Towards a Global Knowledge Economy:
Recent Achievements and Challenges

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International Conditions for strengthening Knowledge Economy

- **Economic and financial crisis:** affecting North America and Europe directly (negative growth, macroeconomic destabilisation, higher indebtedness, massive unemployment, Euro under great pressure), and most of other regions more indirectly (reduced growth rates, smaller exports, volatility of financial markets). “Arab Spring” – a new stage for encouraging democracy in the Middle East.

- **Tensions in global relations:** cooling of US-RF relations, China increasing its global role; increased tensions around Syria, Afghanistan, Iran, Korea, Israel-Palestine -- security situation continues to be volatile.

- **Key international organisations** trying to act positively, but facing strong limitations: IMF determined to stabilize Euro, NATO relations unchanged (however, intervention in Lybia – a new pattern). Positive influence of G-8 and G-20.
Knowledge Economy Developments: A Higher National, Regional Priority

- **Competitiveness Pressure mounting:** squeezed by lack of raw materials and sources of energy (or limitation of resources in case of oil-rich countries), advanced economies continue and intensify knowledge economy strategies, and many economies need to upgrade human capital and some have to improve their position in international brain circulation.

- **Building Knowledge-based Competitiveness:** awareness that knowledge creates long-term value added, but this takes time and enormous resources, more than ever countries are adopting relevant strategies, and implementing them as key priorities (some „emerging“ countries understand this well: Singapore, – besides BRICS, also Gulf states place high priority now).

- **Instruments used to upgrade education capacities:** growth of new universities and enrollment rates higher than ever. In China in 2004, there were 2,236 colleges and universities, with over 20 million students. Over 6 million students graduated in 2008. "Project 211" to create 100 new universities began in the mid-1990s (merging over 700 institutions of higher learning into about 300 universities). Besides growth, efforts for higher quality, more R&D public and private funding. HE institutions, including both private and public funding was highest in the United States (2.7%), followed by Korea (2.6%) and Canada (2.5%).
Drive for Knowledge

- Due to changes in labour market (In 2020 in EU over 30% of new jobs will require high qualifications), more youngsters continue their studies at universities than ever before. Japan has 57% and US about 41% of generation 25-34 years with post-secondary education – EU only 34%). **Skills & competencies of workforce** = key factor of productivity.

- Facilitating and encouraging people to embrace **Life long Learning** has become one of the major instruments of human capital development policies. Many new actors: Open university, Vocational Training centers, In-Company training helps bridge the gap faced by new graduates.

- **E-Learning**: various types being used on an increasing scale (in US over 25% of students work on-line, in EU about 15%).

- It is realised that **quality of primary & secondary education** influence results at university studies, where the didactics is receiving more attention. **Computer skills and use of ICT** amplifies performance of students-e.g. One Laptop per Child global initiative(Uruguay)
Knowledge Economy: global trends (1)

• There are around **21,500 multinationals** (MNCs) based in the **emerging world**. The best, like India’s **Bharat Forge** in forging, China’s **BYD** in batteries and Brazil’s **Embraer** in jet aircraft, are among the best in the world -- *UN World Investment Report*.

• According to *Financial Times 500 List* the number of MNCs from Brazil, India, China and Russia **more than quadrupled in 2006-08, from 15 to 62**. Brazilian top 20 MNCs more than doubled their foreign assets in a single year, 2006.

• Regard them as sources of economic growth and high-quality brainpower, Western **multinationals are investing ever bigger hopes in emerging markets**. These MNCs expect **about 70% of the world’s growth over the next few years to come from emerging markets**, with **40% coming from just two countries**, China and India.

• China and to a lesser extent India are **pouring resources into education** over the past couple of decades. **China produces 75,000 graduates in engineering or computer science**, and **India 60,000 annually**.
Knowledge Economy: global trends (2)

• The world’s biggest multinationals are increasingly doing their R&D in emerging markets. *Fortune 500* companies have 98 R&D facilities in China and 63 in India (some more than one). General Electric’s health-care arm has spent more than $50m in the past few years to build a vast R&D centre in India’s Bangalore, its biggest anywhere in the world.

