

International integration as the external factor of scientific and educational potential realization for regional engineering higher schools

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Abstract

Educational reforms implementing in former Soviet countries often take place in isolation from the need of society innovative development. But on the establishment of innovative national educational system and its foundations - the higher educational and scientific institutions, depends the success of not only education reform, but social progress in general. However, for the last two decades the attempts to transit national higher education from traditional to innovative using administrative and command methods have not had any success, demonstrating conservatism, and at the same time, the need of changing the whole educational paradigm. This is especially true in higher education, in which the innovation process develops unevenly for different kinds of universities and institutes. This requires the formation of innovative thinking in Russian higher education, in connection with a set of processes, accompanying innovative development of national and world educational systems. These processes are connected with the international higher school integration and forming of optimal internal structure of educational and scientific activity of universities.

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In modern Russia, higher education institutions are divided into several groups - federal (10 universities), national research (47 universities), supporting regional and others (over 700). Accordingly, the maximum funding is being provided to the first two groups [1]. In order to get the high status of the institution, such as national research university, it needs to match a large number of indicators, and each of them is very difficult to achieve [2]. In particular, it is necessary to have several internationally recognized scientific schools, highly cited scholars, sustainable public funding, super modern laboratories, and local authorities' support.

It can be stated with some confidence the vicious circle of the national education system focused on the formation of a network of elite universities, declaring the utmost quality of higher engineering education, to the detriment of its availability [3]. On the example of Russian higher education it can be shown that the budget cuts by the government is pushing universities to their consolidation and centralization. At the same time, in order to obtain the status of a federal or national research university, the financing of which is in 4-6 times higher than the «simple» regional universities, a high level of scientific schools is needed badly. And for the development of this widely known scientific schools required enhancing the status of the

university, it is necessary to increase the government funding, which is particularly important for fundamental science [4, 5].

That is the important reason why even the top universities of the former Soviet Union cannot even get in the top hundred universities of the world. But Russian Ministry of Education sets ambitious goals - to place leading Russian higher schools on a par with universities and institutions of Oxford, Cambridge, Massachusetts, Eaton, Princeton [6, 7]. But should every regional technical university look up to these brands? Regional technical university decides completely different tasks than elite institution, which train mostly top managers. On the contrary, the mission of the modern regional engineering higher school, especially specialized on mining, is to provide students with knowledge of quality and quantity to be sufficient to solve any professional problems.

Today, many regional engineering higher schools face a vicious circle of problems: insufficient budget funding - poor development of scientific schools – aging of lecturers and scholars - loss in the competition in scientific and educational services market - the closing down of university as an inefficient [8, 9].

There is a risk that such a fate awaits a significant number of Russian regional technical universities, focused on regional education customers (large indus-

trial enterprises), by 2025, when professorial “old guard” disappears.

In particular, for the typical engineering higher school - Kuzbass State Technical University (Kemerovo, Kemerovo region, Western Siberia, Russia), the average age of the R&D and lecturing stuff with PhD is 59-60 years, and with Dr.Sc. - 67-68 years [10]. On the contrary, in located in the neighboring region (Tomsk Region) National Research Tomsk Polytechnic University the average age of PhD is 36 years, and of Dr.Sc. - 55 years [11].

Accordingly to practical experience, we can say that “overgrown” PhDs (60 years old and more) will remain so, and, furthermore, will not train teams of young, hungry for discoveries scientists. There is also a large number of Dr.Sc over 70 years, who simply work their time and we can understand them: who will leave the work he (she) used to do all his (her) life?

It would seem that the problem of shortage of young scholars and lecturers in regional technical universities can be solved by merging them with national research or federal universities as branches. However, clustering of industrial Russian regions led to the situation when each cluster has its own industrial complex, which representatives are forming the structure of the educational order for regional technical higher schools [12-15]. In particular, Kuzbass State Technical University tends to train students for dominant region industry – coal mining, and Siberian State Industrial University (Novokuznetsk, Kemerovo region) - for metal industry. In turn, the attractor of training students for National Research Tomsk Polytechnic University is oil and gas industry widely represented in the region. In accordance with such structure of higher education services demand the staff of Russian regional engineering higher schools has been formed for decades. So merging of regional technical universities and institutes will not solve the problems of development of scientific schools or improve the quality of training of engineering staff.

Moreover, we can say with confidence that with the absence of proper attention to the problems of regional universities, higher technical education and engineering science will soon exhaust itself and lose competitiveness.

Therefore, for regional technical university to be self-sufficient in Russia is necessary to develop reproduction of its scientific schools. It is also a mandatory requirement to raise the status of university under current Russian legislation. In other words - to go to a higher level - the federal or national research. However, a significant obstacle for Russian regional

technical high schools is the introduction of the Bologna standards into educational process. The Bologna process has generated a large number of standardized educational programs that are highly effective under condition of providing a sufficient number of students and, consequently, high competition between entrants for a student’s place at university [16-18].

