Special Lecture in Development Management

Knowledge Economy

Policy for human capital development in East Asia and Pacific… and the rest of the world

Hiroshima, May 29, 2013

Importance of Human Capital Policy Focus

- Traditional emphasis on school attainment
- Development of access programs
  - MDG
  - EFA
- Some success but still challenges
- …….. QUALITY as a key element

Importance of Quality

- Cognitive and non-cognitive skills
  - Individual learning
  - Economic growth
  - Distributional outcomes
- Policy actions and reform
  - Resources policies
  - Supply and demand side incentives
- Importance of information…. To define policies and talking about information…

Although this may be different in Japan, do you know that ….[1]

- The Department of Labor estimates that in the USA today's learner will have between 10 and 12 jobs…..

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- The Department of Labor estimates that in the USA today's learner will have between 10 and 12 jobs…..

- By age 40!

Although this may be different in Japan, do you know that ….2

- According to the Department of Labor 1 of 4 workers in the USA today is working for a company where they have been working less than 1 year
- And more than 1 out of 2 are working for a company for whom they have been working for less than 5 years

Do you know that ….

- The top 10 jobs that were in demand last year (2012) did not exist in 2006

Do you know that

- We are currently preparing students for jobs that do not yet exist?

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- Using technologies that have not yet been invented?

Do you know that

- We are currently preparing students for jobs that do not yet exist?
- Using technologies that have not yet been invented?
- In order to solve problems we do not even know are problems yet?

Do you know that

- Nintendo invested $140 M in research and development in 2002 alone?

Do you know that

- Nintendo invested $140 M in research and development in 2002 alone?
- And that this is less of what the Federal Government invested in research and innovation in education in 2010!!!

By the way, do you know that

- 3 of every 10 couples that married this year in the USA met online?

- We are living in exponential times!!!

In fact

- The number of text messages sent everyday exceeds the number of the total world population.

And do you know

- The number of questions people ask Google everyday?

And do you know

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- Four years ago it was 2.5 billions a month. Now I think is 2.5 billion a week

And do you know

- The number of questions people ask Google everyday?
- Four years ago it was 2.5 billions a month. Now I think is 2.5 billion a week
- And the questions are asked in more than 150 different languages!!!!

By the way

- To whom were these questions addressed B.G.?

Do you know that

- There are about 540,000 words in the English language?

Do you know that

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- About 5 times as many as during Shakespeare's time.

And do you know that

- More that 3,000 new books are published …

And do you know that

- More that 3,000 new books are published daily!!!

Do you know that

- The amount of new technical information is doubling every 2 years?

Do you know that

- The amount of new technical information is doubling every 2 years?

- And that for students that are starting a technical or college degree this means that half of what they learn the first year will be outdated by their third year of study??????

- It is estimated that 1.5 exabytes (1.5 X 10 to the 18) of unique new information was generated in the world in 2010.

- And that was more than in the previous 5,000 years!!!

- By now this amount of information double every 5 days!!!

Do you know that Facebook

- Was the first Web-site to receive 1 trillion page views in one Month?
- And 3 billion ‘likes’ in one day?
- ……You may not be surprised but

- **What does it all means?**

- **What does it all means?**

- **Shift happens**

- **Now you know**

…….that things are changing…….

….

And, what are we doing to take advantage of it?

How are we using, accessing information/knowledge? How are we applying it?

Let’s remember that the personal computer is enabling millions of individuals to become authors of their own content in digital form.

The spread of the Internet and the emergence of the World Wide Web is enabling more people than ever to be connected and to share their knowledge.

The emergence of software standards means that people are able to seamlessly work together and upload and globalize content.

Knowledge, Innovation and Competitiveness

Understanding the Knowledge Economy: Major Trends

The ability to create, access and apply knowledge is becoming a fundamental determinant of global competitiveness

Innovation policies are critical to the ability of countries to compete and grow in a globalized environment

New models of knowledge production, access and distribution are emerging (e.g., open source, knowledge communities…) and we all can use them. MOOCs (Massive open online courses like Coursera, Udacity, register 160,000 students for a class and free!!!; even Khan Academy has delivered more than 200 million lessons)

Shift to knowledge-intensive industries highlight the importance of well trained talents

Technological Connectivity is transforming the way government, business, and citizens interact

Knowledge, Innovation and Competitiveness

Adjusting Education and Learning Systems for the Knowledge Economy

-Addressing first generation challenges: access, equity, and quality (ECD, basic education, minimum institutional setting)

-Addressing second and third generation challenges:

(i) adjusting teaching and learning environments to respond to new competency requirements

(ii) expanding opportunities and building competencies in secondary education

(iii) expanding relevant and high quality tertiary education

(iv) strengthening vocational and firm-based education and training in a cost-effective way

(v) adopting comprehensive lifelong learning policies

Knowledge, Innovation and Competitiveness

Expanding opportunities and building competencies in secondary education

-Improve access with quality

-Develop curriculum that is more flexible, relevant, and responsive to both local needs and the global environment

-Foster better linkages between schools and labor market institutions (school to work transition)

-Reform assessment and examination systems to provide a direct measure of achievement on a global level

-Increase funding for secondary education through public, private, or community sources, while and at the same time, maximizing efficiency and effectiveness in resource allocation and utilization

Knowledge, Innovation and Competitiveness

Expanding relevant and high quality tertiary education

-Expand Access

-Improve the quality and relevance of tertiary education (linkages to market needs)

-Increase institutional diversification

-Strengthen science and technology research and development capacity

-Promote greater equity mechanisms to assist disadvantaged students

-Establish sustainable financing systems to encourage responsiveness and flexibility

-Strengthen management capacities

-Enhance and expand ICT capacity to reduce the digital divide

Knowledge, Innovation and Competitiveness

Adopting comprehensive lifelong learning policies

-Focus on the needs of young people and adults that are not part of the formal education system and on the job training (SCE programs, LLL per se)

