ON THE PHILOSOPHY, HISTORY AND MANAGEMENT OF QUALITY IN EDUCATION

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The Financing of Higher Education

The financing of the education system is the state's key tool to simultaneously support and control education, proven by the experiences of all developed countries. The competition-based financing of higher education and post-secondary education institutions by the state lies at the root of the principle "let each take the place it is worthy of."

The mechanism that was used until recently in Azerbaijan for financing education institutions by the state absolutely didn't meet the modern trends; it didn't serve the development of education institutions according to their excellence, and to tell the truth, it impeded this development. The current mechanism for financing, in combination with an over-centralized governance policy, is not encouraging free competition inside the country or internationally.

All state education institutions get their "share" of state funding, regardless of the education they provide, its quality, or its results. In reality, it would be better if the government directly aided those students who successfully passed the admission exam held by the State Student Admission Commission or equivalent examinations upon finishing secondary school (instead of directly financing the higher education, and in general, post-secondary, institutions). To that end, successful applicants would receive their share from the state budget, then forward it to the institution at which they chose to study. In this scenario, all interested parties would benefit. The state would be able, without raising costs, to distribute funds among the various education institutions fairly, and the institutions would endeavor to increase their quality in order to attract students with government scholarships. In this way, the private educational institutions also would be able to get the assistance they deserve from the state. Those who are eager to get a bona fide education could enter any university or college they wished with enthusiasm, instead of entering an institution which they were obliged to choose mainly because of free tuition fee or a low cost.

> *The government has not developed a student loan program (although it has now become a subject of discussion!). A small number of private banks have tried to introduce student loan programs. Unfortunately, their conditions are too demanding for students.*

> *In 1994, the Azerbaijani Government (namely, President of Azerbaijan) decided, for the first time in the country, to introduce tuition fees for state higher education and for other post-secondary institutions as a key cost-recovery measure. The main reason for this was the government's inability to finance these institutions at the required level. Thus, in terms of covering student expenses, the education sector, with its student body, was divided into three parts: 1) students who are quite successful in centralized entrance exams to state education institutions receive full scholarships from the government; that is, the government covers tuition fees and additionally supports students' daily expenses (in the form of monthly stipends); 2) students admitted to state educational institutions with low grades have to pay tuition fees; 3) students admitted to private institutions have to pay tuition fees, higher in general than those paid by fellow students in state institutions. A few private universities have had (and still have) scholarships, mostly merit-based, and some need-based tuition waivers. Thus the sources of financing (and, influencing them, methods of management) of institutions have diversified* [6].
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> *Until early 2000, private higher education institutions had the freedom to introduce their own student admission and cost-recovery policies; most of them succeeded in these tasks.*

In addition to financing students admitted, each education institution should be given a certain amount directly from the state budget in the form of grants for well-prepared and presented proposals (so-called, the core monetary), amount of which would be determined by an independent accreditation agency, or at least some influential state agency. The third source of financing, in addition to these state per capita scholarships and core amount, should be resources received from national and international funds for research and development projects. Finally, any capital donated to a university or college as a gift, which could be transformed into the endowment of the educational institution, would be a vital source of income and future investment.

> *The competition-based financing of post-secondary education by the state, at least for higher education, has been a subject of discussion during at least the last several yeas among the responsible government agencies and other stakeholders (including the author of this article).*
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> *Recently (10 February, 2010), the President of Azerbaijan has issued a decree on per-capita financing of higher education institutions including private ones. But it is not clear for all parties and stakeholders (i.e. ministries and other government agencies, higher education institutions) how this decree will be implemented. The Council of Ministers was not able to offer a good mechanism for per capita financing in spite of the fact that it was delegated to this Council according to the*

> *abovementioned presidential decree. Following the precedent set by similar cases in the past, most likely some official will decide on temporary rules for per capita financing and on the amount of this scholarship. In any case, two concerns have become clear from the beginning of this process: leaders of higher education institutions are left outside of this game, and the per capita amount will be much less than the regular tuition fees of private universities.*

In the last decade in some non-western countries, another type of support for higher education has come from the state budget for development-oriented programs, particularly the financing of a limited number of selected institutions in order to expand scientific research, partnerships, the enlargement of physical facilities, etc.

