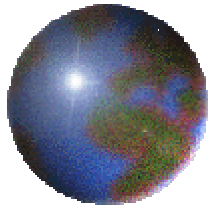




***The Knowledge Economy:  
Concepts, Trends,  
Benchmarking***

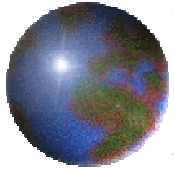


**Conference on**  
***Using Knowledge for  
Development in EU Accession  
Countries***

**February 19-22, 2002**

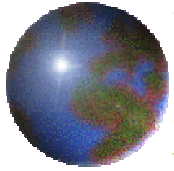
**Carl Dahlman**

**World Bank Institute**



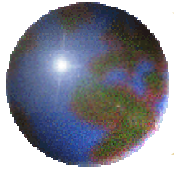
# *Structure of Presentation*

- **The Knowledge Revolution**
- **Implications for EU Accession Countries**
- **Framework for Country Knowledge Assessments and Strategies**
- **Benchmarking the ECA Accession Countries**
- **Challenges**
- **Way forward**



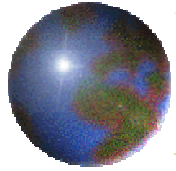
# *The Knowledge Revolution*

- **Ability to create, access and use knowledge is becoming fundamental determinant of global competitiveness**
- **Six key elements of “Knowledge Revolution”**
  - **Increased codification of knowledge and development of new technologies**
  - **Closer links with science base/increased rate of innovation/shorter product life cycles**
  - **Increased importance of education & up-skilling of labor force, and life-long learning**



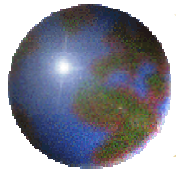
## *The Knowledge Revolution -2*

- **Investment in Intangibles (R&D, education, software) greater than Investments in Fixed Capital in OECD**
- **Innovation and productivity increase more important in competitiveness & GDP growth**
- **Increased Globalization and Competition**
  - **Trade/GDP from 38% in 1990 to 52% in 1999**
  - **Value added by TNCs 27% of global GDP**
- **Bottom Line: Constant Change and Competition Implies Need for Constant Restructuring and Upgrading**



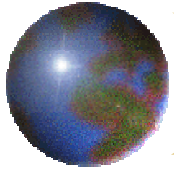
## *Implications for EU Accession Countries*

- **Accession means entering a highly competitive, knowledge-intensive regional and global market**
- **Need to develop strategies to use existing and new knowledge to**
  - **Improve performance in traditional sectors**
  - **Exploit opportunities for leapfrogging**
  - **Develop competitive new sectors**
- **Need to**
  - **Learn from other countries**
  - **Develop strategies for own situation and current context**



## *Strategy of Using Knowledge for Development*

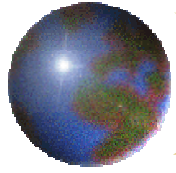
- ❖ **Strategy not just about high tech or information and communication tech.**
- ❖ **Is about making effective use of knowledge across economy and society**
- ❖ **Requires better interaction between policies, institutions, technology, people, and government**
- ❖ **Is about getting knowledge to mothers, farmers, workers, enterprises, and government to improve lives**



## *Framework for Using K4D:*

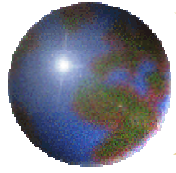
### *Four Key Functional Areas*

- ❖ **Economic incentive and institutional regime that provides incentives for the efficient use of existing and new knowledge and the flourishing of entrepreneurship**
- ❖ **Educated, creative and skilled people**
- ❖ **Dynamic information infrastructure**
- ❖ **Effective national innovation system**



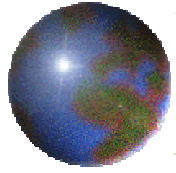
## ***Key Elements of Economic Incentive Regime for K4D***

- **Competitive environment as stimulus for improved performance**
  - Trade policy
  - Competition policy
  - Intellectual property
- **Financial system that mobilizes and allocates capital to its most productive uses**
- **Flexible labor markets including support for up-skilling**
- **Effective safety nets to facilitate adjustment to constant restructuring**
- **[Macro stability remains a fundamental condition]**



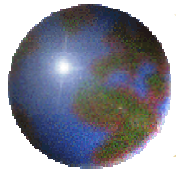
## *Key Elements of Institutional Regime*

- ⊕ **Rule of Law**
- ⊕ **Regulatory Framework**
- ⊕ **Political Stability**
- ⊕ **Government Effectiveness**
- ⊕ **Control of Corruption**
- ⊕ **Voice and Accountability**
- ⊕ **Press Freedom**



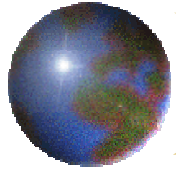
## *Developing Human Resources for the Knowledge Economy*

- ✚ **Educated and skilled human resources = key to success in the KBE**
- ✚ **Basic education critical, but because of KR now also need higher education**
- ✚ **Quality and nature of education need to be improved**
- ✚ **Also need effective systems for life-long learning beyond what is learned in formal education**



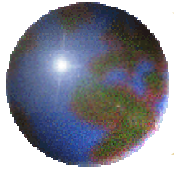
# *Key Issues in Human Resources*

- ⊕ **Access to different levels of education**
- ⊕ **Gender balance**
- ⊕ **Quality of educational content (core technical & social skills, relevance, creativity)**
- ⊕ **Balance among different levels of education**
- ⊕ **Financing & public and private roles**
- ⊕ **Life-long learning opportunities**
- ⊕ **Role of the ministry of education and its relations with labor, market, and economy**



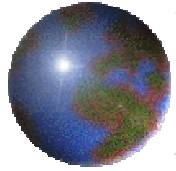
## *Ensuring a Dynamic Information Infrastructure*

- ❖ **A dynamic information infrastructure is critical to take advantage of the knowledge and information revolution**
- ❖ **Not just telephone infrastructure, but Internet and the use of ICT throughout economy**
- ❖ **Not just the hardware, but the content, applications, and skills to use effectively**



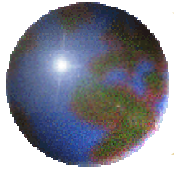
# ***Key Issues in the Information Infrastructure***

