ROLE OF HIGHER EDUCATION IN THE PURSUIT OF KNOWLEDGE ECONOMY*

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This paper focuses on comparative analysis of the current state of knowledge economy in the three selected countries/region: the Czech Republic, Western Europe (includes: Austria, Belgium, Cyprus, Denmark, Finland, Greece, Iceland, Ireland, Luxemburg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland) and USA. The comparison starts on very much aggregated level and gradually proceeds to the area of education in order to assess strengths and weaknesses of each country/region in comparison. Analytical findings are then confronted with European Commission propositions to facilitate development of the Europe of Knowledge.

knowledge economy; knowledge assessment methodology; higher education; Czech Republic

INTRODUCTION

The creation of a Europe of knowledge has been a prime objective for the European Union since the Lisbon European Council of March 2000. Subsequent European Councils, particularly Stockholm in March 2001 and Barcelona in March 2002, have taken the Lisbon objective further forward. To implement the Lisbon agenda, the European Union has embarked upon a series of actions and initiatives in the areas of research and education. One example is the European area of research and innovation, which fresh perspectives have been already opened up and, in this context, the objective to increase the European research and development drive to 3% of the Union's GDP by 2010 (EC, 2003).

It can be argued that the knowledge economy differs from the traditional economy in several key respects:

- The economics is not of scarcity, but rather of abundance. Unlike most resources that deplete when used, information and knowledge can be shared, and actually grow through application.
- The effect of location is either
  - diminished, in some economic activities: using appropriate technology and methods, virtual marketplaces and virtual organizations that offer benefits of speed, agility, round the clock operation and global reach can be created;
  - or, on the contrary, reinforced in some other economic fields, by the creation of Porter's clusters around centres of knowledge, such as universities and research centres having reached world-wide excellence.
- Laws, barriers and taxes are difficult to apply on solely a national basis. Knowledge and information "leak" to where demand is highest and the barriers are lowest.
- Knowledge enhanced products or services can command price premiums over comparable products with low embedded knowledge or knowledge intensity.
- Pricing and value depends heavily on context. Thus the same information or knowledge can have vastly different value to different people, or even to the same person at different times.
- Knowledge when locked into systems or processes has higher inherent value than when it can "walk out of the door" in people's heads.

In the area of education and training, following achievements are worth to mention:

- European area of lifelong learning;
- The implementation of the detailed work programme on the objectives of education and raining systems;
- Work to strengthen the convergence of higher education systems, in line with the Bologna process;
- and vocational training systems, in line with the Copenhagen declaration.

MATERIAL AND METHODS

The paper objective is to provide a comparative analysis of the current level of knowledge economy development in selected countries/region and confrontation of the findings with proposition of European Commission to facilitate the progress towards the Europe of knowledge. For the purpose of comparative analysis the following countries/region were selected:

- USA – as a leading world economy serving as a benchmark
- Western Europe – substituting the European Union for which data is not available
- Czech Republic – representing a country in transition with likely different potential for development.

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Table 1. Overview of KAM variables

Performance indicators
Average Annual GDP growth (%)
GDP per capita (International Current PPP)
Human Development Index
Poverty index
Composite ICRG risk rating
Average unemployment rate, % of total labor force
Employment in industry (% of total employment)
Employment in services (% of total employment)
GDP (current US$ bill)
Economic regime
Average gross capital formation as % of GDP
General government budget balance as % of GDP
Trade as % of GDP
Tariff & nontariff barriers
Intellectual property is well protected
Soundness of banks
Exports of goods and services as % of GDP
Interest rate spread (lending minus deposit rate)
Intensity of local competition
Domestic credit to the private sector (% of GDP)
Institutions
Regulatory quality
Rule of law
Government effectiveness
Voice and accountability
Political stability
Control of corruption
Press freedom
Education and human resources
Internet hosts per 10,000 people
Adult literacy rate (% age 15 and above) Internet users per 10,000 people
Average years of schooling International telecommunications: cost of call to US in $ per 3 minutes
Secondary enrolment E-government
Tertiary enrolment ICT Expenditures as a % of GDP
Life expectancy at birth, years
Internet access in schools
Public spending on education as % of GDP
Professional and technical workers as % of the labour force
8th grade achievement in mathematics
8th grade achievement in science

