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# **EDUCATION—THE KEY TO THE FUTURE OF EUROPE**

## **Introduction**

The transition into the 21<sup>st</sup> century highlights not only a noticeable economic transformation, but also a societal one. Developmental trends in the global economy and demographic changes, indicate a transfer of developmental propensity towards countries of the “Pacific Rim”. It is increasingly clear that two new, giant entrants will soon enhance the group of developed nations: China and India, which, due to the size of their internal markets, can affect the world’s economic situation. They can do so in the near future, as well as influence global politics and culture.

Simultaneously, the end of the 20<sup>th</sup> century brought with it the increasing role of transnational corporations, whose existence and developmental strategies are increasingly removed from the widely understood political, social and economic situation, not only of those countries where the TNC’s are headquartered, but also those where the corporations operate their production and trading divisions. The global liberalisation of trade enhances such tendencies. Less and less countries opt for economic isolationism, with the most notable change in this approach being adopted by China where almost all of the Fortune 500 corporations have already located their production, service and trading divisions.

The role of the nation state is constantly being reduced, especially in the case of small and medium-sized countries. For many years Europe has been attempting to adapt to the new situation by increasing integration processes between the national economies of its member states. EU widening to 25 countries has brought a considerable expansion in the internal market and, in the perspective of a decade or so, should bring about a clear economic development impulse, not only for individual member states but also for the EU as a whole. Unfortunately, the positive long-term economic and political changes within the EU are under threat from the demographic changes, as all EU member states will experience a decline in their population numbers coupled with an unavoidable ageing of those that remain. Such a situation highlights the need for the EU to focus on the resources that form the basis for the Knowledge-based societies: people, especially those most talented and innovative, and on systems that educate and shape such people. It seems that in the current globalising economy combined with negative demographic trends, effective education systems and the organisation of scientific research will become the keys to sustaining Europe’s position in the world. Unfortunately, due to political reasons European education systems are egalitarian in nature, while the dominant political doctrine is the democratic access to knowledge and equality for all academic institutions. At the same time, modern times are times when those

most talented are vital for science and the economy. What should be done in Europe so that the tradition of equality isn't compromised, yet those most gifted are effectively selected, educated and offered conditions in which they can utilise their talent in the service of the nation state?

What should be done to draw in, just like in the USA, those most talented individuals from the rest of the world, so that they would see Europe as a place in which to realise their scientific and economic ambitions?

## Europe in the changing world

The current organisational solutions in European science, systems of promoting young scientists and ways of funding scientific research force the most gifted, ambitious and young European scientists to seek better fortunes in American universities.

Over the last century, Europe has persistently lost its hegemonic status, and done so in all of the most important areas of human activity: political, social, cultural, economic or that of scientific research. We can make an analogy to the times of the Roman Empire. Greece as an area, which just recently dominated the world was losing its importance, Greek cities were crumbling, the Greek fleet was non-existent, and primitive farming was re-emerging as the primary mode of survival. While the state crumbled, Greek culture spread across the ancient world carrying forth its amazing achievements in philosophy, mathematics and literature. Today, our modern world, just like its Roman equivalent, has accepted, transformed and developed the greatest achievements of European civilisation, including the institution of the University and scientific research, while Europe as a whole is beginning to lose its place as a political, military, cultural and economic power.

It is difficult to tell an enlightened European, who can look back on a glorious past, that we can easily envisage a world without the considerable influence of geographic Europe. It is easy to create a script, where Europe joins the global periphery. To illustrate Europe's declining role in world economic affairs, we can draw on much data<sup>1</sup>, but the exercise would be pointless—we treat this process as fact visible to all who engage in analysing the present and future.

If we assume that, in the 21<sup>st</sup> century the world's development will depend on the Knowledge-Based Economy, then the expansion of scientific research, or widely-defined, the production of knowledge and its application, will be the fundamental way in which corporations or countries will acquire supremacy or at least a sizeable portion in the global division of the results of human economic activity<sup>2</sup>.

