

- **PC intellectual property hedonic price index is broadly consistent with technology and end product price trends.**
- **Calculating the average annual quality-adjusted price percent change of -12.3%**

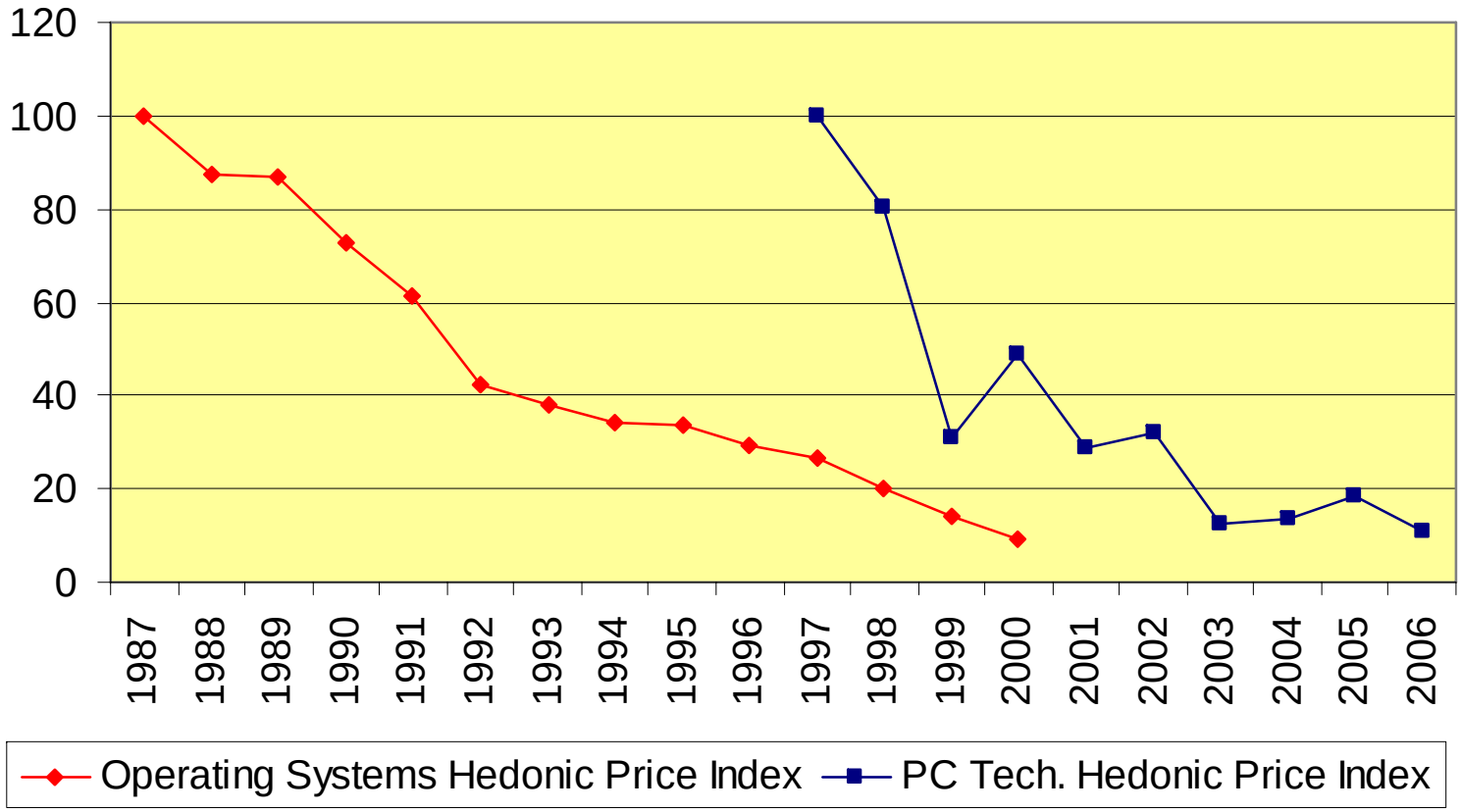




Source: US Department of Labor, Bureau of Labor Statistics Producer Price Index Calculations, found at (http://www.bls.gov/ppi)
White, A. et al (2004). Hedonic Price Indexes for Personal Computer Operating Systems and Productivity Suites, NBER Working Paper 10427.

Price Index

PC intellectual property hedonic price index resembles the hedonic price index for the operating systems category.



Source: White, A. et al (2004). Hedonic Price Indexes for Personal Computer Operating Systems and Productivity Suites, NBER Working Paper 10427.

Summary of Innovation and Intellectual Property

- **Historic transformation underway in the use of technology in new business models and operations.**
- **Increased competitiveness is driving innovation and industry transformation.**
- **Innovation and emerging business opportunities increasing exploit intellectual property assets.**
- **Intellectual Property prices track price trends of final product – not labor rates or other input costs.**