• Cisco is spending more than $1 billion on its second global headquarters - Cisco East - in Bangalore (like GE has done). Microsoft’s R&D centre in Beijing is its largest outside US. Knowledge-intensive companies such as IT specialists and consultancies have hugely stepped up the number of people they employ in developing countries. For example, a quarter of Accenture’s workforce is in India.
More educated a nation, more likely its economy will be able to catch up and innovate.
Education performance of 15 year olds

Source: OECD PISA 2009 Results
Enrollment Trends

- In Europe, overall participation rates in higher education have increased by 25% on average between 1998 and 2006 – or even more, as in Poland where enrolment increased by 90% during this period – albeit with significant differences across countries and across disciplines, with science and technology fields losing their attractiveness.

- In 2008, there were only 66 female tertiary students for every 100 male students in Sub-Saharan Africa and 76 in South Asia. Sub-Saharan Africa is the only region where growth in male tertiary enrollment has outpaced female enrollment growth, especially for doctoral degrees. We are seriously off track in South Asia, where only 82 girls are enrolled for every 100 boys.

- Participation of women has progressed, with a European average of 123 women enrolled for every 100 men. In the United States and Israel, girls obtain better grades in all major school subjects, including math and science. In France, women are the majority in enrollments at the elite Grandes Ecoles de Commerce (business schools).

- However, in the Middle East and North Africa, 91 girls are enrolled for every 100 boys. If current trend continues, gender parity could be achieved by 2015.

- By 2015, it is estimated that the gender parity target will be missed by 6 million girls out of school. Most of them - 3.8 million - will be in Sub-Saharan Africa.
Enrollment trends, cont‘ed

• Studies have shown that in India, states that have a higher number of women in the work force are precisely those states that are growing faster and lifting people out of poverty.

• Sub-Saharan Africa would have almost doubled its average annual growth between 1960 and 1992 if it had closed the gender gap in schooling at the pace of East Asia.

• East Asia, for example, has closed the gender gap in primary school: fifteen years ago, 93 girls were enrolled for every 100 boys, but by 2002 that number was 100 for 100.

• In low-income countries, the overall gender gap in primary school completion rates narrowed from 18 percentage points in 1990 to 10 in 2003.

• In North Africa, the literacy rates among women aged 15 to 24 increased by nearly 17% during past decade, from 56 to 73 percent.

• Critically important are available jobs and career advancement. This remains the key problem for many developing countries, and specially Africa is facing serious brain drain.
Global Education Trends

- In the past 50 years, college graduation rates in developed countries have increased nearly 200%.

Populations (generations 25-34 and 55-64 years) with post-secondary education (top 5):
1. Canada: 50 percent
2. Israel: 45 percent
3. Japan: 44 percent
4. United States: 41 percent
5. New Zealand: 40 percent

- Korea tops the list for 25-34 year olds that have attained tertiary education, followed by Canada.

Percentage of population that has attained tertiary education, by age group (2009)
Structure of Expenditure on core educational services, R&D and ancillary services in tertiary educ. institutions
(2009 in % GDP)
Knowledge Economy Developments: Role of International Entities

- **World Bank**: supports by dedicated loans, activities of World Bank Institute, upgrade of the Knowledge Economy Index (now on-line);

- **DAVOS, and many international meetings on Knowledge Economy issues**: e.g.: Gulf Education Summit (London, May 2012); Saudi Education Conference (Riad, December 2012), OECD Global Forum on Knowledge Economy (Paris, September 2011), One Globe 2012: 21st Century Knowledge Economy (New Delhi, February 2012).

- **International Networks and Associations (global and regional) bringing Knowledge Actors together**:
  - Europe: Science & Business, European Regions Research and Innovation Network, Centre for European Policy Studies, Bruegel;
  - Americas: Brookings Institution, American Enterprise Institute, Center for Strategic and International Studies, Task Force on American Innovation, Brazilian Society for Technological Innovation;
  - Asia & Australia: Society for Knowledge Economics, National Research Council for Economics, Humanities and Social Sciences;
  - Africa and Middle East: Arabian Knowledge Economy Association.
Entrepreneurship-Pivotal to Future Prosperity

• It is increasingly understood, and appreciated that the innovation process has changed fundamentally, and unless elements of entrepreneurship and marketing are present from early stages, even highly relevant, new knowledge may remain only an idle invention, isolated from economic processes.