-Create multiple education and training pathways to acquire qualifications within a national qualification's framework

-Provide incentives for the development of education and training providers

-Create certification and accreditation systems

-Develop appropriate funding mechanisms for firms and individuals

-Leverage technology: radio, TV, internet based, interactive video …

Fundamental Changes

- Globalization
  - Communication and transport costs are falling
  - Global information
  - Regional integration
  - Free trade and competition increases
  - Aggregated value of MICs was 27% of Global GDP in 2012
- Digital revolution
- Knowledge Economy (KE)
  - Knowledge Revolution and its implications for education and training
  - Lifelong learning (LLL)
  - Key competencies for the KE

Knowledge Revolution

- The Knowledge Revolution in the world is characterized by: more knowledge and more easily accessed technologies, accelerated innovation, shorter life cycle of many products, superior productivity and abilities of the labor force, and a strong globalization and more competition.
- The labor force is demanding more average education and new jobs.
- Because of this, the capacity to produce, access and use knowledge is becoming a determinant factor of global competitiveness.

Changes are happening

- Manufacturing is more digitalized:
  - More smart software
  - New materials (less heavy but stronger and durable)
  - New processes (in particular 3d printing. 3D printing? Anybody knows what 4D printing is?)
  - The geography of supply chains is changing
  - Nonatechnology (self-cleaning glass, ‘bandaids’ for metals)
  - Ford needed a lot of capital (and space) to do the second industrial revolution (assembly line), today you just need a laptop and creativity. 3D and 4D.

This (revolution) will cause changes

- From the factory to the office (the line between manufacturing and services will be attenuated; Rolls-Royce does not sell jet motors, now they sell hours of use....)
- Where and how products are made
- New occupations (see earlier slide)
- Labor cost will decline
- Consumers adapt, but Government not much so (their instinct has been to protect existent industries). Governments should focus on improving labor force quality.

It really has caused changes. See four kind of workplace tasks

Routine Cognitive (filing, bookkeeping)

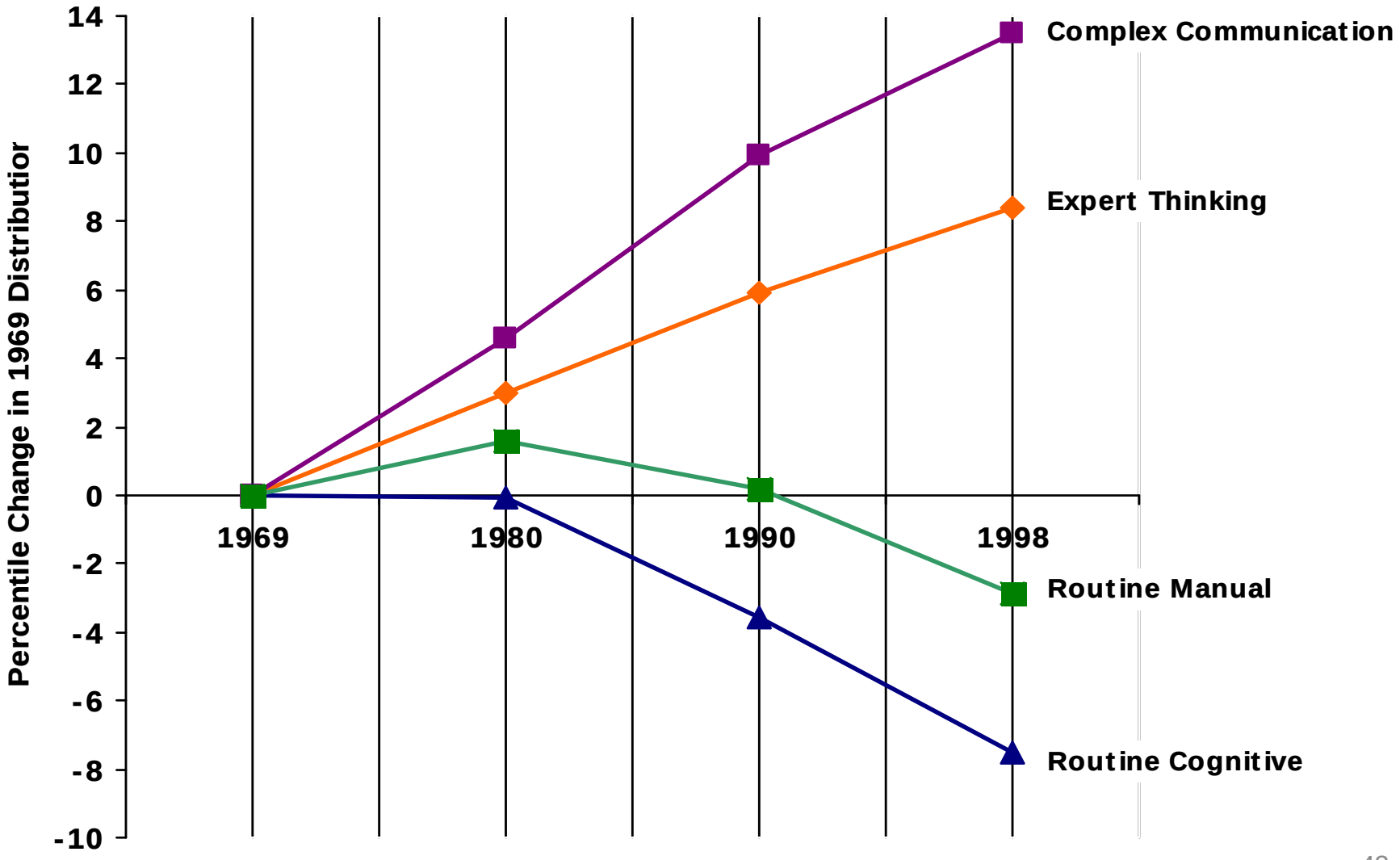
Routine Manual (assembly line work or like being a manager at the World Bank)

Expert Thinking or non-routine analytic (identifying and solving new problems)

Complex Communication or non-routine interactive (eliciting critical information and conveying a convincing interpretation of it to others)

How the demand for skills has changed

Economy-wide measures of routing and non-routine task input: 1969-1998 (1969=0)



The skills agenda in EAP in this context

This demand for new skills present a dilemma for the education sector because the skills that are easiest to teach are the ones that are easiest to digitize, automate, and outsource.