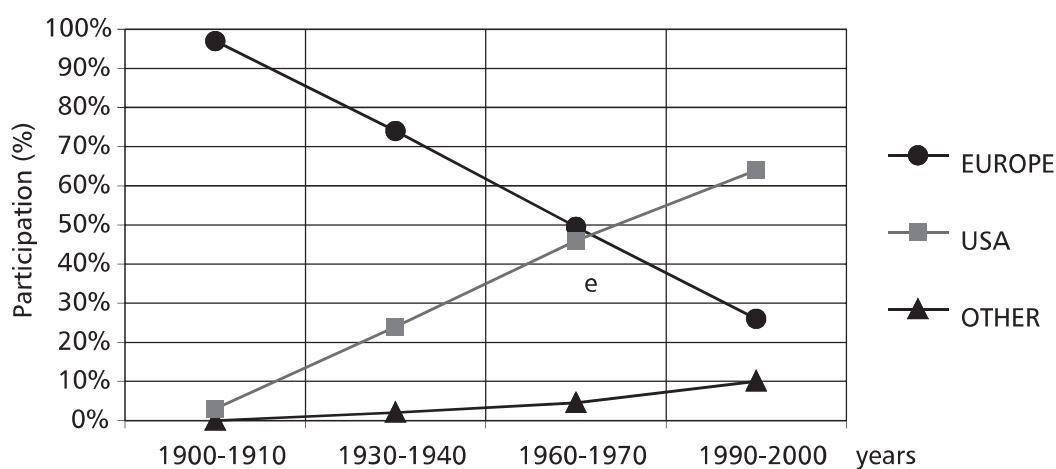
To illustrate the level of scientific research development in a given country we can utilise a variety of data or synthetic indicators. This work proposes to use the simplest of them all, which clearly illustrates the position in the global race for scientific dominance—the percentage of the entire number of Nobel Prize laureates (excluding the Peace and Literature prizes), generated in 10-year periods by Europe, the United States and the rest of the world.

<sup>1</sup> Kennedy, P. (1989), *The Rise and Fall of the Great Powers*, New York: Vintage Books; Huntington, S. P. (1996), *The Clash of Civilisations and the Remaking of World Order*, New York: Simon & Schuster; Oswald, S., (1991), *The Decline of the West*, New York: Oxford University Press.

<sup>2</sup> Read: Kleer, J., Liberska, B., Kukliński, A., (et al), (1998), *Globalizacja gospodarki światowej, a integracja regionalna. Konsekwencja dla Polski*, Warszawa: Komitet Prognoz „Polska w XXI wieku” przy Prezydium PAN, Dom Wydawniczy ELIPSA; Bożyk, P., (et al), (1999), *Jaka przyszłość Europy?*, Warszawa: Komitet Prognoz „Polska w XXI wieku” przy Prezydium PAN, Dom Wydawniczy ELIPSA; Jałowiecki B. (2000), Brukselskie scenariusze dla Europy, in: *Strategia rozwoju Polski do roku 2020, Vol. 2, Studia eksperckie na temat 20-lecia 2001–2020*, Warszawa: Komitet Prognoz „Polska 2000 Plus” przy Prezydium PAN, Dom Wydawniczy ELIPSA, p. 164–181.

The process of globalisation and the development of the Knowledge-Based Economy will boost the role of world leaders—corporations and countries that have direct access to research data and its applications in the shortest possible time frame. The winners will be those, who can create the best systemic conditions for the conduct of science and for utilising the results of scientific research and who acquire the best scientists. That is the reason why the number of Nobel Prize winners working in a given country is a clear illustration of the country's scientific potential, and thus its developmental opportunities.<sup>3</sup>

**Pic.1. Percentile participation by nation in Nobel Prizes awarded between 1900-2000**



Source: Own analysis, based on data from [www.nobel.se](http://www.nobel.se)

The data speaks for itself, and should provide the necessary impulse for Europe to initiate special actions. The number of Nobel prizes awarded to Europeans has declined from nearly 100% to 26% in the 1990's while the number of Nobel Prizes awarded to scientists working in the USA has exploded from 3% to over 60% in the same period. The number of Nobel prizes awarded to scientists from outside Europe and the US is also steadily rising. Of course we could delude ourselves that, when looked upon in absolute values, the decline is much smaller because we still generate over a third of the laureates and six of the American laureates in the 1990's came from Europe<sup>4</sup>. But such explanations only weaken the message emanating from the graph above, especially when we extrapolate the European decline into the future, even if we assume a relative slowdown of the process. The message is stunning: should the decline in the number of Nobel Prize laureates living and working in Europe persist, after 2030 the number of Prizes awarded to the Continent ought to be marginal. The data presented is a shocking signal of Europe's possible marginalisation in one of the crucial areas of human activity—the development of science.