• Even in countries where entrepreneurship used to be poorly understood, now it is appreciated as a principal driver of change and development (e.g.: China). It is taught as part of regular curricula at secondary and tertiary education in many countries of the world. Growth of specialized training of management and innovative entrepreneurship by sectors.
Linking Four Pillars of Knowledge Economy

- **The four pillars** are: education, R&D, innovation, and entrepreneurship.
- **Business-Academia Partnerships** are growing in most jurisdictions, and slowly overcoming traditional “culture gap“ via: university spin-offs, incubators, science and technology parks, clusters, centers of excellence;
- Also **Regional Development Agencies** can link various knowledge actors and facilitate their collaboration, by providing project development and management support, and resolving challenges in project implementation.
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Remarkable growth in R&D expenditure: Turkey

- Turkey’s GERD was only 0.84% of GDP in 2010 - compared to levels of EU-27 (1.91%) and OECD (2.4%) – but it has increased its public R&D spending for over 400% since 1998, and TUBITAK claims that the 2% GERD is still achievable by 2013. Government commitment translates into action!
- With over 140 universities and favourable demographic outlook, Turkey was ranked 2nd in Europe in terms of Human Capital Index (by Lisbon Council).
- Turkey has the highest share of public spending in Gross Expenditure on R&D (GERD) among OECD countries.
In US they mean business

- For over half a century federal government has paid considerable attention to support new ventures and small businesses. U.S. Small Business Administration (SBA) employs some 3,000 people full time, and has an additional 2,000 on-call employees.

- SBA has a portfolio of more than $90 billion in loan guarantees. Each year, the agency helps leverage nearly $100 billion in federal contracts to small businesses and supports free counseling and technical assistance to more than 1 million entrepreneurs.

- SBA has at least one office in each state. The agency also provides grants to support counseling partners, including approximately 900 Small Business Development Centers (often located at colleges and universities), 110 Women's Business Centers, and SCORE, a volunteer mentor corps of retired and experienced business leaders with approximately 350 chapters.
Overhaul of Japanese Education

Japan: one of the **world's best educated populations**, with 100% enrollment in compulsory grades and practically zero illiteracy. High school enrollment over 96% nationwide and nearly 100% in cities - high school dropout rate stands at only 2%.

**Aging population** (world oldest with 23.1% of Japanese over 65), and **soaring public debt** (cumulative national debt equals to 233% of GDP), Ministry of Education, Culture, Sports, Science and Technology (MEXT) was left with no choice but to take **serious action and adapt radically to new conditions**.

Two types of universities: **national universities (87)** and **local public universities (73)**. Remaining 556 four year colleges are private, and they account for 80% of all enrollments, while national universities are most highly regarded. Based on QS World University Rankings 2011/2012, there are **33 Japanese Universities** among the **top 100 Asian** Universities.
Central Council for Education defined in 2005 „A Vision for the Future of Higher Education in Japan“ stating:

For the universal stage of tertiary education, it is necessary for each institution to clarify its own individuality and distinctiveness.

Universities must all put education and research into operation that are fully based on each one’s position and expected role / function. In particular, even for the same type of institution, each institution should clarify their own functions and goals out of a wide range of functions and goals based on the institution’s own choices.
Key Reform Policies and Measures - 3

• National universities were turned into independent agencies, only partially funded from the state budget.

• Career system of researchers. Academic researchers previously enjoyed indefinite term employment, and were not subject to performance-based evaluation as a means of gaining additional compensation or rank, but rather advanced by seniority.

• Japanese universities are now subject to the evaluation of their programmes by certified agencies. Evaluations are now publicly available!

• Consolidation of national university institutions: reduction from 101 to 87, further consolidation within the public sector of tertiary education is possible and desirable.

• Dramatic growth of joint research centres at national universities (from only 28 in 1992 to virtually all national universities having established offices for university-industry cooperation). Number of academic spin-off companies rose from 22 in 1997 to over 200 today, a level comparable to US.
Innovation in India

• Government of India has declared 2010-2020 as the ‘Decade of Innovation’.

• National Knowledge Network (NKN) is being developed by Government of India as a high-speed multi gigabyte network which aims to connect the country’s educational and research institutions for real time research and collaboration.

• Despite impressive growth in R&D since the 90’s, India still spends only 1% of its GDP on research, compared to 2.7% and 3.4% by the U.S. and Japan. This is just 3.7% of the global R&D expenditure and has remained constant at this level for the past five years, while China has increased its global share from 13% to 18% in the same period. Only 4% of the total R&D expenditure in India belong to higher educational institutions, putting India lower than its global peers — China (10%), Japan (14%), U.S. (17%) and Canada (35%).
Comparison India: EU

• The EU27 is performing better than India in most indicators, except in exports of Knowledge intensive services, and exports of medium and high-technology products, where India is performing better.