So to adapt to this global environment we face a formidable list of priorities!

-Preparing the workforce of the future (with social inclusion)
-Workforce development
-Employer engagement
-Increasing demand for learning
-Planning for skills development…
-Role of government and governance
-Life-long learning in the Knowledge Economy
-Paradigm shifts

Preparing the workforce of the future

Increasing 16+ participation and achievement

Employability through general and vocational learning *(new qualifications and curriculum delivery),* after ECD for all and basic education for all

Capacity building to deliver more cost-effective TVET in schools

Developing understanding of enterprise, business, and the economy *(Young Enterprise, citizenship, key skills)*

Financial support for learners (*alternative financing*)

Workforce development

-Low levels of skills in the current workforce limits competitiveness and productivity

-Poor basic skills – Skills for life

-Also a minimum level of vocational skills as the baseline for employability

-Free tuition and replacement costs

-BUT higher level skills is needed in some sectors (*varies from country to country but all countries experience this in different degree...*)

Employer engagement

Employers influence in the design, delivery and quality assurance of general and vocational learning is vital to secure skills for productivity

Requiring or encouraging higher skills for employees

Recognizing and rewarding successful learning

Enabling employees to deploy new skills and knowledge

Reviewing workplace roles to deploy new skills and knowledge

Larger and small firms

A framework for employer engagement [1]

Employer as stakeholder:

- Provides leadership through involvement in the design, development, management, delivery and assessment of learning
  - Acts as visiting speaker
  - Provides work experience places
  - Advising on curriculum and its assessment
  - Participates in collegiate governance

A framework for employer engagement 2

Employer as consumer:

- Purchases diagnostic services and skills development from providers
  - Uses customised day release or regular provision as part of company training
  - Uses national qualifications to select new staff and upgrade skills of current staff

A framework for employer engagement 3

Employer as strategic partner:

- Sustained interaction between employer and the planners and providers of learning
- Uses the LSC sector providers as sources of support for business development
- Collaborates with planners in developing new provision for the benefit of own company and wider sector
- Contributes in cash and kind to new or updated resources for learning – joint ventures and sharing training facilities
- Shares or subsidises specialist staff

Developing the infrastructure

Look at the general and the vocational curricula

Reforming qualifications *(Establishing Standards, Accreditation frameworks)*

Planning for skills development *(Sector Skills Councils, Learning and Skills Councils)*

Focussed provider missions *(Centres of Excellence)*

In the case of TVET shifting reliance on funding from the state to employers and individuals

Increasing Demand for Learning (changes in the labor market)

In MIC recent findings show that:

-The 12 – 16 years of formal education is no longer sufficient to support a lifelong work life

-Companies increasingly tend to ‘buy’ the necessary human resources from outside labor markets rather than ‘make’ them internally as the changes in external environment accelerate

-The increasing flexibility of the labor market is demanding higher level of employability of workers