Innovation system
FDI as percentage of GDP
Royalty and license fees payments ($ millions)
Royalty and license fees payments in US$ millions / million population
Royalty and license fees receipts in US$ millions
Royalty and license fees receipts in US$ millions / million population
Science & engineering enrolment ratio (% of tertiary level students)
Researchers in R&D
Researchers in R&D / million
Total expenditure for R&D as percentage of GDP
Manufacturing trade as % of GDP
Research collaboration between companies and universities
Cost to register a business (% of GNI per capita)
Cost to enforce a contract (% of GNI per capita)
Scientific and technical journal articles
Scientific and technical journal articles per million people
Administrative burden for start-ups
Availability of venture capital
Patent applications granted by the USPTO
Patent applications granted by the USPTO (per million pop.)
State of cluster development
High-technology exports as percentage of manufactured exports
Private sector spending on R&D
Information infrastructure
Telephones per 1,000 people (telephone mainlines + mobile phones)
Main telephone lines per 1,000 people
Mobile phones per 1,000 people
Computers per 1,000 persons
TV sets per 1,000 people
Radios per 1,000 people
Daily newspapers per 1,000 people
Gender equality
Gender development index
Females in labour force (% of total labour force)
Seats in Parliament held by women (as % of total)
Females literacy rate (% of females ages 15 and above)
School enrolment, secondary, female (% gross)
School enrolment, tertiary, female (% gross)
Quality of science and math education
Extent of staff training
Management education is locally available in first class business schools
Well educated people do not emigrate abroad

Source: http://siteresources.worldbank.org/KFDLP/Resources/KAM_ Paper_WP.pdf

The comparative analysis was undertaken with the application of the Knowledge Assessment Methodology. The Knowledge Assessment Methodology (KAM) was designed by the World Bank Institute to proxy a country's preparedness to compete in the knowledge economy using more than 80 structural and qualitative variables – see Table 1 for the overview. The comparison is undertaken for a group of 128 countries, which includes most of the OECD economies and more than 90 developing countries. To allow for a flexible cross-country comparison, each variable is available in both actual and relative value (normalized on a scale of zero to ten relative to other countries in the comparison group.).

The unique strength of the KAM methodology is its cross-sectoral approach, allowing the user to take a holistic view of a wide range of relevant factors rather than just focusing on one area. The variables serve as proxies for the **four pillars of the Knowledge Economy framework**:

- An economic and institutional regime to provide incentives for the efficient use of existing and new knowledge and the flourishing of entrepreneurship;
- An educated and skilled population to create, share, and use knowledge well;
- An efficient innovation system of firms, research centres, universities, consultants and other organizations to tap into the growing stock of global knowledge, assimilate and adapt it to local needs, and create new technology;
- Information and communication technology to facilitate the effective creation, dissemination, and processing of information.

Included in the KAM are several variables that track the overall performance of the economy. These variables help to illustrate how well an economy is actually using knowledge for its overall economic and social development.

The KAM offers several pre-set display modes for simple visual representations of a country's Knowledge Economy readiness. A country can be assessed and compared with others on the aggregate performance on each of the KE pillars or the overall Knowledge Economy and Knowledge indexes for 1995 and the most recent available year. The KAM also makes possible customized country analysis and cross-country comparison on the indicators hand-picked by the user. This allows for capturing various aspects of a country's ability to generate, diffuse and apply knowledge for economic development.

The KAM Knowledge Index (KI) measures a country's ability to generate, adopt and diffuse knowledge. This is an indication of overall **potential** of knowledge development in a given country. Methodologically, the KI is the simple average of the normalized performance scores of a country or region on the key variables in three Knowledge Economy pillars – education and human resources, the innovation system and information and communication technology (ICT).

The Knowledge Economy Index (KEI) takes into account whether the environment is conducive for knowledge to be **used effectively** for economic development. It is an aggregate index that represents the overall level of development of a country or region towards the Knowledge Economy. The KEI is calculated based on the average of the normalized performance scores of a country or region on all four pillars related to the knowledge economy – economic incentive and institutional regime, education and human resources, the innovation system and ICT.

For the purposes of calculating KI and KEI, each pillar is represented by three key variables:

The Economic Incentive and Institutional Regime

- Tariff & Nontariff Barriers
- Regulatory Quality
- Rule of Law

Education and Human Resources

- Adult Literacy Rate
- Secondary Enrolment
- Tertiary Enrolment

The Innovation System

- Researchers in R&D
- Patent Applications Granted by the US Patent and Trademark Office
- Scientific and Technical Journal Articles

These three variables are available in two forms: scaled by population and in absolute values. Thus, both KI and KEI are also available in "weighted" and "unweighted" forms. In innovation, absolute size of resources matters, as there are strong economies of scale in the production of knowledge and because knowledge is not consumed in its use.