- **Communications infrastructure**
  - **Radio, TV, newspapers, other means**
  - **Fixed and mobile phone lines**
  - **Internet**
- **Telecom structure issues**
  - **Price of services, including domestic vs. international**
  - **Ease of access**
  - **Degree of competition and openness to FDI**
- **Digital Divide--Universal access**



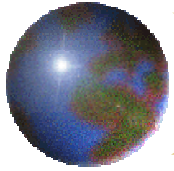
# *Use of Information Infrastructure*

- ❖ **Communications**
- ❖ **E-govt, E-business**
- ❖ **Delivery of education, health**
- ❖ **Internet issues**
  - ❑ **Access**
  - ❑ **Content and language**
  - ❑ **Regulatory and Legal Issues**
- ❖ **Software**
- ❖ **Skills to use**



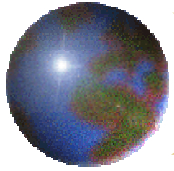
# *Elements of the National Innovation System*

- **Tapping into Global Knowledge**
  - Trade, foreign investment, tech transfer,
  - Technical journals, travel, internet, conferences
- **Creating and adapting knowledge**
  - Public vs private R&D; Basic vs applied R&D
  - From specialized research institutions to production
- **Disseminating Knowledge**
  - Growth of more efficient enterprises
  - Suppliers of equipment, technical services and info
  - Extension services: agricultural
- **Using knowledge**
  - Depends on cost and benefits
  - Depends on education, skills, complementary inputs
  - Depends on economic and institutional regime



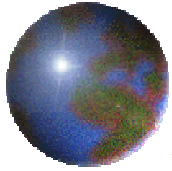
# *Managing the Innovation System*

- **Link domestic to fast global knowledge system**
  - **Encourage jt public and private research with foreign countries/firms**
  - **Promote strategic alliances, jt. Ventures, purchase of foreign technology assets.**
- **Improve efficiency/relevance of existing R&D government programs; encourage private effort**
- **Clearly justify rationale for public intervention**
- **Facilitate interaction among firms, universities, and R&D institutions**

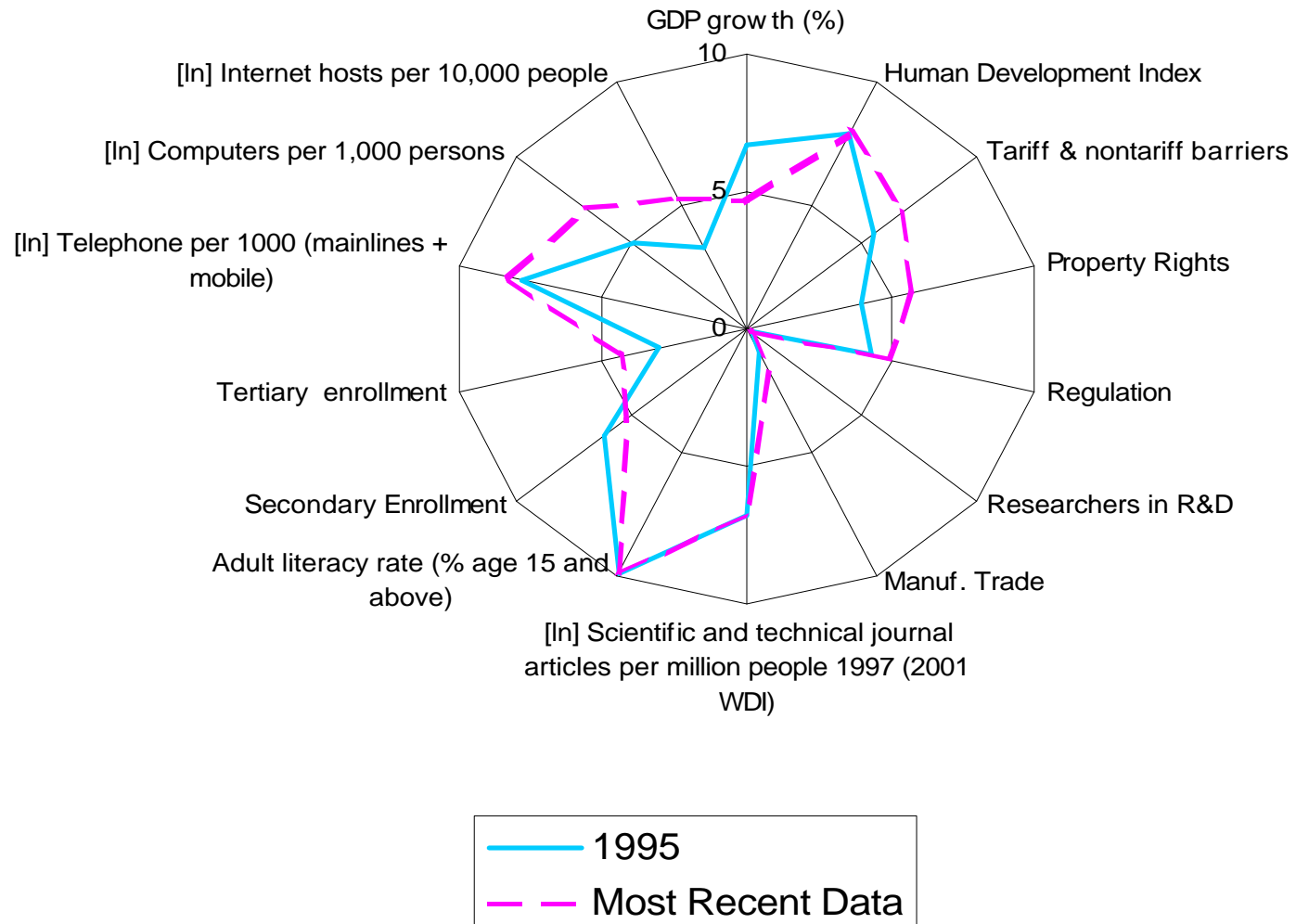


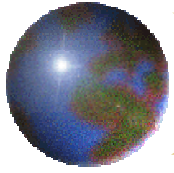
## *KAM Methodology*

- ❖ **KAM: 66 structural/qualitative variables to benchmark performance on 4 pillars**
- ❖ **Variables normalized from 0 (worst) to 10 (best) for 100 countries**
- ❖ **[www1.worldbank.org/gdln/kam.htm](http://www1.worldbank.org/gdln/kam.htm)**
- ❖ **Basic scorecard for 14 variables at two points in time, 1995 and 2000**
- ❖ **Aggregate knowledge economy (KE), and knowledge and information (KI) indices**