-A knowledge gap can be an important cause of unemployment and poverty

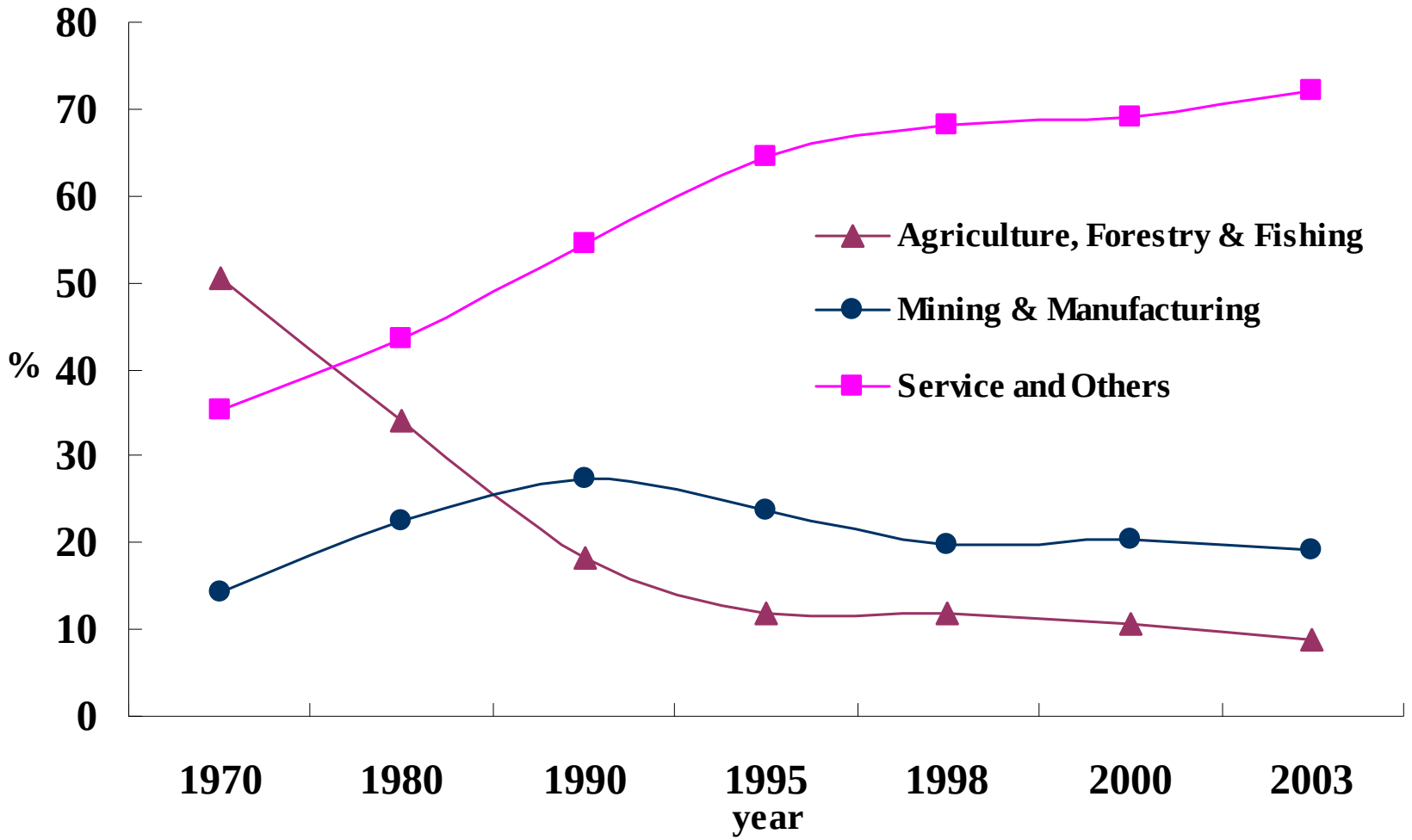
Challenges in Policy Making

Also in MICs recently the policy is supporting the following:

- Encouraging Corporate Learning
- Encouraging Self-directed Learning
- Improving Job Training Equity
- Reforming the Vocational Qualification System – demand driven
- Establishing the Labor-Management Participatory Training System – demand driven
- Enhancing the Efficiency of the Delivery System for Job Training

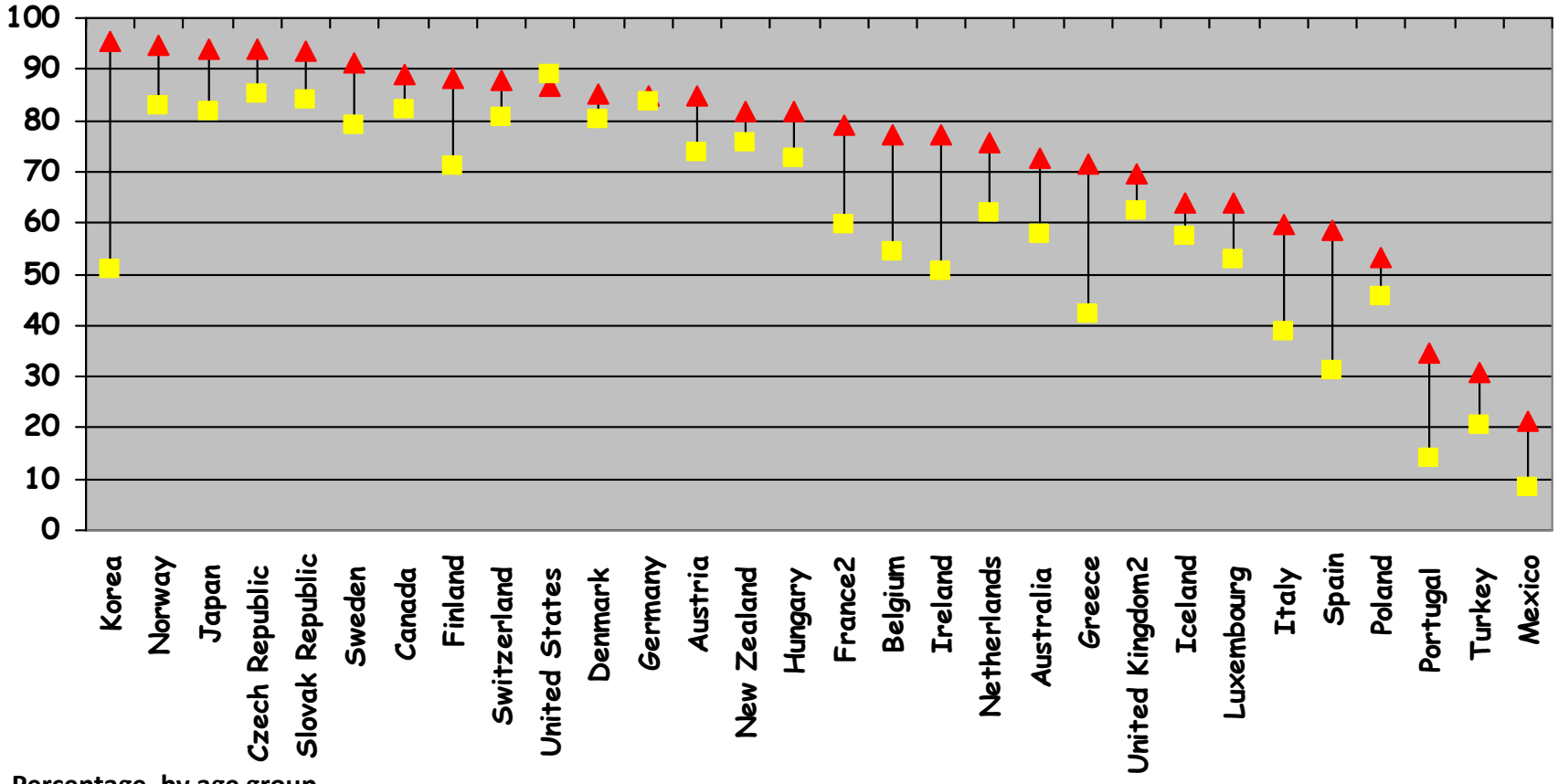
I think we need to help LICs and Fragile ones do the same

Employment by Industry(1970~2003)