During 2002-2004, a Japanese university reform program considered competition-based financing of selected national, public, and private higher education institutions in proportion to the results they achieved in external competitive evaluations. At the same time, the decision was made to reduce the state operational grant to national universities each year by a certain percentage (1%, excepting faculty salaries) [16].

In 2006, a competition was held among Russian higher education institutions. As a result, 17 of them were declared first-degree winners and 40 - second-degree winners. Each of these institutions was awarded financial assistance for two years in set amounts from $8 million to $40 million. These funds were allocated towards scientific research projects, equipment purchases, and sending faculty to leading foreign universities for training [17].

The Chinese government declared a new program in 1998 to establish a certain number of world-class universities in China. Universities that were distinguished according to the final evaluation received a large amount of financial assistance from the government, with the top 9 receiving exceptional support [18].

It must be noted that those who consider the financing of higher education mainly the state responsibility are a small minority. In the USA, approximately 25% of financial resources comes from the state governments, 20% comes from the central government, and 55 % comes from the private sector (including support from corporations, charities, and tuition fees). This balance is shifting towards the private sector. Total government assistance to some research-oriented public universities in the US comprises 20-25% of their total financing or even less [4], [1].

This phenomenon has created some negative tendencies as well. Many universities are raising tuition fees, it seems, unproportional to quality enhancement of the education they provide and unproportional to household incomes` increase.

At present some larger, paid-education public universities in Azerbaijan receive about one third of their budget in the form of student tuition fees and the rest from the state budget. Of course, circumstances depend on the ability of state institutions

to profit from their tuition; likewise, the level of tuition depends on many factors, such as fields of study, the reputation of the institution, its location, quality of programs, existence of interesting international programs, state education policy, etc. The percentage of paid students varies from institution to institution and from major to major [6].

During the six years from 2003 to 2009, in absolute terms, public expenditure for the education system in Azerbaijan has increased six times in total. It is now 10.1% of the whole budget. High growth in the economy (over the past few years the highest in the world), with the lucrative production of oil, has enabled the increase in public expenditure. At the same time, public expenditure as a percentage of GDP indicates a low rate in Azerbaijan, close to Georgia and Armenia but less than that of most countries [19], see. pp.53-54.

Total public expenditure on education per student as a percentage of GDP per capita leaves much to be desired and has quite a different dynamic from the positive trend in GDP per capita itself.

In spite of these lower rates, the years 2008 and 2009 saw some improvements in public spending in the education sector; one can interpret this advance as a desirable turning point.

Higher Education and Research

Unfortunately, growth and development in the economy of Azerbaijan isn't felt in the field of scientific research. The demand for scientific research has weakened in the process of the Soviet Union's disintegration, and the new demand has not yet grown to a high enough level. Many scholars who developed their research ability and capacity during the Soviet times have become aged, and the new generation of researchers isn't gaining maturity through serious scientific schools. Many scholars working in research institutes and universities aren't engaged in real scientific research at all; rather, at least a number of them are involved in superficial studies that are conducted just for show, resulting in publication in weak local periodicals or transactions. That is to say, the majority of current publicized research activity isn't true research at all; in reality, it reflects a provincial approach to scientific research.

The development of modern, science-based high technologies and the modern economy's shift into a knowledge economy have tremendously elevated the role of scientific research in the development of society. Since the mission of many higher learning institutions is, first of all, to create new knowledge through research (or at least, so they declare to the public and to stakeholders), this research activity must be evaluated in more or less acceptable ways. For instance, recognition of scholars`

work by influential academies, professional associations and prominent awarding bodies can be considered a sign of associated research.