<sup>3</sup> To simplify the analysis, numbers of laureates have been partitioned into 10-year periods: 1900–09, 1930–39, 1960–69, 1990–99, and those are the periods of relative stability in crucial areas of the world (therefore the decades following both World Wars and the periods of turbulence that followed have been omitted).

<sup>4</sup> Detailed data about the Nobel Prizes awarded in various areas can be found in: Braun T., Szabadi-Peresztegi Z., Kovacs-Nemeth, E., (2003), No-bells for ambiguous or ranked Nobelists as science indicators of national merit in physics, chemistry and medicine 1991–2001, *Scientometrics*, vol. 56, no 1, p. 3–28

## What the data says and why American universities are the best

The Nobel Prize data presented above, illustrates the increasing lead that American science has over its continental European counterpart. To avoid any accusations of one-sidedness it is necessary to quote additional data from B. Clark's "Places of Inquiry"<sup>5</sup>. The US economy has roughly 25% of global GDP, but American share of the global expenditure on R&D amounts to 38%. Also, 38% of scientific publications originate in the US, but the share of index citations is over 50%<sup>6</sup>. In various disciplines, 18–20 US universities are places in the global top 25, while the top 10 is traditionally dominated by 8–9 of them. In the "electrical engineering" top 25 category, 20 universities are US-based, 4 in the UK and 1 in Japan. In the "economics" top 25, 21 universities are US-based, 2 in the UK and 2 in Israel. New inventions and achievements originate from the US: 72% of all new business methods based on the use of Internet originated from America<sup>7</sup>, while US corporations were responsible for 60% of the top 100 innovations made between 1945 and 1970<sup>8</sup>. Despite the fact that biomedical R&D is conducted all over the world, 75% of all biotechnology pharmaceutical patents emerge in the US<sup>9</sup>. American domination is clearly visible in the area of organising and funding scientific research: 89% of global venture capital belongs to US investors, while half of the 17 well-known innovation centres<sup>10</sup> are located in the US (Silicon Valley and Boston Route 128 are the most famous)<sup>11</sup>. When quoting such data we have to remember that the USA never achieved the level of R&D expenditure that the European Union has it eyes upon—3% GDP. The US case shows that excessive funding is not enough and that effective systemic solutions are needed. The US economy has retained the status of the world's most dynamic economy, and over the last 50 years has increased GDP per capita by 2.5 times, despite the fact that it spent less than 3% GDP on R&D over this lengthy period.

A different argument illustrates the dominance of American higher education: in 2000/2001, there were 23 705 American students in Europe, whereas the US hosted over 80 000 Europeans<sup>12</sup>. But if we consider the overall population size and recalculate the data the US-Europe ratio would be even higher. If we recalculate the number of European students relative to 1 million US citizens, we receive 295, whereas there are 49 Americans for every 1 million European citizens (six times less). It is appropriate to point out that a decision to undertake study in the US also means the need to fund ones study, the costs of which are much higher than comparative study at even the most expensive European institutions.

If we assume that top research universities in the US are the current world reference, we should ponder upon what differentiates them from European institutions.

<sup>5</sup> Clark, B.R., (1995), *Places of Inquiry: Research and Advanced Education in Modern Universities*, Berkeley: University of California Press, p. 139.

<sup>6</sup> JSI data for 1991–2000. *ibid.*

<sup>7</sup> NSF, (2002), *Science and Engineering Indicators 2002*, Arlington, Da; Washington, DC: National Science Foundation.

<sup>8</sup> OECD, (1970), *Gaps in Technology: comparisons between member countries in education, research and development, technological innovation, international economic exchanges*, OECD.

<sup>9</sup> Porter, M.E., Schwab, K., Sachs, J., (et al), (2002), National Innovation Capacity, in: *The Global Competitiveness Report 2001–2002: World Economic Forum, Geneva, Switzerland, 2001*, New York: Oxford University Press p. 24.

<sup>10</sup> Manuel Castells calls these centres „technopolis sites”, in: Castells, M., Hall, P., (1994), *Technopolis of the World: the making of twenty-first century industrial complexes*, London, New York: Routledge.

<sup>11</sup> UNDP, (2001), *Human Development Report 2001: Making New Technology Work For Human Development*, New York p. 32–34.