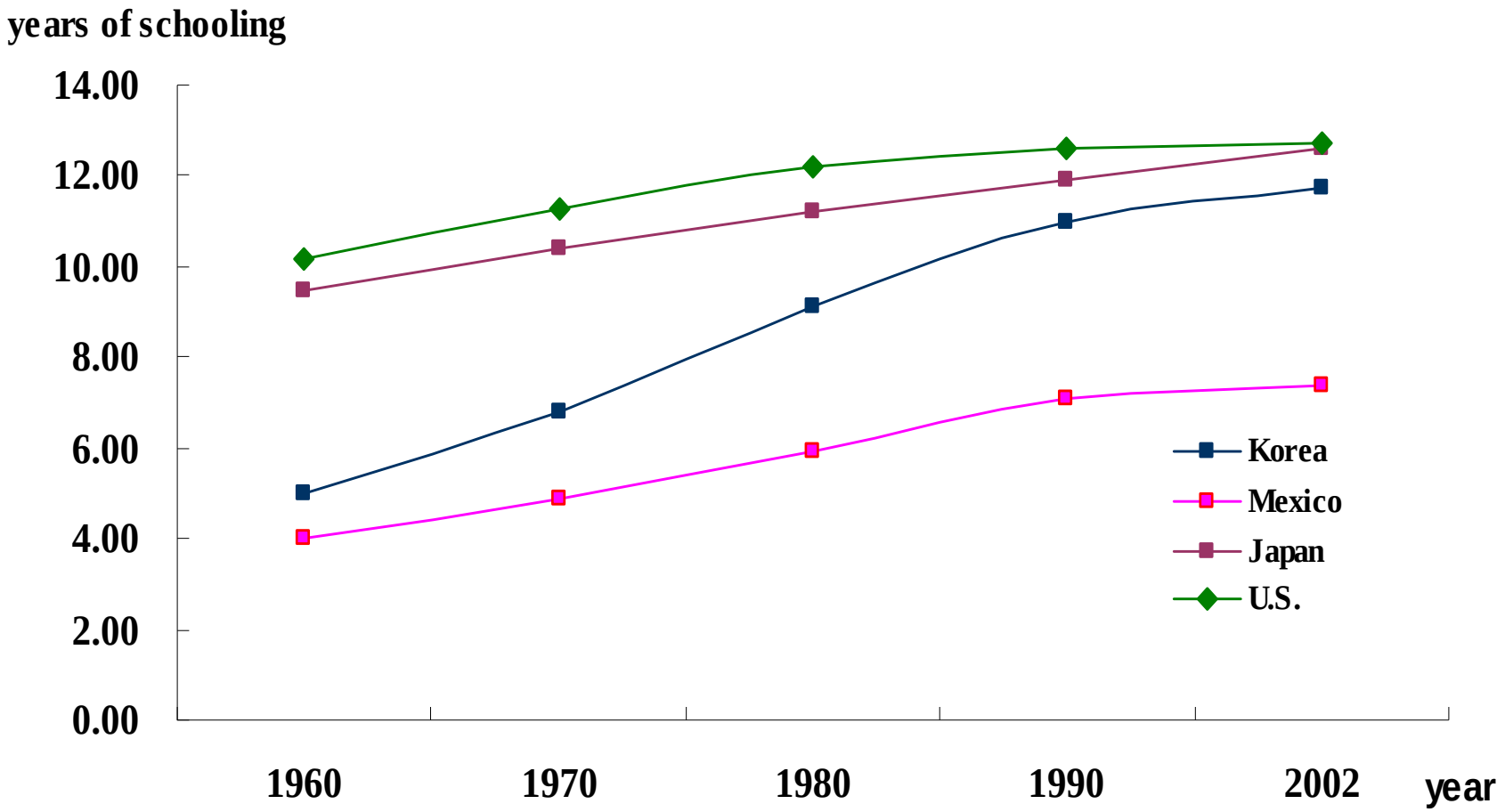
Educational Attainments

Population that has attained at least upper secondary education1 (2002)



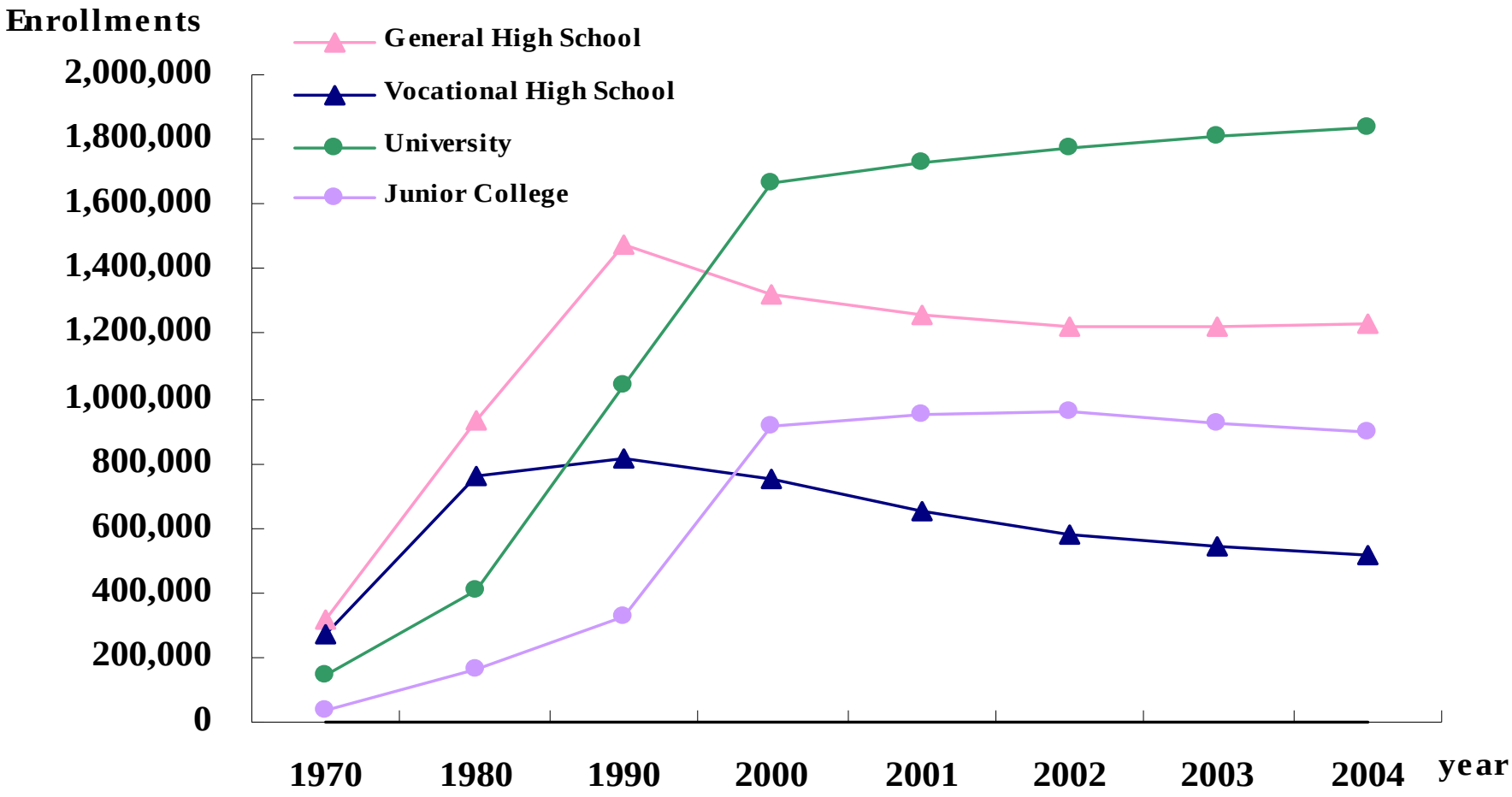
Percentage, by age group,
aged 25-34, aged 45-54
Source: OECD