International evaluation of teaching quality will be quite complicated and may even be controversial. It must be noted that scientific research, unlike the teaching process, can be evaluated, to a certain degree, objectively. For this reason, the capacity for scientific research can be used as a major benchmark in the worldwide comparison of higher education institutions, particularly in global rankings of higher education and research institutions. The power and the rank of scientific research, and especially the influence of said research in the fields of science, engineering and technology, can be measured by responses to articles based on this research and published in authoritative journals; in particular, the number and quality of citations related to these articles in other publications during a given period are the main indicators of the value of this research. Though this quantitative indicator isn't completely flawless, it has been adopted by the world scientific society (or by a majority of scholars) as a measure of an article's success, and it seems to be an accurate reflection of intellectual power (Phenomenon: can quality be judged via good-quality quantitative factors!?). The evaluation of capacity and excellence of universities, colleges and other research institutions according to international citation indexes such as the SCI (Science Citation Index), SSCI (Social Sciences Citation Index), and A&HCI (Arts and Humanities Citation Index) are familiar to all those in scientific-education circles.

> *According to citation index indicators, Azerbaijan lags behind developed countries and behind its neighboring countries (for discussion and some comparison details see* [1]).

The vast flow of knowledge to developed countries, of which the USA is the leader, strengthens one group through "brain gain" and impoverishes the other group from the viewpoint of "brain drain." Many Azerbaijani scientists and qualified experts in humanities and social studies work abroad, teaching, doing research, publishing articles and giving other benefits in the name of their institutions. In general, it is impossible to stop this tendency. But even a small number of distinguished universities and other institutions in developing countries could work on turning this brain drain into brain circulation.

The backwardness of the country has all but excluded it from cutting-edge fields that will have an impact on global life in the future, such as nanotechnology, bio-medical technology, and the genome project. To make new contributions to these fields would require active and energetic scientific schools and organizational/ financial power. The simplest task set before many countries, including Azerbaijan, is to be aware of what is happening in the world in these technological fields, and if it is possible, to use these findings and achievements to its own advantage; that is, short of contributing to these fields, at least to be aware of their developments, and try to benefit from them.

The strengthening of scientific research in higher education and grassroots transformation of the system of the Academy of Sciences is one of the urgent matters of scientific-educational reforms. The problem won't be solved by making the employees of the Academy of Sciences younger, by cutting staff and researchers, or by extorting extra money from the government. The reanimation of the Academy of Sciences, while maintaining its current substance and form, is impossible. In general, its Soviet-style breadth of research subject areas and methods of financing a large number of scientific research institutions with government money do not reflect modern tendencies in the development of science, technology, or education and their relations with government. A few scientists in the National Academy of Sciences of Azerbaijan (NASA) carry out active research, but most of them work there because of connections with others and, to tell the truth, because of the mercy of the government. In many cases aged scholars who were not very successful in research activity in Soviet times are now receiving the rank of membership in this Academy (becoming so-called "academicians"); it is a poor "success" story for NASA for certain…

When evaluating the way those research and education fields use finances (state funded principal), it is important to note to what degree financing is used effectively, not just to evaluate its net value quantitatively. Let's also remember once more that in developed countries, the majority of scientific research is financed not by the state but by corporations. Corporations try to invest capital in science because innovation and the discovery of advanced technologies is closely connected with scientific research. It is natural that corporations supporting research activities demand high standards and want to see research carried out in the directions in which technology is developing.

It is crucial to be engaged in serious reforms in developing countries that will take into account international experience in research and education as well as a research and development strategy based on a knowledge economy. Research at NASA is not advanced and furthermore, for the most part, isn't applied research, and that is why is not attractive from the industry/business and innovation points of view. Unconditional state funding in this case is surely an undeserved luxury…

With great certainty we can say that the only acceptable way to fund science is through a competition-based grant awarding system that will provide funds for predetermined scientific fields to implement projects which meet high standards. To discuss this idea and bring it to fruition would freshly stimulate the rebuilding of NASA, to transform it from its current state as a net of huge scientific institutions (judging by the number of employees) to a smaller net of research centers receiving project- and competition-based grants. It would be a decisive step in the renovation of the science-education sector in content and form if higher education institutions and research institutions under NASA were brought together and integrated (what form their merger should take is a topic for a separate discussion). One more reasonable step in the administration of research and

education areas would be transforming the Ministry of Education into the Ministry of Research (Science) and Education. Just for interest's sake, let's note this ministry's counterpart in Japan: Ministry of Education, Culture, Sports, Science and Technology.