Then all evaluation tools, competences and credits system, all the things that set the vector and the structure of the demand for graduates from large and small companies, the overall way of education development (to prepare the elite engineering) would allow regional universities to attract a sufficient number of students on full-pay basis. This would cover the funding needs of scientific activity and educational process.

However, a set of unresolved problems of funding R&D in the former Soviet countries by the state and corporate educational customers, led to the fact that despite declaring continuous growth of education quality, universities are forced to fight for the preservation of the student body, financed from the budget. The technical side of this problem in Russia is that the financing of higher schools is based on the number of students. And with the stringent standards of the number of teachers and students compliance (for Russia it varies between 1: 10 - 1: 12), expulsion of ten students turns firing one teacher. Such a “sword of Damocles” does not support the steady development of universities and research teams, and prevents the transfer of methodological and pedagogical innovations in the teaching process.

In international practice, some financing of educational process is carried out by trustees – usually large companies interested in training highly qualified personnel, in improving their image [19]. At the same time trustees not only pay contracts for the training of their future staff members, but also fund R&D and maintain functioning of the university.

The trustees of Russian engineering higher school institution are mainly the largest national enterprises – JSC “Gazprom”, “Lukoil”, “Rosneft” and a number of others. The beneficiaries of their funds are mostly federal and national research universities. Regional universities focused on the demand structure for highly qualified graduates from local communities receive contracts for target training students for certain enterprises. This funding usually does not cover research activities, and that does not help to raise the status of regional universities.

What opportunities exist for regional technical universities of the former Soviet Union to raise their status, preserve and develop scientific schools and

initiate integration into the global educational community?

First of all, it is necessary to activate internal reserves of research and innovation, to improve the quality of education and strengthen its adaptation to the international standards. To do this, the audit of universities R&D and pedagogic and staff certification are required. These measures can help to define the strengths of each university member, to generate individual "*profile of university activity*" (PUA) for each scholar and teacher. This profile includes an assessment of pedagogical, methodical, scientific, innovative and inventive, educational and PR-potential of each member of university staff. The Graph of University Potential Distribution in the regional higher school team can be represented as following.

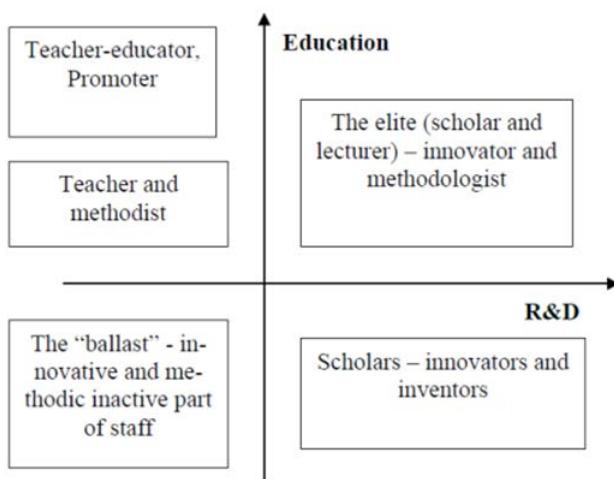


Figure. Graph of University Activity (PUA) distribution

As it follows from this figure, in any university a certain part of the staff tends to the solution of scientific problems, another - to methodical presentation of research results, and the rest - to promotion of the results. Also some members of university staff successfully realize itself in mentoring and educational work (supervisors, mentors, proctors, etc.). Of course, some employees always are innovative and methodically inactive “ballast”.

According to the results of the PUA Graph compilation management of regional university should develop an adequate system of scientific, methodological and innovative-pedagogical activities, using all available means - effective contracts, grants, incentive payments, financing the post-graduate and doctoral studies. Differentiation of incentive measures should be adjusted to PUA of teachers belonging to the elite, scholars, methodologists. At the same time the high mobility of university elite must not be forgotten, so the task of regional university management is to keep the elite in every possible way, to encourage scientists

and innovative lecturers and get rid of the “ballast”.

Another way of raising the status and international integration for regional university is upgrading of publication activity and “rocketing” of scholars’ citation to the international level – Scopus and Web of Science databases. In this regard, universities of the CIS countries are faced with the problem of high costs of publications, as payment for publication in leading scientific journals reaches \$1,000.

At the same time “Bulletin” is available in almost every university of the former soviet countries. Typically, bulletin - scientific journal of higher school - is published at the intervals from once a month to once a quarter. 90% of the articles are working papers of local scholars. Under certain conditions, regional university’s bulletin can be included in the number of national peer-reviewed journals. In particular, for the bulletins of Russian universities, the impact factor RSCI (Russian Science Citation Index – national analog of HHI) is not greater than 0.15-0.2 [11]. The international influence of such scientific journals is limited by having one or two foreign members of the editorial board, as well as by translation (not always correct) of the titles and abstracts of articles in English.