Information and Communication Technology (ICT)

- Telephones per 1,000 people
- Computers per 1,000 people
- Internet Users per 10,000 people

The scorecard also presents two variables related to the overall economic and social performance.

Overall Performance of the Economy

- Average Annual Gross Domestic Product (GDP) Growth, 1994-98 and 2000-2004 (%) (DDP). Annual GDP growth is a good indicator of a country's overall economic development.
- Human Development Index (HDI), 2003 (UNDP Human Development Report 2005). HDI is a composite measure of three components: longevity (measured by life expectancy); knowledge (adult literacy rate and mean years of schooling); and standard of living (real GDP per capita in purchasing power parity). The HDI provides information on the human development aspect of economic growth.

RESULTS

Several comparisons among the Czech Republic, Western Europe (includes: Austria, Belgium, Cyprus, Denmark, Finland, Greece, Iceland, Ireland, Luxemburg, Netherlands, Norway, Portugal, Spain, Sweden, Switzer-

Table 2. Comparison of the Czech Republic, Western Europe and USA – basic knowledge economy indicators

Country/region	Knowledge economy indicators											
	KEI		KI		Econ.		Innovation		Education		ICT	
	1995	recent	1995	recent	1995	recent	1995	recent	1995	recent	1995	recent
Western Europe	8.31	8.09	8.45	8.22	7.89	7.69	7.96	7.96	8.38	8.14	9.02	8.57
Czech Republic	7.15	7.29	6.77	7.33	8.28	7.16	5.77	6.92	7.15	7.1	7.39	7.96
USA	9.19	8.7	9.48	8.96	8.33	7.95	9.91	9.91	8.79	8.22	9.74	8.24

Source: http://info.worldbank.org//kam

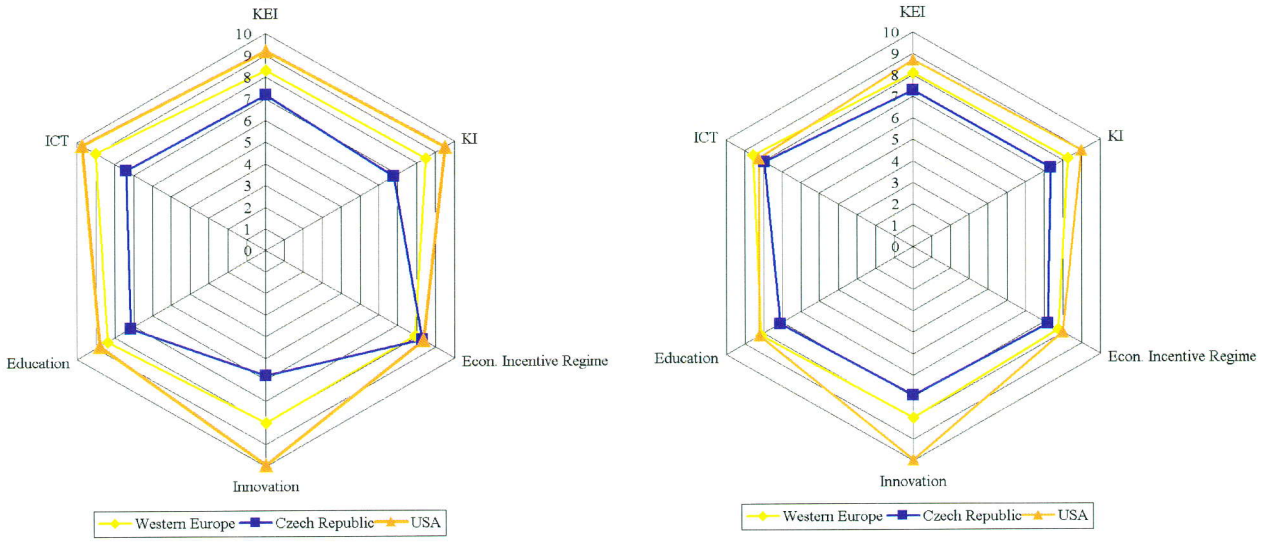

Fig. 1. Basic knowledge indicators – comparison of the Czech Republic, Western Europe and USA (year 1995 on the left, recent data on the right)

land) and USA using above mentioned actual as well as normalized variables.[1]

Whenever data was available, an overtime comparison is made taking into account their performance in two points in time – year 1995 and most recent available data, which often falls into year 2003 and 2004.