The present system of centralized approval of scientific research degrees (candidate of science – now PhD and doctor of science degrees) by the Higher Attestation Committee can be considered archaic. In neighboring Georgia this system has been totally abolished. Awarding advanced degrees is the job and the responsibility of the higher education and research institution itself. Quality can't be achieved by holding on to archaic systems; on the contrary, in this case universities and other research institutions neglect their own responsibilities. In reality, the activity of the Higher Attestation Committee is just another link in the chain of corruption.

An attempt to effect a complete renovation and set up quality mechanisms will yield positive results in the quality of education and research, in merging universities with the Academy of Science, in the advanced degree awarding system, in governance and in management.

Higher Education Institutions and Labor Market

The scientific and practical sides of the relationship between the labor market demand and training specialists with higher education have not been sufficiently studied in Azerbaijan. For this matter it is essential to investigate the capacity of higher learning and research institutions as well as the country's needs. Universities and colleges must be considered from different viewpoints, such as the situation with respect to the quality and capacity of research, teaching, resources and facilities, dynamics of development, favorable career fields, etc. In planning for admission to the first degree as well as advanced degree programs by the government, it is important to take into consideration many factors such as the strategy of the development of regions, the dynamics of opening new work places, and the employment capacity of different sectors.

At the same time, all the above circumstances must not be considered absolute. The knowledge economy is full of innovations, the place and the role of different fields change, and new and interesting combinations appear among the different fields. In addition, globalization causes the flow of specialists from one place to another (including brain circulation, brain-drain, and brain-gain); we live in a period where there is an abundance of desires and opportunities to set up businesses in different countries. Specialists trained in any country can work, in general, in any part of the world.

The Industry/Business World, High-Tech Development and Higher Education

Info-bio-nano-technologies! The collaboration of higher education institutions and the industry/business world is the main force drawing mankind forward! University-business/industry relations give the opportunity to synthesize the solutions of applied and fundamental problems. This alliance seeks new scientific discoveries, finds their applications, and takes them into the business world by putting an idea into practice.

Is there any corridor joining the strong research-oriented university or institute with the industry-business world, and if there is, what is it? There are two links here. The small passageway is called the "incubator," whose target is to solve the problem of getting small businesses to apply scientific ideas and technologies, and successfully turn them into a company. The big passageway is called "Technology Park" or "Science Park," where the same type of work is done as in the "incubator," but on a greater scale and in more depth. The university or the institute (or its school, department) with innovative scientists and engineers can try to offer to take a role in the research and development division of corporations. The talented students who study in advanced degree programs do research here on the problems that arise in practice; at the same time they are attached to the business world. In the developing countries similar to Azerbaijan, little has been done in the incubator field, and no serious attempts have been made in tech-park building.

Universities have to be engines for economic development through human resources, acceleration of technology transfer, and through contribution to regional and national economies, with industrial and knowledge clusters and spin-offs. Recent progress in university-industry collaboration is illustrated by technology commercialization, the performance of university technology transfer offices, the amount of joint research and sponsored research with companies, numbers of spin-offs of universities, and other related examples. Spin-offs are children of two parents, namely universities and industry. Increasing worldwide and national-level competition among universities also requires usefulness and transferability of university research efforts.

A fine example of the relations between universities and the industry-business world comes from the USA and Japan. Let's look at the Japanese situation. The number of joint research projects was 1139 in 1991, and it rose to 9378 in 2004; the value of those contracts rose fivefold during that period [16].