Meanwhile, there is a set of programs and instructions with a list of actions that must be fulfilled to turn the magazine into the world databases citing, for example, Scopus. However, even the federal and scientific research universities in Russia, not mentioning even regional ones, do not use the opportunities to improve their status by incorporating scientific journals published by them in word citation databases. In 2015 only 140 published in Russian scientific journals were included in international databases citation (in the Netherlands - more than 200). This shows higher schools managers’ underestimation of the value of this research activity indicator for improving its organizational and legal status to the level of federal or national research university.

To include regional universities bulletins in the world citation databases the fundamental reform of their research activity is often required. It means affiliating and inviting world-class researchers with high citation index HHI determined in Scopus and Web of Science in Editors Group, attracting partners such as foreign universities and forming international research teams, recruiting professional translators staff.

Of course, the level of scientific publications of the international journal should be much higher than published only for domestic scientists. This means updating the editorial boards of regional universities bulletins, which often include people who are not involved

in this matter at all.

Regional higher schools management should understand that the work of the editorial board of scientific journal is a very great responsibility, because its results are observed not only by a narrow group of like-minded people within a single city or region, but also by experts in the same area throughout the country and abroad.

But for the successful communication of the average member of the academic society with his foreign colleagues, it is necessary to speak foreign language. If in the 1920s there was a slogan "Down with Illiteracy", the 2010s should have the slogan "English language - a key competence of the scientist" which is vitally necessary. Never to read an article in a foreign journal or to write your own - is a sad, but a natural result of lack of knowledge of English for many scholars of the former Soviet Union.

Another possibility for improving the quality of education up to the international level and, consequently, the status of a regional higher school is the educational franchising of leading educational centers. Franchising in education can be presented as a joint activity of educational institutions for providing and promoting of all and associated services. These services must comply with the licenses of educational institutions. Franchise is a system of exclusive rights for the implementation of educational services under the brand name and trademark of the franchisor under certain conditions.

The educational franchise can contain the rules for students body forming, principles of admission, organization of educational process (transfer, learning and knowledge control), educational and methodical literature, video and multimedia courses, grading system, forms and procedures of examinations.

The mechanism of educational franchising consists of signing the contract between educational institutions (the franchisor and the franchisee), which specifies all the basic terms and financial conditions for cooperation. Educational process in franchisee higher school is carried out on franchisor's curriculum and programs by lecturers and tutors admitted by franchisor.

The franchisor is a famous university, performing administrative, educational, informational, technical and legal support of educational institutions - franchisees. The franchisor organizes the educational process, forms, licenses and accredits educational programs, provides teaching materials, conducted research and methodical work, trains tutors and certifies them, registers students and trainees, carries out the issuance of education documents.

Franchisee - educational centers (usually regional institutions) can be independent institutions that have entered into a contract with the franchisor. On behalf of the franchisor, they take tuition fees, applications and other documents from students, arrange tutorials and courses. Also in cooperation with the franchisor franchisee can manage R&D and methodical work, participate in teachers and tutors training, and certify them.

Foreign experience of educational franchising development in higher school shows the possibility for famous universities to increase availability of high quality education due to the involvement of local resources. For example, the University of Central Lancashire emphasizes the "natural environment" of interaction with other colleges, and its willingness to support the whole structure of regional education system. Accordingly, another prestigious UK university - Gateshead College, attracts franchisees in order to provide flexible local training systems allowing involving more students in higher education using modular training schedule. Similarly, one of Sunderland University's main principles of franchising system called NEEDS is regionality. It suggests such the interaction of the head university (franchisor) with each of the colleges (franchisees), which is carried out through a system of educational modules, supplied directly by Sunderland University.

Currently in the UK educational franchise has become the most rapidly expanding area of cooperation of higher and postgraduate education. In the mid-1990s, the number of higher education institutions involved in franchising has reached 60% [20]. The universities which purpose was to increase access to higher education became the leaders in franchising. The development of franchising, however, was not limited by a certain part of the country. It went on to the cities and in rural areas, and where higher education is extremely scarce, and where there is a wide range of universities (e.g. in London and its suburbs).

The British model of educational franchising significantly complemented the American model, including franchisees in the process of assessing the quality of teaching and academic value of provided programs. In American model only Franchisor University was responsible for the quality of the academic programs offered to the franchisees [21]. British model requires close cooperation of universities and colleges, with a reference to a style of work adjustable for students' needs. Direct collaboration of the colleges under franchising allows educational institutions to expand the number of courses offered, to provide access to high quality higher education for their

students and to open new opportunities for their staff. Franchising abroad also allows colleges to increase sources of income and, thus, provides scholars financial benefits encouraging R&D.

The development of educational franchising for the countries of the former Soviet Union can be carried out with convergence of distance learning technologies. They are aimed at implementing the main condition of franchise - accessibility of quality ("capital") professional education for a large part of the population, regardless the place of work and residence.

Conclusion

Thus, the need for international integration of universities of the former USSR countries is determined on the one hand, by objective process of globalization of humanitarian spheres. On the other hand, the increase in research and educational level of Russian regional universities is connected with the improvement of their status to federal and national research universities, with increased funding. This is impossible without reorganization of research and educational universities staff groups, without raising their publication activity to the international level, without development of an educational franchising.

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