The regression over the time period may be due to two reasons:

- the country has actually lost ground in absolute terms, or
- even if in absolute terms the country has made an improvement, the countries in the comparison group on average have made a significantly larger improvement.

First comparison is made with the application of basic knowledge economy indicators (the two indexes and four KE pillars; see Table 2 and Fig. 1 for details).

- Knowledge Economy Index (KEI) – as an aggregate indicator of a country/region overall level of development towards the knowledge economy – shows clear leadership of USA in the selected group, but its regression over time suggests faster growth of the index within the whole population (128 countries) than in USA; while the dynamic of development in Western Europe is lagging behind, figures from the Czech Republic suggest the fastest development of countries/region of comparison, and generally faster growth than the population as the whole.
- Knowledge Index (KI) – as an indicator of overall potential of knowledge development in a given country – shows in all countries/region of comparison very much similar pattern as the above described KEI.

[1] The normalization procedure used in the KAM is as follows:

1. The actual data (u) is collected from World Bank datasets and international literature for 80 variables and 128 countries.
2. Ranks are allocated to countries based on the absolute values (actual data) that describe each and every one of the 80 variables (rank u). Countries with the same performance are allocated the same rank. Therefore, the rank equals 1 for a country that performs the best among the 128 countries in our sample on a particular variable (that is, it has the highest score), the rank equals to 2 for a country that performs second best, and so on.
3. The number of countries with worse rank (Nw) is calculated for each country.
4. The following formula is used in order to normalize the scores for every country on every variable according to their ranking and in relation to the total number of countries in the sample (Nc) with available data :

   Normalized (u) = 10*(Nw/Nc)
5. The above formula allocates a normalized score from 0-10 for each of the 128 countries with available data on the 80 variables.

- Economic Incentive Regime (Econ.) – shows regression in all three compared countries/region suggesting substantial improvement in other countries; the greatest slow-down is visible in the Czech Republic – this might be attributed to the effort to align economic regime of the country to the rules applied within EU, which tends to be protectionist and over-regulated.
- The Innovation Systems (Innovation) – USA show the highest level in this pillar of the knowledge economy as well as good dynamics, as it keeps the same level over time period; similar development is possible to observe in Western Europe, however the level of innovation here is significantly lower; the Czech Republic shows again the fastest development, clearly exceeding the average of the population, but the starting as well as recent level are still very low.
- Education and Human Resources (Education) – regression is observable in all three countries/regions,

Table 3. KAM Basic Scorecard: Comparison of the Czech Republic, Western Europe and USA – actual variables

Variable (actual)	Czech Republic		Western Europe		USA	
	1995	recent	1995	recent	1995	recent
GDP growth (%)	2.20	3.14	3.72	2.65	3.80	2.78
Human Development Index	0.843	0.874	0.903	0937	0.925	0.944
Tariff & nontariff barriers	0.50	2.00	2.50	2.03	2.50	2.00
Regulatory quality	1.18	0.97	1.33	1.47	1.56	1.22
Rule of law	0.64	0.69	1.68	1.61	1.79	1.58
Researchers in R&D / million	1257.00	1466.60	2659.36	3495.76	3881.00	4525.81
Scientific and technical journal articles / mil. pop.	192.91	256.46	520.85	596.36	761.94	704.02
Patent applications granted by the USPTO / mil. pop.	0.10	3.14	47.12	77.91	243.62	320.70
Adult literacy rate (% age 15 and above)	99.00	100.00	98.63	99.02	100.00	100.00
Secondary enrolment	98.70	95.81	112.92	115.07	97.40	92.96
Tertiary enrolment	21.80	33.66	42.50	55.31	80.90	81.35
Telephones per 1,000 people	241.00	1390.70	608.13	1513.09	736.00	1208.80
Computers per 1,000 people	53.21	239.60	187.37	480.53	328.09	740.60
Internet users per 10,000 people	145.00	4693.92	372.53	4968.89	755.00	6228.05

Average Annual GDP growth (1995) is the average annual GDP growth for the period 1994–1998.
Average Annual GDP growth (most recent) is the average annual GDP growth for the period 2000–2004. Most of the remaining recent data is for 2003 or 2004.
Source: http://info.worldbank.org//kam