• Overall there is a clear performance lead in favor of the EU27. But this lead is declining, as India’s innovation performance has grown at a faster rate than of the EU27. India has been decreasing the performance gap in 4 indicators (Most cited publications, Business R&D expenditure, Public-private co-publications and License and patent revenues) and has experienced a decrease in its performance lead in Exports of medium-high and high-tech products and Knowledge-intensive services exports. The EU27 has increased its lead in Tertiary education, Public R&D expenditure, PCT patents and PCT patents in societal challenges.
Good practice: Chile

• Chile launched an ambitious effort in 2000 to become an IT Outsourcing Hub (to reduce dependency on mining). By offering massive subsidies, the Chilean government created an outsourcing industry that generated $800 million in revenue and employed 20,000 people in 2008. The Chilean Economic Development Agency (CORFO) plans to grow this to a $5 billion industry by 2015.

• Nicolas Shea, an adviser to the Chilean Ministry of Economy, had a good idea: Pay foreigners to come to Chile (proposed an experiment in March 2010 to import 1,000 foreign entrepreneurs over three years to build a thriving tech hub with a culture of innovation and risk-taking). This program, called Start-Up Chile, formally launched in January 2011. Entrepreneurs who choose to move to Chile for at least six months receive a grant of $40,000. Additionally, the program provides free office space and moving assistance. It also facilitates networking and business connections.

• In 2011, Start-Up Chile hosted 100 entrepreneurial teams. They hope to import a total of 1,000 entrepreneurs by 2014. What Start-Up Chile seems to understand is that in order to create a hub of innovation you need “foreign” ideas and a mix of people who think globally. Innovation is more than technology and venture capital. It is based on people connecting and sharing ideas.
Chile

an Experiment – first results

• The Start-Up Chile program confirms its global appeal, attracting 574 applications from 53 countries.
• No.of applicants from top ten countries:
  – Chile (179)
  – USA (127)
  – Brazil (24)
  – Argentina (22)
  – India (22)
  – Canada (18)
  – Spain (18)
  – Mexico (16)
  – Germany (12)
  – the UK (11).
Qatar: Efforts towards Knowledge Economy

• **Determined to build Knowledge Economy:**
  – In strategy: **Vision 2030** takes clear Knowledge Economy orientation, and planning to secure required resources (e.g.: spending on tertiary student 50% more than OECD average);
  – Ambition to develop **world-class education system in 10 years**, and to become a regional leader in education, research and innovation.

• **However, huge challenges remain:**
  – Very limited research activities, and science culture in infant stage;
  – Foreign private universities offer very expensive programmes;
  – The country still has 41% of students in „non-Knowledge Economy Sciences“ (Finland, Norway, Korea, UK – between 20-29%).
  – Gender issues: not easy to overcome.
Good practice cases - 1

Making Knowledge Work (www.makingknowledgework.eu) is an EU-funded project aiming to exploit ideas and foster smart, sustainable growth by exchanging experience on how regions support the process of commercialisation of ideas and R&D results. The MKW consortium is led by Brainport Eindhoven (initially owned by Philips) and is supported by European Regions Research and Innovation Network, ERRIN.
• **A Living Lab** is a research concept. A living lab is a user-centred, open-innovation ecosystem, often operating in a territorial context (e.g. city, agglomeration, region), integrating concurrent research and innovation processes within a **public-private-people partnership**.

• **European Network of Living Labs** (ENoLL) focuses on experience sharing in terms of user acceptance of innovative solutions provided by Living Labs, experience research centres and other similar initiatives. The concept of user experience is central, and Living Labs are considered as the key instrument to implement open innovation business models tailored to SME needs and creating user experience.
In 2008, the World Bank Institute’s (WBI) designed a broad-based learning course Knowledge for Development (K4D) 4-days program, which allowed participants to engage in a process of developing coherent Knowledge Economy (KE) strategies in their countries.

The main aim of this course was to have a broad discussion with a wide range of stakeholders from government, private sector, and civil society on how countries can leverage their potential to further compete in the global KE, and identify appropriate processes and policies that can help them achieve their goals. The course focused on policy strategies, concrete case studies, exchange of experiences, and analytical tools that can help to benchmark progress on the KE.