<sup>12</sup> OECD, (2001), *Number of foreign students in tertiary education by country of origin and country of destination*, electronic document: [www.oecd.org](http://www.oecd.org), table C3.5; OECD, (2002), *Foreign students enrolled in institution of higher education in the United States and outlying areas, by continent, region, and selected countries of origin:1980–81 to 2000–01*, electronic document: <http://www.opendoorweb.org>, table 415.

The Author's experience in creating and managing a higher education institution, situated on the crossroads of two cultures and education systems—Polish and American—allows for the formulation of five major factors that differentiate US universities:

1. Effective and professional management;
2. A shortening of the journey to scientific and academic independence of staff;
3. Financial and organisational stability;
4. Focusing research funding (both public and private) on the best research teams;
5. An academic atmosphere where scientists and students coexist; that situation creates attitudes and character;
6. A much stronger relationship with the surrounding environment, especially with the economy.

## **Proposed changes to the European system**

One of the most important characteristics of the American higher education system is its internal differentiation. Alongside top research universities—where those most talented, and often the richest, are educated, where Nobel Prize laureates and/or candidates conduct scientific research—there is also a sea of colleges and universities whose primary mission is education. The education system is analysed through a variety of rankings, which allow the prospective student and academic to find an institution best suited to their needs and capabilities. Simultaneously, the American system allows for the progression of students and staff to better and better universities in line with their career objectives and abilities.

The European higher education system, especially the Continental one, due to the incorrectly understood equality in access to funding, “dilutes” public financial support, which still remains the dominant form of university funding, equally across all universities. This is undoubtedly one of the fundamental reasons why there haven't appeared any European elite research universities capable of competing with the best American and British research institutions.

The model presented below shows the proposed changes in national education systems, which focus on:

- A. The creation of conditions for the emergence in individual EU member states of research universities capable of competing with the world leaders, that can be achieved via funding and organisational methods;
- B. The creation of a system for staff development at the highest level, that are necessary for effective and efficient national governance;
- C. The identification and selection of scientific talent at the university entry level, followed by the creation of opportunities for conducting scientific research at European universities, while retaining the rule of equality of access to education.

In the system outlined below, the Author attempts to combine the best American solutions with European values.

Fundamental assumptions of the proposed new higher education system are as follows:

1. The best universities selected by the government, receive funds for accepted students onto “competency” programmes lasting 5 years, yet each year there is a public verification process of elite-creating institutions. Universities or Faculties that lower their standards will be denied follow-on contracts, while their place is taken by new entities that have raised their education standards to the appropriate level. This system assures competitiveness and enforces the sustaining or enhancement of educational quality. Governmental contracts for elite education are signed with institutions regardless of their status, i.e. private or state-owned.

2. The government decides about the scale of competency-based special scholarships based on current demand and financial resources. We can assume that such scholarships will cover 5% of all students accepted onto the 1<sup>st</sup> year in most nations to 10% in the richest countries. This approach is based on the solutions applied in French Grand-Ecole's, but doesn't freeze the process into an elite-educating programme, seeing that places are accessible only after passing a stringent selection process. Five faculties/universities leading in each teaching area would function within this system, allowing for the dispersion of "special" students amongst them so that a monopoly never arises at a single institution.
3. The remaining 95% candidates study for free during the 1<sup>st</sup> year, which retains the principle of democratic access to higher education. Individual institutions define intake limits and set entry criteria, for example additional entry exams.
4. From their 2<sup>nd</sup> year, all students learning on normal terms pay tuition whose minimal amount is defined by the government and the maximum amount by the university, taking under consideration the real costs of study on a specific programme or faculty. The government transfers to all universities (private and state-owned) a standard amount of funds per student, via an "education coupon" or by an algorithm, as well as covering the operational costs of state universities like investments, renovations, fixed and administrative costs, and internal research. When retaking a year, students pay a much higher tuition, which ought to cover the full cost of studying.
5. National and local governments create scholarship systems permitting the awarding of funding based on study results as well as awarding social/poverty scholarships that cover the tuition and study costs for students originating from poorer families.
6. The national government, through a special fund, covers the cost of doctoral studies, but also awards high scholarships to the most gifted doctoral students, so that they become tied to the European universities and consider remaining there to undertake scientific careers.

The nature of the proposed funding and organisation system is based on:

- Moving away from tuition-free studies for all students;
- Introducing a rule where only the state carries the financial burden of study for those most gifted students and doctoral researchers, simultaneously strengthening European universities so that they could compete with the best institutions in the world.