University technology transfer offices, which can work on the patenting and licensing of inventions, should also work on the development of research and problem-solving partnerships with industries. The approval of adequate legislation to motivate university-business relations is a necessity and it is a duty of government. The Bayh-Dole Act in the USA (PL 96-517, Patent and Trademark Act Amendments of 1980) and the TLO Law with the so-called "HIRANUMA

Plan" in 2001 in Japan are brilliant examples of government policy that backs the strengthening of the university-industry relationship. They give universities an opportunity to hold ownership of inventions made under state-funded research and to share the royalties with inventors, encouraging commercialization of university research results. The following cumulative numbers of spin-offs of Japanese universities most aptly illuminate the power of scientific research in the business and industry stream:

1990……40
1995……101
1999……293
2000……430
2001……598
2004……1265
2006……1590

The Japanese government's "Science and Technology Basic Plan" Phase 2006-2010 lays out capacity development and infrastructure building to create a competitive environment for university -industry collaboration.

I express my gratitude to the Osaka and Nagoya universities' senior officials responsible for university-industry relations and technology transfer offices for their discussion of Japanese cases with me during my visit on 20-29 October 2009.

For another example of university-industry cooperation, let's look at the number of science-technology parks in Asia; China and Japan form the first group (92 and 71 accordingly), and others follow them: India – 36, S. Korea – 26, Israel – 23, Russia –16 [20].

Industry-university relations in some cases have a closer link in Far East countries, particularly in China, than in the West. Singapore is aiming to be the bio-medical research and higher education junction in Asia. Here between the years 1982 and 2000, about 300 technological companies were set up from the science park [21]. After the recent economic-financial crisis, both universities and industries must make the best possible use of the efficacy of the research and innovation abilities of scientists and engineers.

In Azerbaijan some universities have developed university-industry relations through short-term and long-term training programs, including in-service training for companies and corporations. In general, there is very little income-generating activity among universities, even none in most cases. University technology transfer offices have not yet been established in most universities in the Caucasus and Central Asia.

One collaboration model has been worked out with the participation of BP Exploration and Khazar University, Baku, Azerbaijan. We have called it the Triangle Education-Industry Model, proposing the participation of three parties: 1) Khazar University, 2) a company or corporation, 3) a research-oriented university or institute abroad, outside of the given country. The issues brought to the table by the company– for example, the carrying out of research, the organization of short training courses, or the education of the company's employees in master's programs in needed fields– are solved by the joint efforts of the two higher education institutions.

Each of these institutions can efficiently handle some of the issues put forth by the company on its own. Many problems are best solved with assistance of both institutions, maybe even in different degrees of participation. Examples of such problems are ensuring the timely availability of particular experts, applying long-distance learning, taking into account both local and international experiences, awarding diplomas, and so on. The company, in turn, contributes to the development of these institutions by providing new financial resources for faculty development and by giving scholarships to students during their study cycle. It also must be added that bringing together two universities and directing their research to real needs of the industry/business world and more stable fields are valuable endeavors for all three vertices/members of this triangle. One manifestation of this triangle model which initiated the collaboration of Khazar University, Heriot-Watt University and BP Exploration [22] was one of most highly praised projects in the 3rd Knowledge Economy Forum of the World Bank (Budapest, 23-26 March 2004).

The desire to establish "the truly global university, no longer constrained by space, time, monopolies or archaic laws, but rather responsive to the needs of a global knowledge society and unleashed by technology to empower and serve all of humankind" is noble! [4]. Along the way toward this goal, there are of course general obstacles, and some additional obstacles that apply to transition economies such as stereotypes, prejudices, and judging based on group averages rather than individually.