Educational Attainments



Note : Average years of schooling for aged 25~64
source : OECD development centre(2002)

Enrollment at H.S. and Colleges



source : Statistical Yearbook of Education(2004)

Reform of VT Legal Framework -Korea

Before(1977~1998)

■ ***The Basic VT Act***

- Supply-oriented System
- Training Levy System

- Compulsory Training
- Vocational Training Promotion Fund
- Closed Training Market

Now (since 1999)

■ ***The Worker VT Promotion Act***

- Demand-driven system
- Vocational Competency Development Program
- Incentive System
- Employment Insurance Fund (1995~)
- Open Training Market

Increasing Demand for Learning (Demand for Educated Workforce)

New jobs require more educated workforce

-Basic skills: reading, writing, computation

-Core skills: analytical, problem-solving skills, creative thinking, self-management

-Technical skills: computer skills

Education and training is part of a positive cycle of benefits for both employers and workers

Consequently increasing their productivity

Reforming Educational System

Change current subject-centered curriculum to competence-based curriculum

-Develop the Basic Competency skills for All

Enhance and evaluate teacher's ability/quality

-Promote autonomy and accountability in the school system

Strengthen the support system to promote LLL

-Set up ubiquitous learning systems (e-Learning)

-Support LLL by financial aids (Loans, Tax Credits, etc)

Enhance quality of higher education up to global level

-Innovative role and function of universities as new engine for sustainable economic growth

-Expand cooperative system among industries, universities and research institutes

Revamp the Role of Government

Deregulation

From input control to performance control

Decentralization

From Government driven to school-based management

Dissemination

From no choice to choice with information

Quality Assurance

From *nada* to set up quality assurance system with school improvement plans and performance evaluation

A Framework for Knowledge Economy

- 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

Lifelong Learning in the Global Knowledge Economy

- Knowledge economy puts premium on learning
- Requires multi-sector strategy
- Focus on equity
- Expand access to learning
- Raise quality by changing content, pedagogy
- Variety of financing mechanisms needed
- Policy, institutional, legal framework

Learning in Knowledge Economy

Then	Now
Information based	Knowledge creation/application
Rote learning	Analysis and synthesis
Teacher directed	Collaborative learning
Just in case	Just in time
Formal education only	Variety of learning modes
Directive based	Initiative based
Learn at a given age	Incentives, motivation to learn
Terminal education	Lifelong learning

Learner-centered

- Learner: motivation, adaptability, analytical thinking, communication, problem solving
- Teacher: from director to facilitator
- Implement:

EGRA: Make sure pupils learn to read at the right time

Active pedagogy: One of the most critical but difficult challenges our education systems face (proper pedagogy)

Learning by Doing

- Teacher: from director to facilitator
- Classroom: learn by doing, team work and peer learning, individual learning plans
- Institution: professional community centered on achievement

Traditional Learning Differs From Lifelong Learning

Traditional learning	Lifelong learning
Teacher is source of knowledge	Educators are guides to knowledge
Learners receive knowledge	People learn by doing
Learners work by themselves	People learn in groups
Tests given to prevent progress	Assessments guide learning
All learners do same thing	Individual learning plans
Teachers receive initial training	Educators are lifelong learners
Good learners identified	Access to lifetime learning

Alternative Delivery Mechanisms

- Increase access to learning opportunities
  - Increase variety of ways learners can learn
  - Give access to knowledge resources
- Enhance quality through technology
  - Learning by doing
  - Self-directed learning
  - Continuously updated curriculum
  - Networks of good practice

Financing Lifelong Learning

- Expenditures increase, public resources limited
- Priority for public: ECD, basic education
- Balance between subsidies and market mechanisms given that
  - Benefits both private and public
  - Access to capital uneven

Governance for Lifelong Learning

- Requires multi-sectoral
- Enabling environment for pluralistic approaches
- Focus on equity
- Demand-driven policy