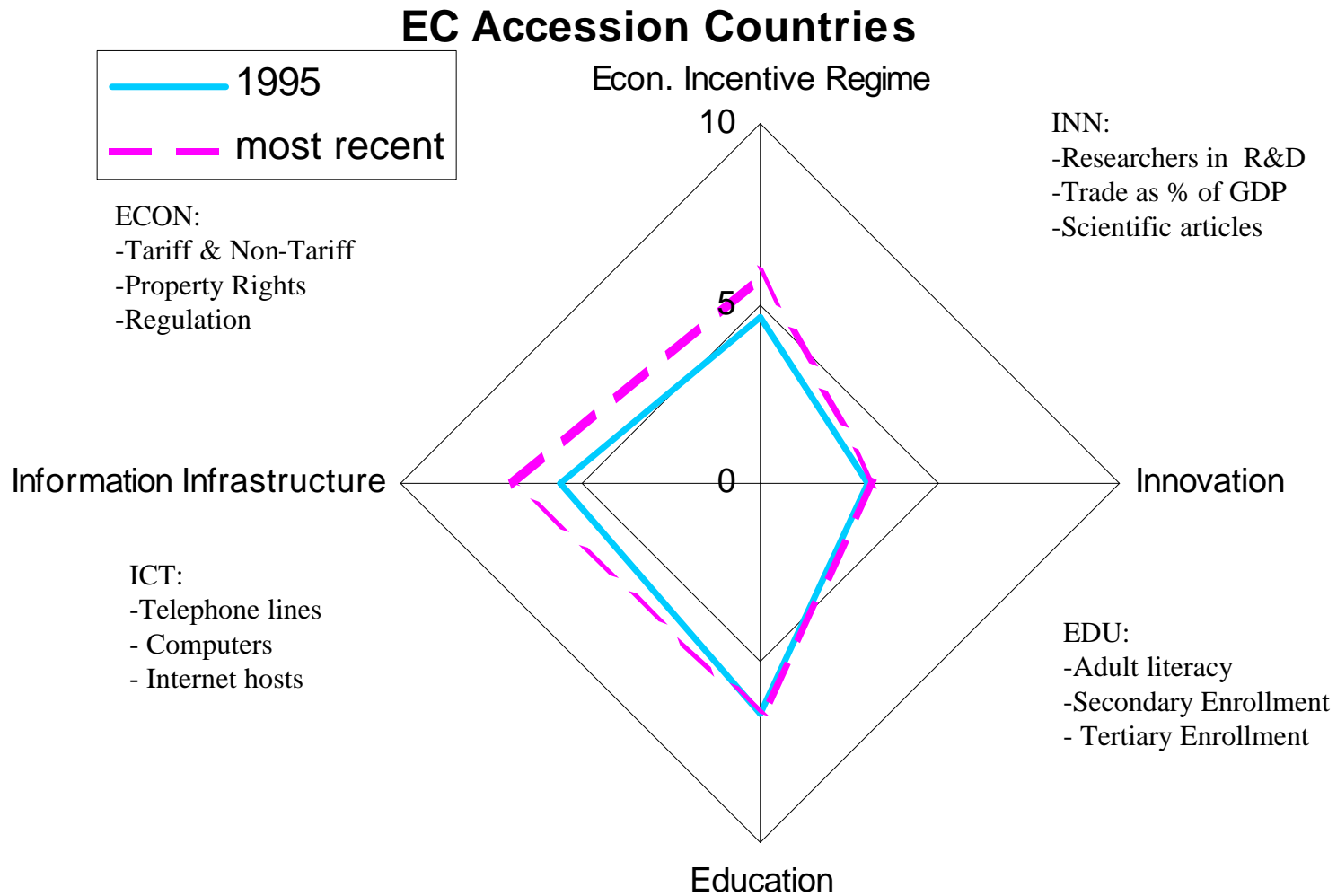


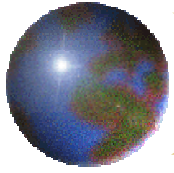
# EC Accession Group





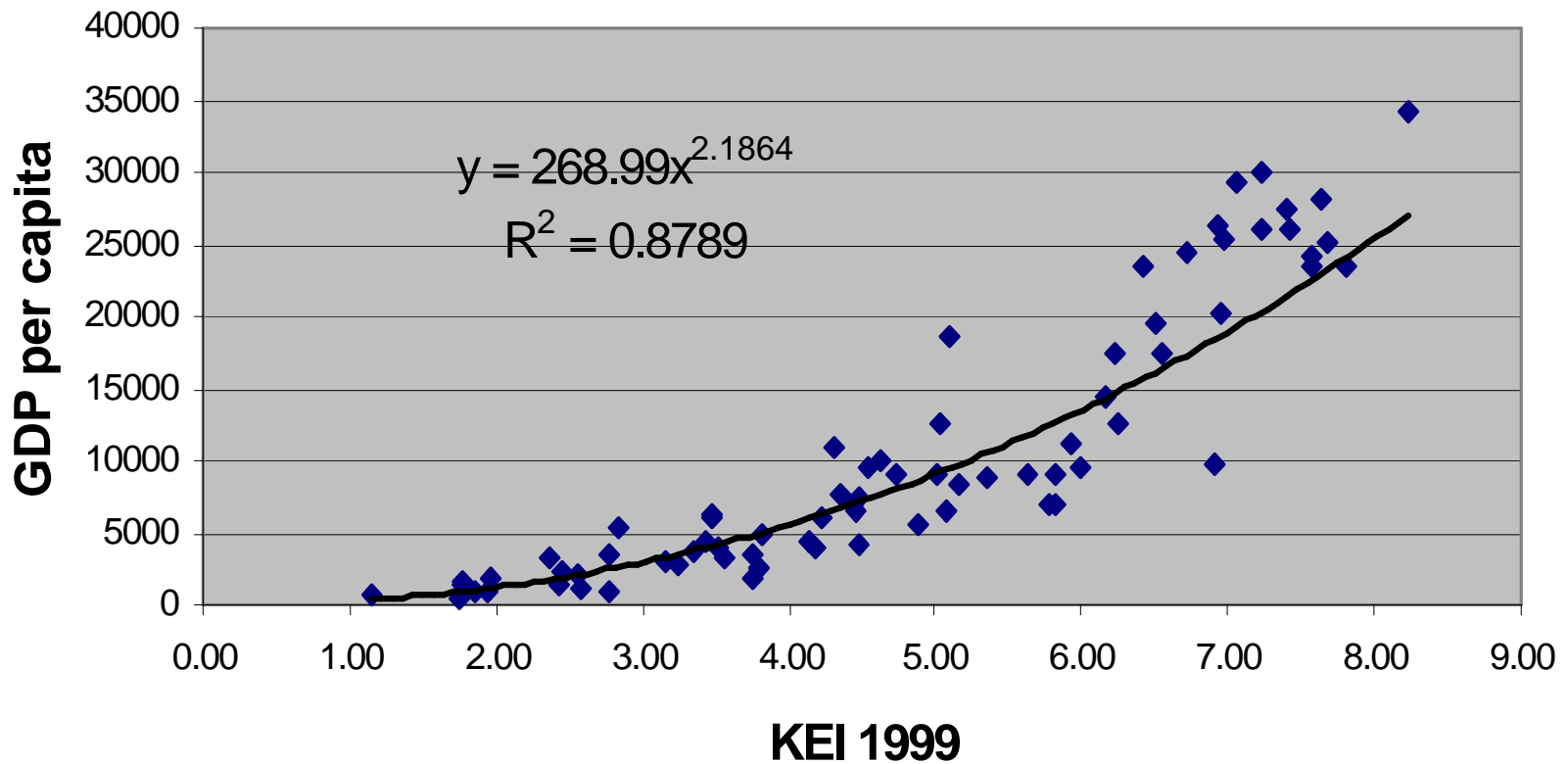
# Components of KE index: EU Accession Group