Table 4. KAM Basic Scorecard: Comparison of the Czech Republic, Western Europe and USA – normalized variables

Variable (normalized)	Czech Republic		Western Europe		USA	
	1995	recent	1995	recent	1995	recent
GDP growth (%)	1.81	3.39	4.71	2.48	4.8	2.68
Human Development Index	7.48	7.54	8.5	8.69	9.51	9.21
Tariff & nontariff barriers	9.92	7.04	6.72	5.66	6.72	7.04
Regulatory quality	8.12	7.5	8.4	8.71	9.38	8.12
Rule of law	6.8	6.95	8.54	8.71	8.91	8.67
Researchers in R&D / million	5	5.23	7.96	8.66	9.25	9.3
Scientific and technical journal articles / mil. pop.	7.8	7.87	8.92	8.87	9.29	9.06
Patent applications granted by the USPTO / mil. pop.	4.92	7.66	8.93	8.78	9.92	9.92
Adult literacy rate (% age 15 and above)	7.46	8.19	7.34	7.13	8.49	8.19
Secondary enrolment	8.28	7.34	9.18	9.26	8.05	6.72
Tertiary enrolment	5.7	5.76	8.62	8.04	9.84	9.76
Telephones per 1,000 people	6.8	8.52	9.02	9.18	9.61	7.5
Computers per 1,000 people	7.08	7.25	8.79	8.12	9.83	9.58
Internet users per 10,000 people	8.28	8.12	9.26	8.4	9.77	9.14

Source: http://info.worldbank.org//kam

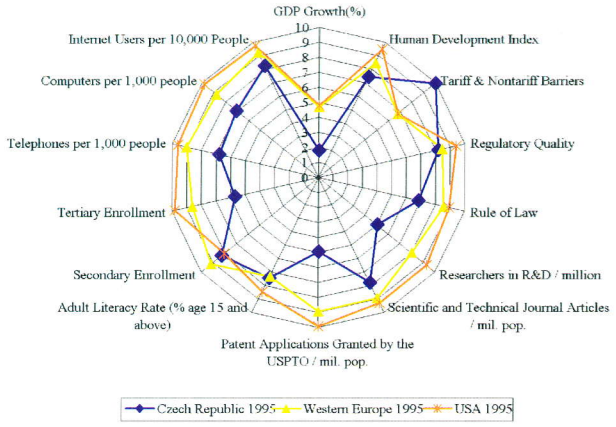

Fig. 2. KAM Basic Scorecard: Comparison of the Czech Republic, Western Europe and USA – normalized variables – year 1995

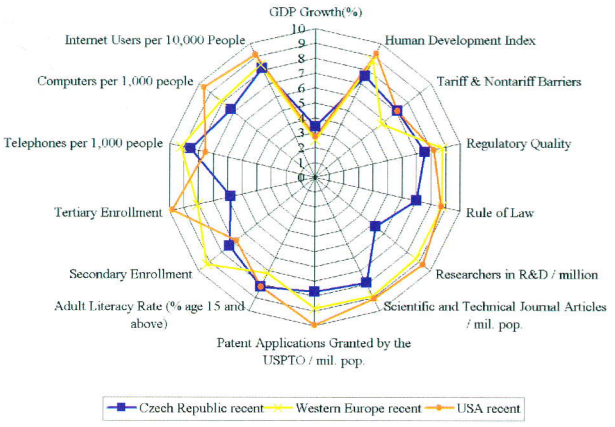

Fig. 3. KAM Basic Scorecard: Comparison of the Czech Republic, Western Europe and USA – normalized variables – recent

the smallest in the Czech Republic, USA still ahead of Western Europe.

– Information and Communication Technology (ICT) – both USA and Western Europe show regression over time, however starting from very high levels, the Czech Republic has been progressing over time, but its level of ICT is still slightly behind both USA and Western Europe.

Generally, the Czech Republic has been improving in most indicators over the time, while USA and Western Europe show stagnation and/or regression; the dynamics of improvement is first natural with regard to low level of development in 1995 and second not satisfactory regarding the level achieved over time in all indicators compared with both USA and Western Europe.

The second comparison is focused on 14 selected variables (Basic Scorecard). In this scorecard, three key variables are used as proxies to describe each of the four Knowledge Economy pillars: Economic Incentive and Institutional Regime, Education, Innovation, and Information & Communication Technology (ICT), plus two variables for overall economic and social performance.