Characteristics of a Globalized Knowledge Economy

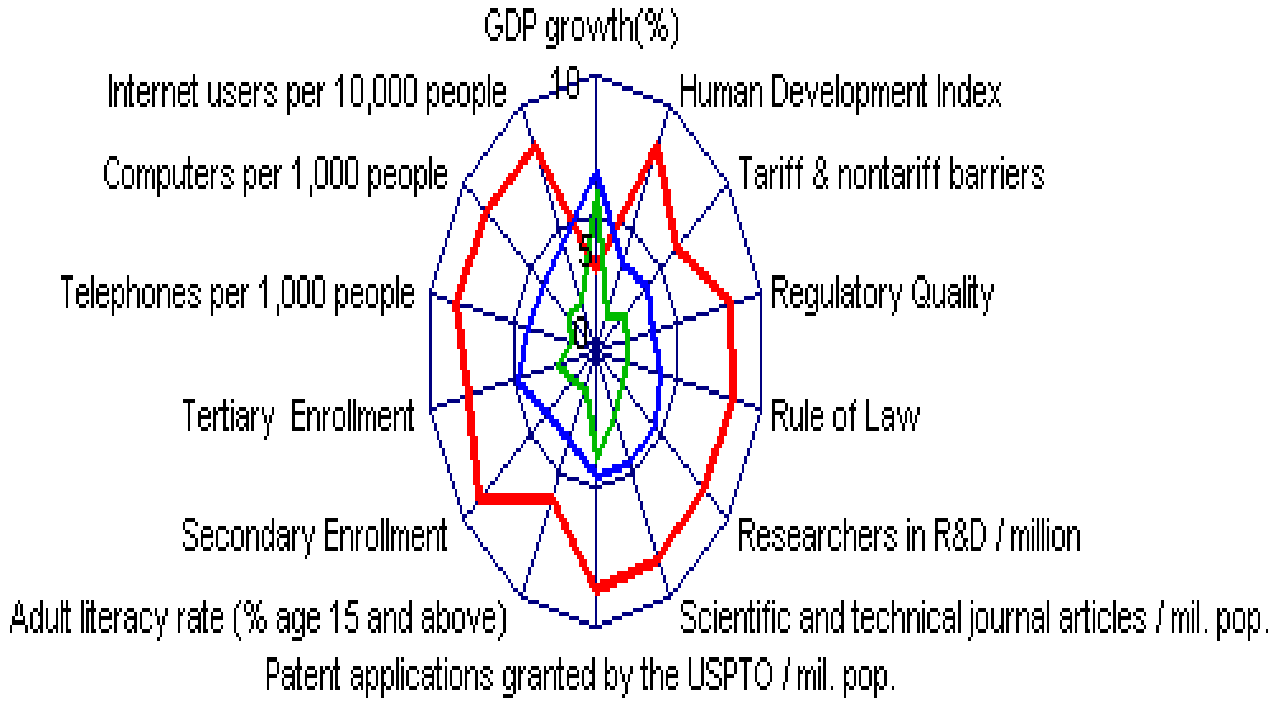
- Rapid and continuous change
- Susceptible to global movements of capital
- Function of global trading agreements
- Quality as important as price
- Organizational changes at firm level
- Short job tenure in competitive sectors
- Fundamentals of macro stability, openness, competition, good governance

Knowledge Assessment Methodology (KAM)

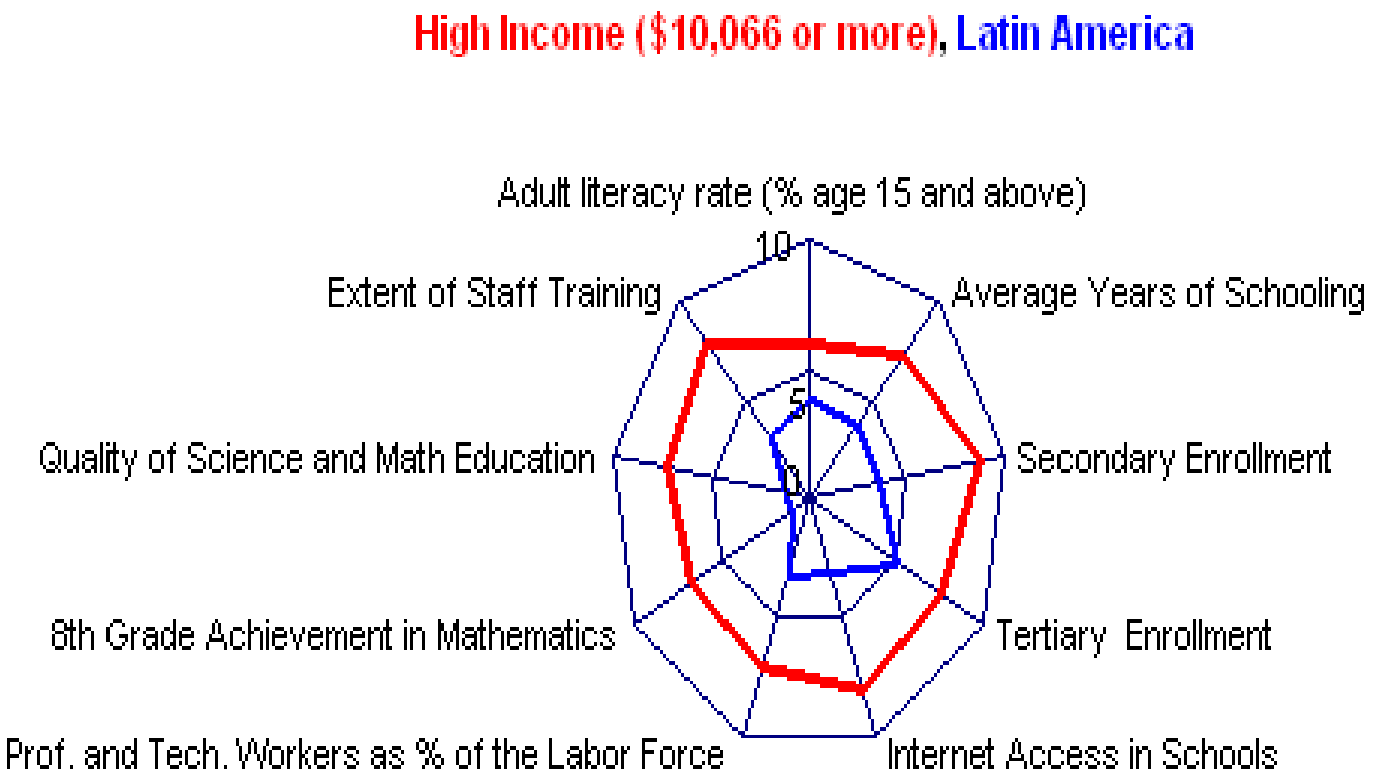
- KAM: 76 structural/qualitative variables to benchmark performance on 4 pillars
- Variables normalized from 0 (worst) to 10 (best) for 121 countries
- **www1.worldbank.org/gdln/kam.htm**
- Basic scorecard for 14 variables at two points in time, 1995 and 2002