Detailed solutions regarding the new system of funding and organisation of higher education for a specific country—Poland—have been explained in a previously published book<sup>13</sup>.

The proposed system foresees a much higher than standard funding for competency-based studies and doctoral programmes from the state budget. Such a solution should gradually, within a decade or so, strengthen the best Faculties and universities, in terms of money and people, which conduct competency and doctoral programmes. Additional public funding for education will permit hiring of increasingly better academic and scientific staff and bring about the return of the highly individualised Master-Apprentice relationship. If this system will be accompanied by a well-prepared system of research grants, then gradually, the best will be visibly strengthened—those institutions that best find their way in the new conditions—and as a result gain much needed international competitiveness.

An important part of the system must be its openness and the introduction of permanent competition for access to additional funding. Every several years (5–7) universities should undergo external evaluation by validation committees, while a special national-level accreditation organisation would maintain an official ranking of Faculties conducting competency and doctoral

<sup>13</sup> Pawłowski, K., (2004), *Spółczesność wiedzy—szansa dla Polski*, Znak, Krakow

programmes. The weakest and lowest-ranked institution would lose its license to the strongest of the Faculties applying for the right to conduct competency and doctoral programmes that would be additionally funded from public sources.

A very important part of American and British university dominance is their ability to draw in students from the rest of the world, especially for their doctoral programmes. It is obvious that such people strengthen the scientific potential of those universities where they undertake studies. US and British universities have a fundamental advantage: they offer programmes in the most popular global language, English. Yet, there is no financial barrier to the creation of a European network of universities offering all, or their best, programmes taught in English. Such a network would not only enhance much desired staff and student mobility within the EU, but would also draw in students from elsewhere, especially in a situation where they would be able to continue their studies in a series of universities operating in different EU member states. Tentative steps are being taken in this direction within the framework of the Socrates-Mundus programme, but on a small scale and with the simultaneous retention of programmes operated in national languages.

One of the reasons for the superiority of American universities over their European counterparts is the high mobility of researchers and academics and the relative ease of their employment and firing. Most European states are still dominated by the mentality promoting permanent employment of people who have been awarded the state professorship, regardless of their professional activity. In the American system, a professorship is tied to the institution and the percentage of people being awarded tenure is clearly lower, while the evaluation of academic and scientific activity is much stricter. As a result, there is increased competitiveness between staff employed by American universities, which, when looked at through the prism of final results, clearly has an effect on the quality of work.

When analysing the staffing policy of European universities their over-socialisation is clearly visible. A popular model (virtually undoable in the USA) is one where a person's entire professional development is conducted within the confines of a single Department: from a student, through doctoral study all the way to the state-awarded professorship. Such a system in no way enhances effective staff selection nor stimulates the generation of conditions helpful in maximising the effects of conducted research and its application.

## Conclusion

Education, in its widest sense—from primary school, through university, all the way to continuous learning—is becoming the key to the future for all societies.

This notion seems obvious, but maybe it is worth recalling the arguments in its support:

1. A good education system creates people capable of creative and innovative application of knowledge.
2. A good higher education system boosts the development of scientific research and its application in the economy.
3. An open and effective education system maximises value added—it is not only the increase of knowledge in the minds of those being educated, but also of abilities to utilise it, both amongst those most gifted as well as all participants within the education process.
4. A good education system, in the long run, brings with it social behaviours that can bring about the emergence of an innovative Knowledge-based society.

Only an innovative Knowledge-based Society is capable of creating and innovative and competitive economy. Only an economy capable of constant competition with the best in the

approaching world, combined with an entrepreneurial, mobile and innovative KBS can help Europe regain its competitiveness and thus become a global actor in the 21<sup>st</sup> century.

European politicians, still dreaming of realising the Lisbon Strategy, are left with implementing the decision to introduce a series of reforms into the European academic world, including those most fundamental—introducing competition and the concentration of funding for research and university development in the best institutions.

The reward is not only the position of the European academic establishment in the race for global leadership but also something much more important—the position of the European economy in the global competitive system and the chance to acquire the potential to effectively compete with the best.

Reforms are difficult to implement, because they go opposite to the centuries-old traditions of academic autonomy and overturn politically correct notions of equal access to higher education. Yet, without them, the goals set in the Lisbon Strategy will remain forever on the horizon, possibly a horizon moving further and further away.