Since the variables are normalized on a scale from 0 to 10 relevant to four possible 'Comparison groups' – all countries, region, income and HDI groups, the scorecards always demonstrate *comparative performance*. Thus, if a country performs worse on a certain variable in the most recent period than in 1995, this may be due to two reasons explained above.

For this reason, it is advisable to always compare both actual and normalized values of the variables, presented in Tables 3 and 4. Figs 2 and 3 provide spider diagrams of normalized variables in two points of time – 1995 and most recent.

This comparison reveals following observations:

– The Czech Republic shows comparative improvement in many (10 out of 14) of the selective indicators over the given period of time, while both Western Europe

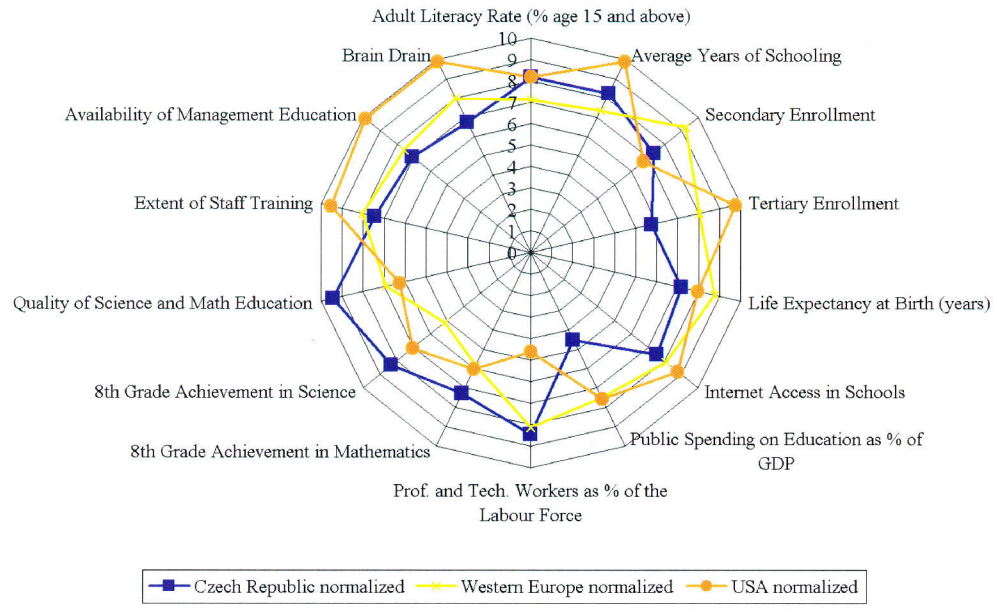

Fig. 4. Comparison of the Czech Republic, Western Europe and USA in indicators related to Education and Human Resources (recent normalized values)

and USA are more or less stagnating (comparative improvement in 6 and 2 respectively, out of 14).
- Actual values are however significantly higher in most indicators (recent levels) in USA (8 out of 14), Czech Republic is doing better only in GDP growth and relative number of telephone lines.
- Astonishing gaps remain in indicators closely linked to knowledge generation and distribution – research and education; in research especially the actual relative figures tend to be anything between 2 up to 10 times higher in USA than in the Czech Republic.

The third comparison focuses more closely on the knowledge economy pillar Education and Human Resources and this reveals following (see Table 5 and Fig. 4 for details):

- The Czech Republic is significantly lagging behind in the level of public spending on education, the tertiary enrolment, extent of staff training, availability of management education and brain drain (brain drain = the lower the score the more people leave the country in the pursuit of their professional career).
- The Czech Republic is however an apparent leader in the quality of education (measured by 8th grade achievement in Mathematics and Science, Quality of science and math education) and in the qualification of its workforce (professional and tech. workers as per cent of the labour force).

DISCUSSION

If they are to play their full role in the creation of a Europe of knowledge, European universities must rise to a number of challenges.

- **European higher education is fragmented** into (what are often) small national systems and sub-systems, without effective links and bridges between them;
- **National regulations are too often over-detailed**, and this diminishes universities' responsiveness to changing learning and research needs emerging from markets and society;
- **Europe's universities have a tendency to uniformity within each system/subsystem** which has led to a good average level, but has limited access and failed to enable enough world-class research;
- **Universities under-use the knowledge they produce** because they and business still inhabit largely separate worlds;
- **Many universities are insufficiently prepared** for the coming competition for students, researchers and resources in an increasingly globalising world.
- Most importantly, **funding for universities is far too low** compared to our major competitors, both in education and in research, due mainly to much smaller contributions from private sources.
- Furthermore, **access rates to higher education are still lower in Europe** than in many other leading world regions, especially for adult learners

What does the Commission propose to do about the problem?