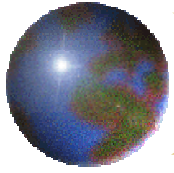




# Strong Correlation between GDP/capita and KE Index

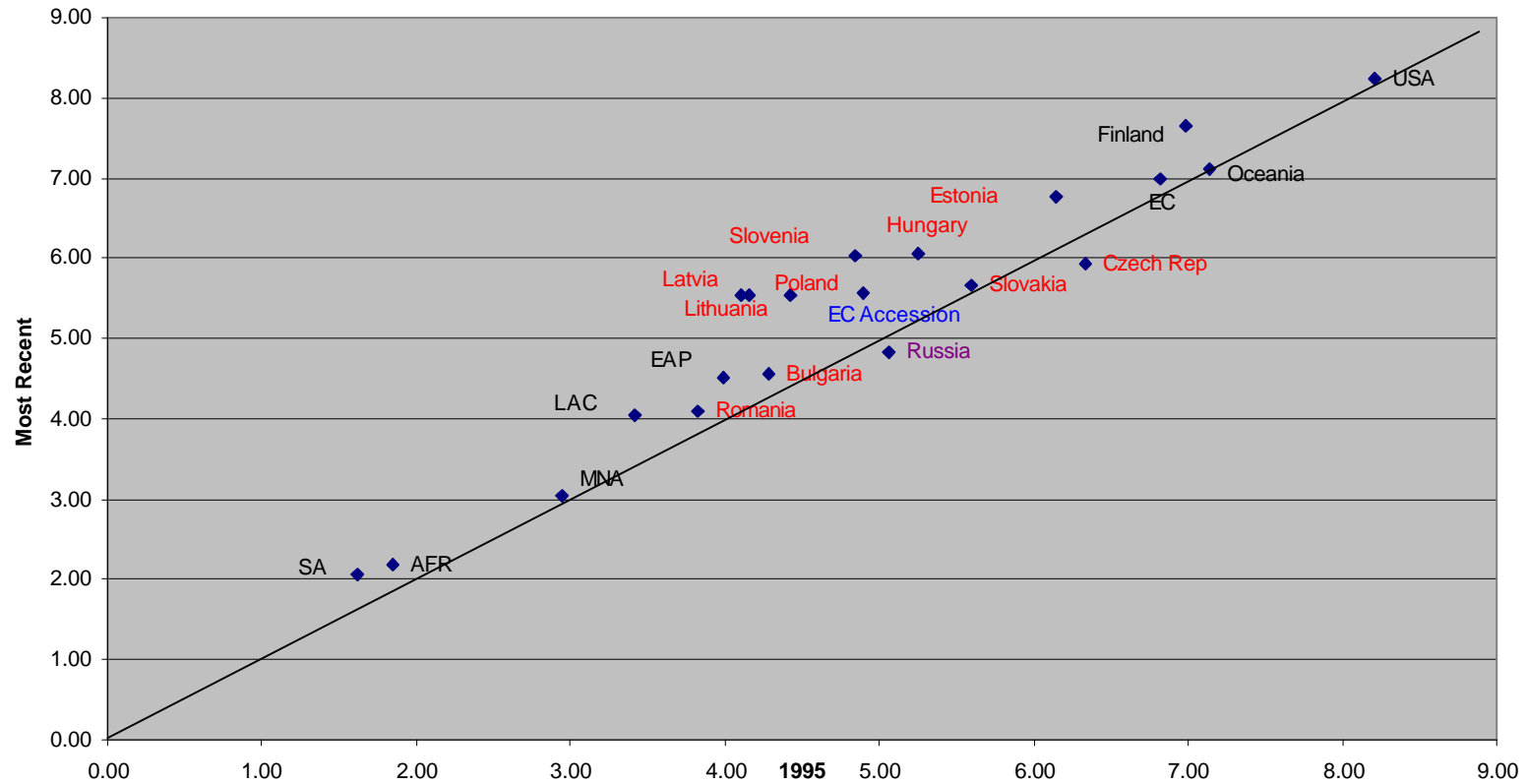
## Knowledge Economy

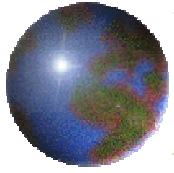




# KEI EC Accession vs. World

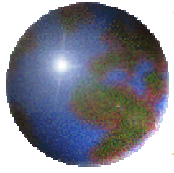
KEI EC Accession vs World





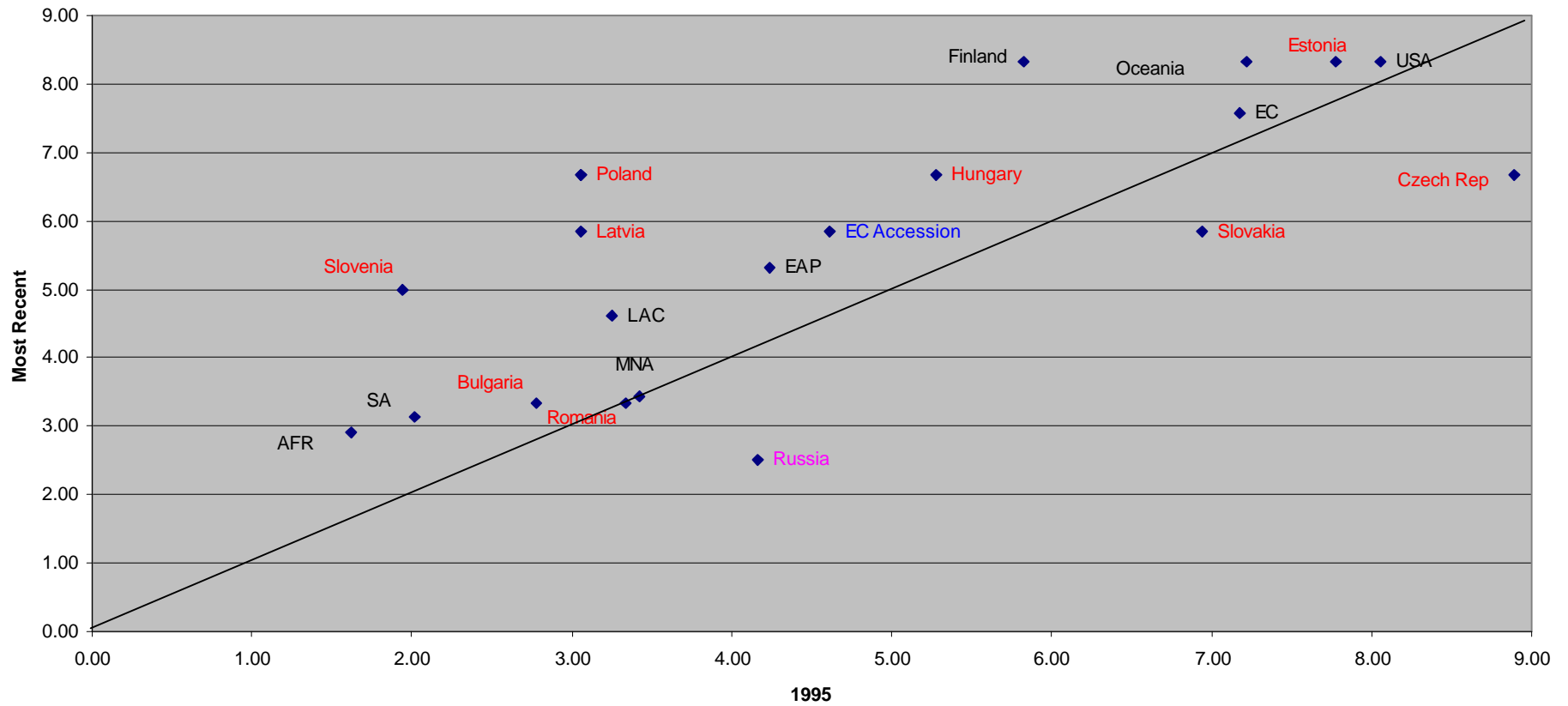
## ***Overall Performance of EU Accession Countries***

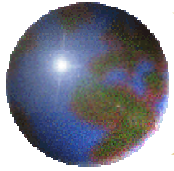
- **Overall have improved most on information infrastructure and economic and institutional regime**
- **Smaller progress on innovation and education**
- **But strong variance across countries, with differing performance among components**
- **Most variance in economic and institutional regime**