The need to work with teams, and sometimes rather big teams in the modern world, is a much more necessary form of research and innovation than it was before. The Information Technology Revolution has opened quite a new way of thinking, acting and living since 1990. Worldwide projects with worldwide participation have become a leading tendency of societal changes and involvements. One of the best worldwide projects is "Wikipedia," the virtual encyclopedia in which everybody can write, add and make corrections. This treasure has frequently been compared with the Encyclopædia Britannica. The scientific formality of the latter is sometimes claimed to give it decisive superiority. While this thinking probably has some reasonable basis, certainly it is not very much. Wikipedia's strengths of keeping up with the times and covering all topics imaginable are undoubtedly what give it superiority in today's world and give enough information to establish first

avenues of study. I cannot imagine now that there are more people using the Britannica than Google or Wikipedia.

Just for interest's sake, if we look up the subject of Azerbaijan and the Azerbaijani people in both of the encyclopedias, the result is vastly in favor of Wikipedia. First, the coverage of this subject matter is miserly in Britannica and also is not very accurate. The basic published edition shows the well-known Azerbaijani-Soviet composer Qara Qarayev (in other forms: Gara Garayev, Kara Karayev) as an Armenian composer (?).

Information technologies are the power changing society, replacing and renewing the old ways of doing things. The Internet world freed humans, different organizations, people and states from the curse of isolation. Whatever you want for all to read, see, hear and be well-informed about, please write, show, and place into the advertising blackboard of the world that the Internet has become. Now we can bravely speak about the electronic union of the world.

The cooperation of the business world, industry, higher education and research institutions, and the state is the fundament for a knowledge economy, as well as for development of a nation, country and people!

Higher Education and Wealth

Wealth and higher education institutions! Diogenes Laërtius writes in his work *Lives and Opinions of Eminent Philosophers* that someone asked Aristippus, a student of Socrates: why don't rich people visit scholars, but the scholars go to rich people? Aristippus answered that rich people probably can't appreciate science and philosophy, but the scholars are able to appreciate wealth. This statement is an apt introduction to the current condition of the higher education and wealth alliance. At present, the relation between science and wealth is a problem of considerable magnitude.

Great financial capacity is needed to develop university and college libraries, laboratories, and campuses so that they can gain power to improve their own research and innovation capacities. It is impossible to fill this need with just student tuition fees which is the case, for example, in many higher learning institutions in post-Soviet countries. Universities and colleges in developed and some developing nations receive financial support from national and international corporations, donations from successful graduates and other people, and some amount of state help.

The extraordinary idea of corporate and individual sponsorship of education and research has spread mostly in the United States, and it has turned into one of the principal means of strengthening American higher education. In Europe, and

especially Great Britain, similar kinds of giving also play a great role. Though the rich and open-handed people in Azerbaijan are ready to spend much money on pleasure, they are, in general, not inclined to spend money for the education of bright students, to support the establishment or advancement of laboratories, or to assist in the construction of buildings for universities. At the same time, for fairness's sake, we have to indicate that universities here also lack the culture of asking and soliciting capability.

The power of the leading higher education institutions in the world is almost proportional to their endowment. As of June 30, 2007, Harvard University's endowment was $34.9 billion, Yale - $22.5 billion, Stanford – $17.2 billion, Princeton - $15.8 billion, University of Texas - $14.4 billion, and Massachusetts Institute of Technology (MIT) - $10 billion. The endowment of Harvard is more than the sum of the endowments of all public universities in the USA. Thus, Harvard has the opportunity to engage in financial activities like a bank [23], [1]. Let's look at one outcome of this wealth: the number of articles that three American Universities - Harvard, Yale and MIT- published in scientific and technical SCI, SSCI, and A&HCI journals is more than the total number of similar articles that all Russia has published.

The well-known research-oriented universities are more concerned with increasing their endowment than increasing their enrollment! A similar comparison reveals the same trend among top corporations [24].

Universities are organizations which create wealth as they grow out of their solid roots in the knowledge economy, but they are also in need of wealth for their development. One of the most needed changes in countries like Azerbaijan is to give tax concessions to companies, holdings, and corporations in order to motivate them to support the development of research and educational establishments.

(To be continued)

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