- **Break down the barriers around universities in Europe** There should be a major effort to achieve the core Bologna reforms by 2010 in all EU countries. These are:
  - universality of the BA/MA/PhD structure;
  - flexible, modernised curricula at all levels; and
  - trustworthy quality assurance systems.

Table 5. Comparison of the Czech Republic, Western Europe and USA in indicators related to Education and Human Resources (recent actual and normalized values)

Variable (recent)	Czech Republic		Western Europe		USA	
	actual	normalized	actual	normalized	actual	normalized
Adult literacy rate (% age 15 and above)	100	8.19	99.02	7.13	100	8.19
Average years of schooling	9.48	8.26	9.25	7.36	12	9.89
Secondary enrolment	95.81	7.34	115.07	9.26	92.96	6.72
Tertiary enrolment	33.66	5.76	55.31	8.04	81.35	9.76
Life expectancy at birth (years)	75.2	7.19	78.59	8.79	77.4	7.97
Internet access in schools	5.2	7.55	5.6	8.09	6	8.82
Public spending on education as % of GDP	4.2	4.52	5.69	7.52	5.7	7.57
Prof. and tech. workers as % of the labour force	29.4	8.46	28.99	8.14	19.36	4.62
8th grade achievement in mathematics	520	7.29	502	5.83	504	6.04
8th grade achievement in science	539	8.33	507.67	5.16	527	7.08
Quality of science and math education	5.7	9.45	4.79	6.94	4.5	6.27
Extent of staff training	4.5	7.45	5.07	8.03	5.8	9.55
Availability of management education	4.9	7.09	5.05	7.59	6.6	9.91
Brain drain	4.1	6.73	4.66	8	6.4	9.91

Source: http://info.worldbank.org//kam

- **Create real autonomy and accountability for universities** Member States should draw up a framework of rules and policy objectives for the higher education sector as a whole. Such rules would cover, for example, issues such as performance assessment, cost transparency, recruitment procedures and staff promotion mechanisms and tenure systems. Within this context universities should have the freedom and the responsibility to set their own missions, priorities and programmes in research, education and innovation; to decide on their own organisation and on the bodies necessary for their internal management and the representation of society's interests; to manage their own physical, financial and intellectual assets for research and education, their budgets (including fundraising) and their partnerships with academia and industry; to recruit and set the compensation rules for their permanent and temporary staff and to target their collective efforts towards institutional priorities in research, teaching and services. In doing so, universities need to accept that they are fully accountable to society at large for their results, including the cost-efficiency with which these are achieved. Member States should build up and reward management and leadership capacities within universities. The Commission suggests this could be done by establishing national bodies dedicated to university management and leadership training and using EU support to create strong linkages of these at European level.
- **Provide incentives for structured partnerships with the business community** Member States should support universities to develop incentive mechanisms to improve the use of knowledge and the wider sharing of research results, including with respect to intellectual property rights, patents and licensing and the creation of innovative spin-offs. Universities should build up lasting partnership with the business community, in particular by working with local and regional partners (research laboratories, science parks, start-ups and SMEs), for example by creating "clusters for knowledge creation and transfer". Universities should also be encouraged to establish university-industry research partnership offices at the interface between the two sectors.
- **Provide the right skills and competencies for the labour market** The current pressure for uniformity – or even conformity – in much national regulation for universities does not enable sufficiently differentiated programmes geared towards the needs of different types of learners and regional/local actors. Member States should value and reward diverse university profiles, including through differentiated regulatory and funding systems. Programmes should be designed to enhance the employability of graduates. Research candidates should have the opportunity to acquire skills in IPR management, communication, networking, entrepreneurship and team-work in addition to research techniques. While university education and research pursue much broader ethical, cultural and social goals than "employability" alone, labour market access should be used as one indicator, among many, of the quality of university performance. Universities will soon be faced with the consequences of an ageing population, with a dwindling potential pool of graduates. By providing more courses open to students at later stages of life, they will be better prepared to meet this challenge.
- **Reduce the funding gap and make funding work harder in education and research** There is a significant funding gap in Europe compared to its major competitors. In simple terms, to close the funding gap with the USA, Europe would need to spend – on average – an additional EUR 10,000 per higher education student per year. However, the bulk of this would need to come from non-public sources, i.e. from households, industry and donations. To tackle this gap, Member States should adopt the target that within a decade total funding for a modernised higher education sector should not be less than 2% of GDP. Universities will not be able to make their full contribution to growth and to the Lisbon strategy with less. University financing should be comprehensible and transparent. It should be based on what universities do and not what they are. Universities should take greater responsibility for their own long-term financial sustainability, through working with industry, foundations and other private sources. Member States should critically examine their current model of student finance and support for efficiency and equity.
- **Enhance interdisciplinarity and transdisciplinarity** Teaching and research agendas should reflect new developments in existing fields and emerging areas of inquiry. This will require an approach that brings together various disciplines that have an impact on a specific research domain, for example renewable energy or nanotechnology. It would also imply closer links between related or complementary fields, such as humanities, social sciences or business studies. This necessarily implies a more open approach to staff management, evaluation and funding criteria, teaching, curricula and research.
- **Activate knowledge through interaction with society** As Europe moves towards becoming a knowledge society, society in general needs to be a part of the process. Therefore universities should consider how they interact with the society within which they operate, whether locally, regionally or nationally. This can be done through greater emphasis on lifelong learning, but also by communication through open door days, placements, forums for dialogue and community service.
- **Acknowledge and reward excellence at the highest level** All Member States should review their provision at postgraduate levels (master and doctorate, including postdoctoral opportunities) and the disciplines concerned, in the light of their strategic objectives for higher education, research and innovation in the national and European context. In this way, each univer-