# EC Accession Economic Incentive Regime

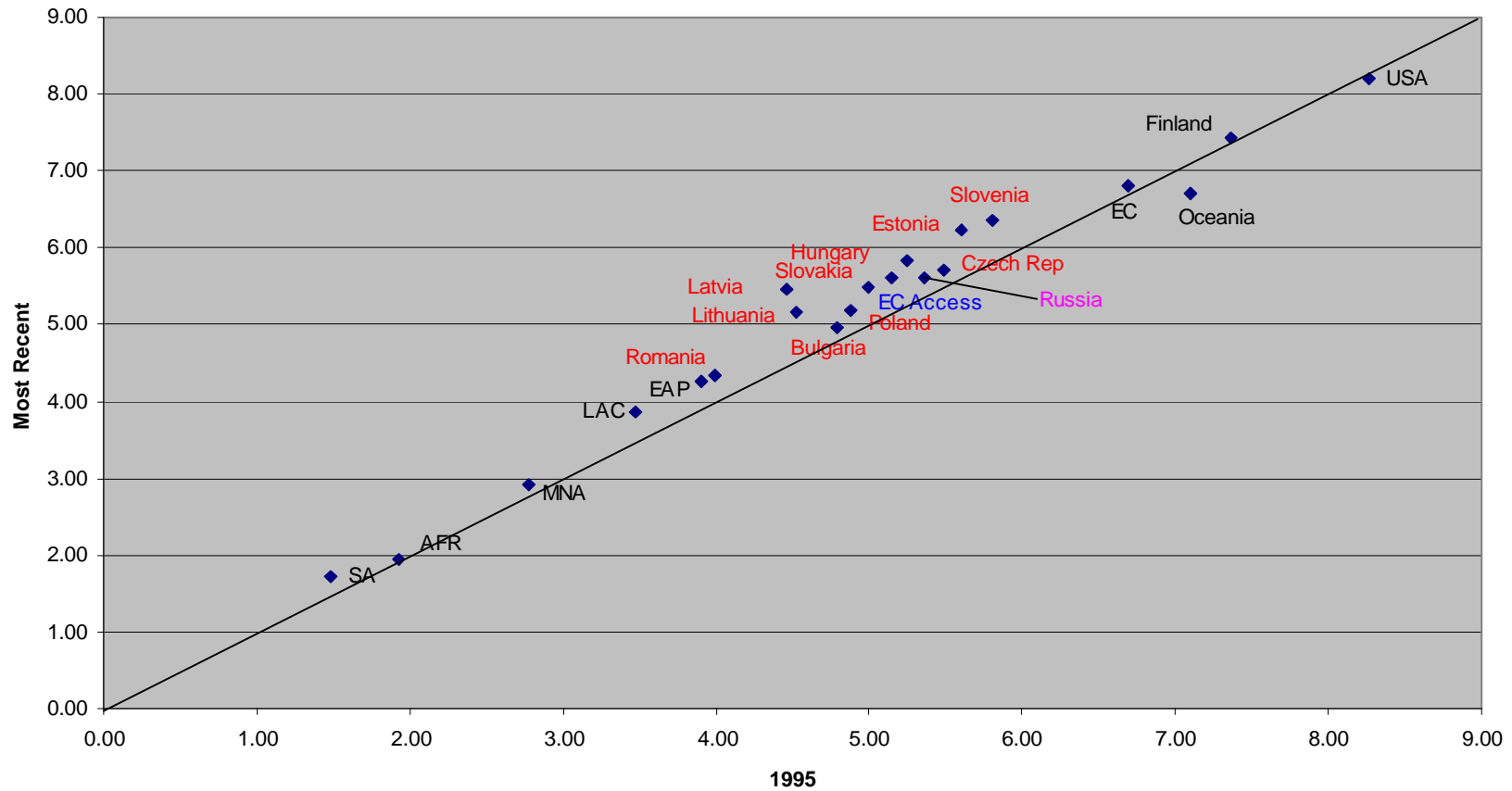
EC Accession Economic Incentive Regime

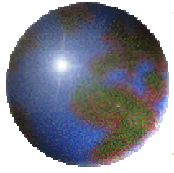




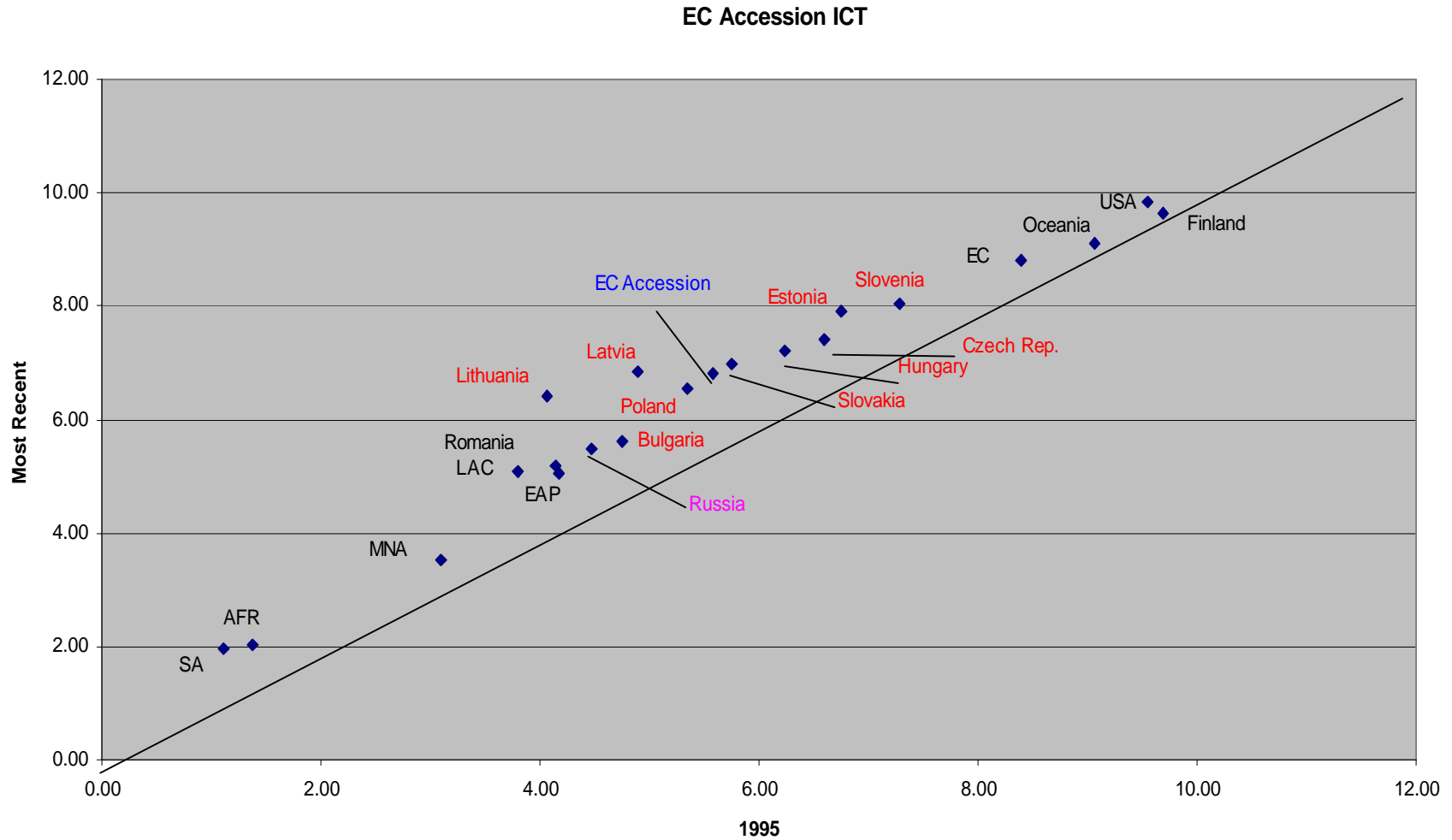
# KI EC Accession vs. World

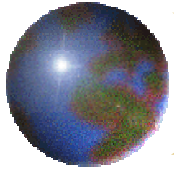
KI EC Accession vs World



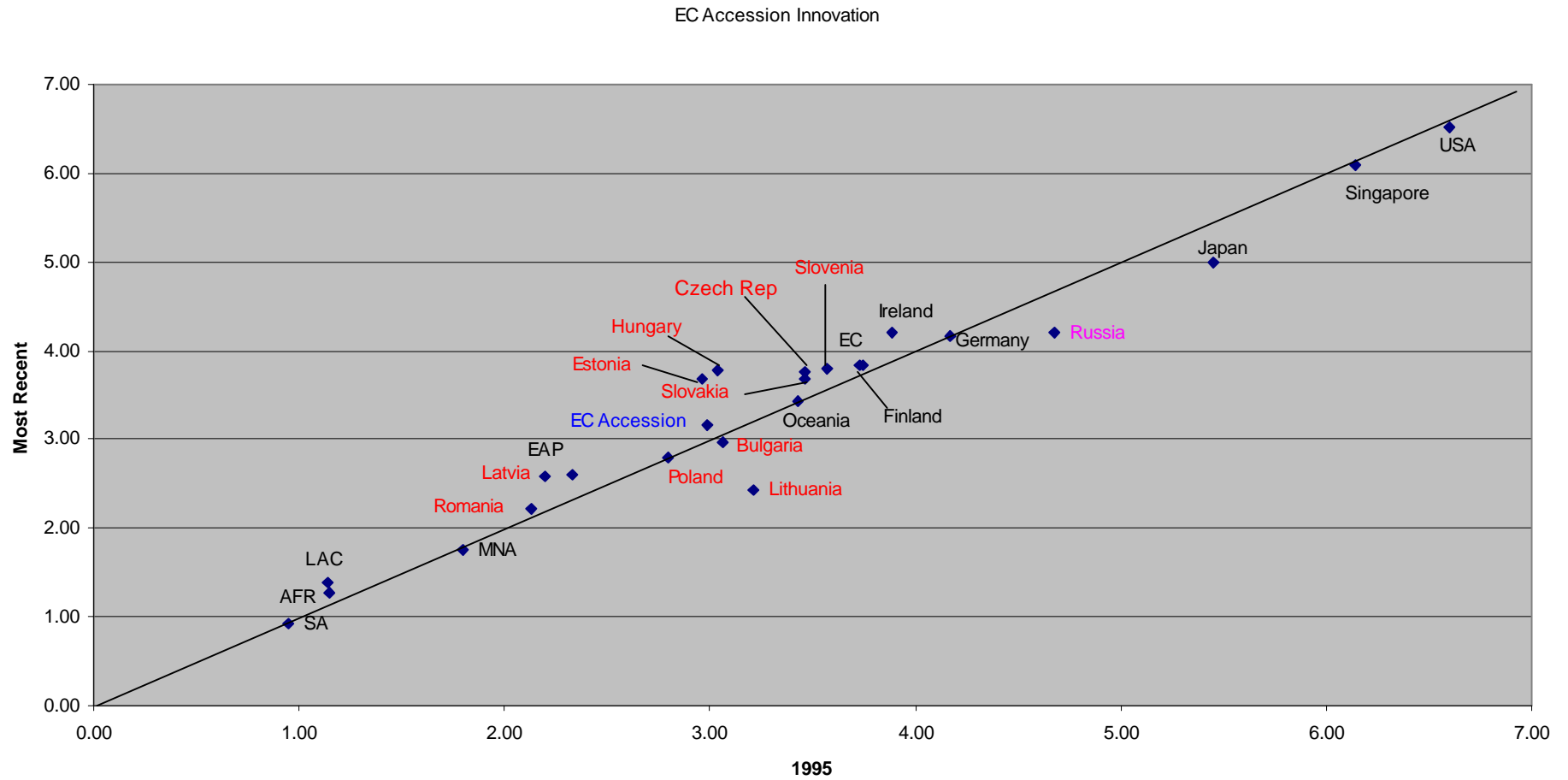


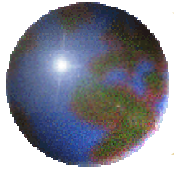
# EC Accession ICT





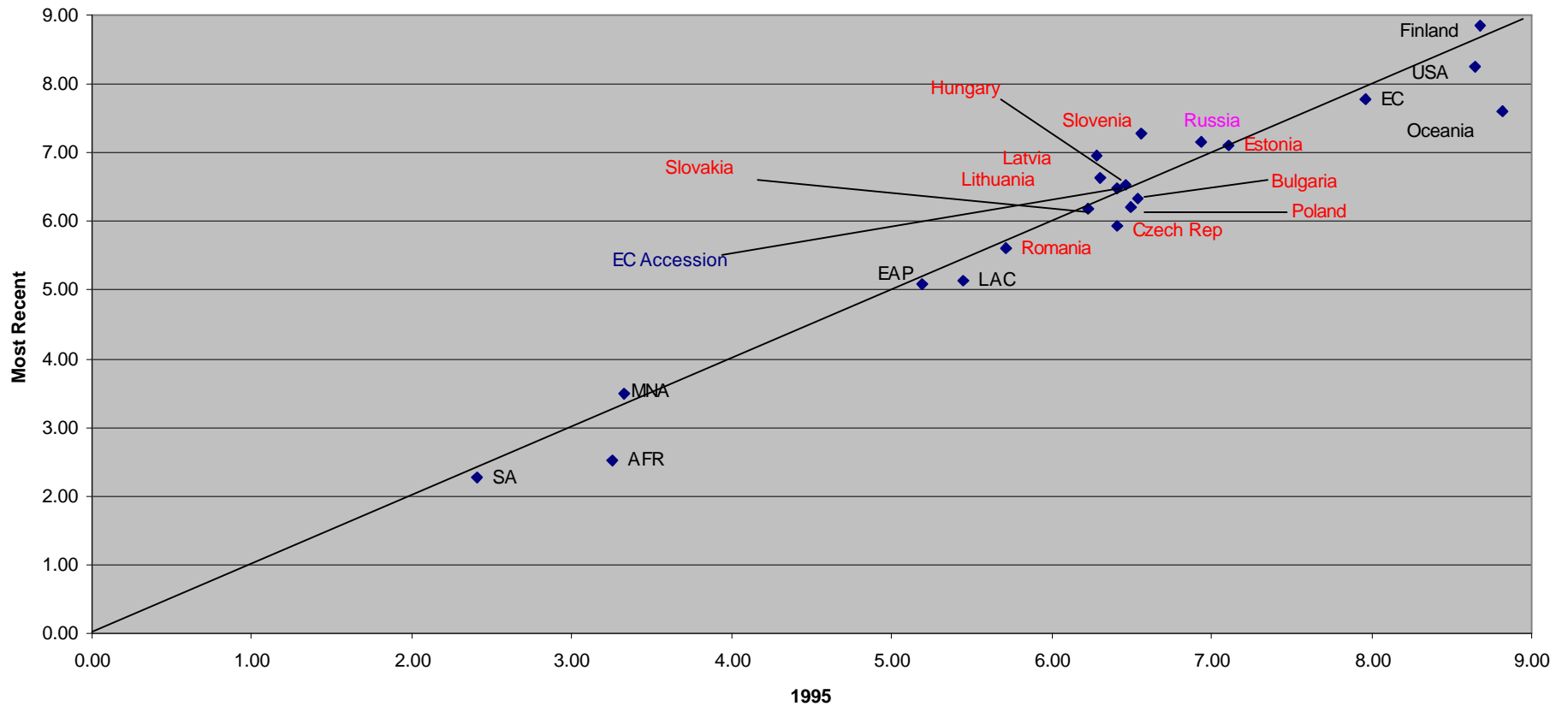
# EC Accession Innovation





# EC Accession Education

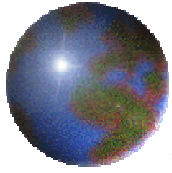
EC Accession Education