Measuring Knowledge for Development

High Income ($10,066 or more), Lower Middle Income ($826-$3,255), Low Income ($825 or less) (most recent)



Measuring Education and Training



Core Competencies in the KE

- There is no universal definition so far;
- The Definition and Selection of Competencies (DeSeCo) Project of the OECD reviewed 12 countries on competencies for a knowledge society;
- Despite wide variations in definitions of competencies in the 12 countries, the DeSeCo found some competencies appearing in most reports.

Key Competencies Frequently Cited in DeSeCo's Country Reports

High	Medium	Low
Social competencies/ cooperation	Self-competence/self-management	Health/sports/physical competencies
Literacy/intelligent and applicable knowledge	Political competence/ democracy	Cultural competencies (athletic, creative, intercultural, media)
Learning competencies/ lifelong learning	Ecological competence/ relation to nature	
Communication competencies	Value orientation	

(Source: Reychen and Salganik 2003)

Key Competencies Have Multiple Dimensions

- Complexity and uncertainty of modern life requires people to apply more than one type of competency to tackle tasks and issues that they face and achieve goals.
- Given this background, the DeSeCo sees that key competencies have many dimensions (for instance, cognitive, motivational, ethical, volitional, and social components) and they are interrelated.
- Based on extensive research, including the above reports, the DeSeCo identified three groups of key competencies.

Key Competencies Identified by DeSeCo

Interacting in socially heterogeneous groups	Acting autonomously	Using tools interactively
To relate well to others	Acting within the big picture or the larger context	Using language, symbols, and text interactively (written and spoken, communication, mathematical skills in multiple situations)
To cooperate	Forming and conducting life plans and personal projects	Using knowledge and information interactively
To manage and resolve conflict	Defending and asserting one’ rights, interests, limits, and needs	Using technology interactively (understanding the potential of technology and identifying technological solutions to problems)

(Source: Reychen and Salganik 2003)

The World Bank View

Related to the competencies identified by DeSeCo, World Bank suggest

- Technical skills (literacy, foreign languages widely used (preferably world-wide), math & science, analytical and so on
- Interpersonal skills
- Methodological skills (ability to learn, to cope with risk and change, etc.), and
- Knowledge and participation in civil society

Key Competencies and Skills from Employers' Perspective

- Employers' hiring criteria in the US

Employers Response to the Question:
"what characteristics or attributes are most critical in making your hiring decision?"

Average of Responses
on a scale of 1 to 5:
1= not at all important ...
to 5= essential

- In the United Kingdom, employers reported that communication skills, learning ability, problem-solving skills, team work and the capacity for self-management were more important than technical, ICT or numeracy skills as criteria in the recruitment of graduates.

Workplace Competencies

The mostly agreed upon workplace competencies include:

- *Inter-personal skills:*
  - Team work and the ability to collaborate in pursuit of a common objective
  - Leadership capabilities
- *Intra-personal skills:*
  - Motivation and attitude
  - The ability to learn
  - Problem-solving skills
  - Effective communication with colleagues and clients
  - Analytical skills
- *Technological or ICT skills*

Paradigm shifts

The old bureaucratic education system	The modern enabling education system
Hit & miss	Universal high standards
Uniformity	Embracing diversity
Provision	Outcomes
Bureaucratic – look up	Devolved – look outwards
Talk equity	Deliver equity
Received wisdom	Data and best practice
Prescription	Informed profession
Demarcation	Collaboration

How can countries ensure that all students learn?

	Students	Teachers	School Directors	Schools	Local Government	State/Provincial /Regional Government	National Government	Employers
Performance Standards								
Performance Evaluation								
Performance Reporting								
Impact evaluation of policies and programs								
Requirements to operate								
Ensuring adequate and equitable resources								
Autonomy, support, and intervention								
Accountability and consequences								

And finally, let me mention the 10 skills for the future workforce

1. Sense Making:

- **The ability to determine the deeper meaning or significance of what is being expressed.**

- Simply stated, sense making is critical thinking

2. Social Intelligence:

- **The ability to connect to others in a deep and direct way, to sense and stimulate reactions and desired interactions**

3. Novel and Adaptive Thinking:

- **Proficiency at thinking and coming up with solutions and responses beyond that which is rote or rule-based**

4. Cross-Cultural Competency:

- **The ability to operate in different cultural settings**

5. Computational Thinking:

- **The ability to translate vast amounts of data into abstract concepts and to understand data-based reasoning**

6. New-Media Literacy:

- **The ability to critically assess and develop content that uses new media forms, and to leverage these media for persuasive communication.**

7. *Transdisciplinarity*:

- **Literacy in and ability to understand concepts across multiple disciplines**

8. Design Mindset:

- **The ability to represent and develop tasks and work processes for desired outcomes**

9. Cognitive Load Management:

- **The ability to discriminate and filter information for importance, and to understand how to maximize cognitive functioning using a variety of tools and techniques**

10. Virtual Collaboration:

- **The ability to work proactively, drive engagement, and demonstrate presence as a member of a virtual team**