sity would be encouraged to identify a limited number of fields where it can achieve excellence. Financial support should be made available at European level to develop excellence at graduate/doctoral schools and networks meeting key criteria such as:
- critical mass,
- trans- and inter-disciplinarity,
- a strong European dimension,
- backing from regional/national authorities and from industry,
- identified and recognised areas of excellence, and
- provision of post-doctoral opportunities.

Competition for excellence should be strengthened through the European Research Council: the European Research Council (ERC) will promote a European champions' league in "frontier research" by opening up competition among Europe's best and brightest.

- **Make the European Higher Education Area and the European Research Area more visible and attractive in the world** There should be serious effort to market European universities abroad. The Commission has begun this process, through the highly successful Erasmus Mundus and Marie-Curie programmes. Both are oversubscribed and should be expanded. A single Europe-wide internet portal already exists for researchers. A similar one should enable students to search across all EU countries to find and compare courses per specialisation, level and language (COM, 2006).

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Úloha vysokých škol při budování znalostní ekonomiky.

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Příspěvek je založen na využití Metodiky hodnocení znalostí (KAM) vyvinuté Institutem Světové banky za účelem ohodnocení připravenosti země konkurovat v prostředí znalostní ekonomiky. Na agregované úrovni jsou předmětem srovnávací analýzy Česká republika, USA a region Západní Evropa, který zahrnuje: Rakousko, Belgii, Kypr, Dánsko, Finsko, Řecko, Island, Irsko, Lucembursko, Nizozemsko, Norsko, Portugalsko, Španělsko, Švédsko a Švýcarsko. Toto srovnání na obecné úrovni je dále rozpracováno detailněji se zaměřením na oblast Vzdělávání a lidské zdroje – jeden z pilířů znalostní ekonomiky. Silné a slabé stránky každé země a regionu jsou posouzeny jak z hlediska dosažené úrovně v relevantních ukazatelích, tak z hlediska trendů vývoje v posledních deseti letech (s použitím dat za rok 1995 a nejnovějších dostupných). Česká republika prokazuje nejdynamičtější rozvoj v posledních 10 letech ve srovnání s USA i vybranými zeměmi západní Evropy, hodnoty jednotlivých agregovaných ukazatelů však nedosahují úrovně ani Spojených států a často ani vybraných zemí západní Evropy. V oblasti Vzdělávání a lidských zdrojů odhalilo hodnocení současného stavu silný potenciál pro rozvoj a přispění této oblasti k budování znalostní ekonomiky v České republice. Zjištěné analytické poznatky jsou v závěru konfrontovány s návrhy Evropské komise na podporu rozvoje Evropy znalostí.

znalostní ekonomika; metodika hodnocení znalostí; vysokoškolské vzdělávání; Česká republika

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