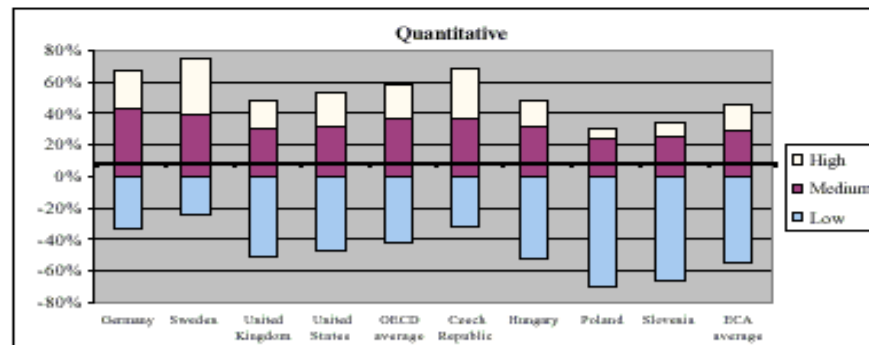
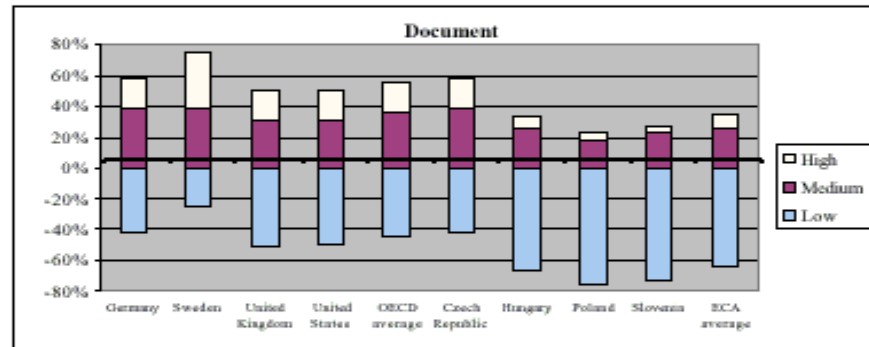
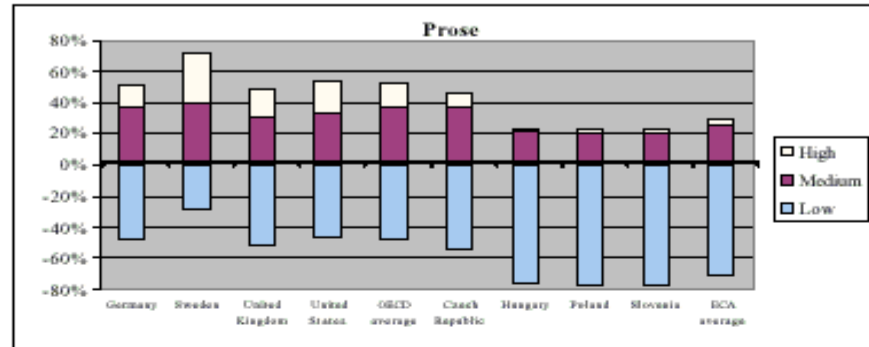
# Where are ECA EU-Accession Countries on Enrollments?

## Gross enrollment rates, 1997

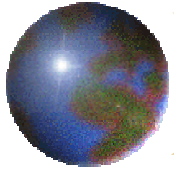
Country	Secondary	Tertiary	Expected Years of Education
Bulgaria	77	41	12
Czech Republic	99	24	13
Estonia	104	42	12
Hungary	98	24	13
Latvia	84	33	12
Lithuania	86	31	..
Poland	98	25	13
Romania	78	23	12
Slovakia	94	22	..
Slovenia	92	36	..
<b>EU Accession (Average)</b>	90	30	12.4
<b>ECA</b>	86	32	..
<b>High Income</b>	106	62	..
<b>Europe EMU</b>	108	49	..



# Percentage of 16-65 Year Olds who Test at Low Literacy Levels, 1994-98

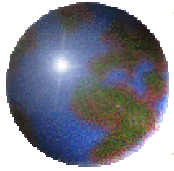


Source: Based on data from table 2.2, OECD (2000).



## *Challenges Ahead*

- ❖ **Very dynamic situation with moving goalposts, EC itself still behind leaders**
- ❖ **Aggregate performance behind EC (although some accession countries near EC average, but wide variance)**
- ❖ **ICT shows greatest improvement, but still needs significant liberalization**
- ❖ **Innovation area furthest behind leaders**
- ❖ **Education shows the most backsliding, but most critical for longer run; requires significant reform of content for KE**



## *The Way Forward*

- ❖ **Critical to go from analysis of problems to concrete initiatives to improve KE performance**
- ❖ **Successful further reform requires creating stakeholder awareness**
- ❖ **Consultation and discussion necessary to create stakeholder ownership**
- ❖ **Monitorable goals and constant evaluation key to improving performance**
- ❖ **Rapid adjustment needed in light of experience and changing circumstances**