

These are exactly the areas of lowest output shares for Russia, according to Scopus.

In-depth analysis of such a profound contradiction is beyond the scope of this essay. We just have to mention that, while nationally-oriented academic communities in arts and humanities are typical for most non-English-speaking countries, the notion of 'national' medical research is clearly something worrying.

Social sciences in the former USSR republics, almost non-existent in Scopus in the 1990s (possibly due to a low number of indexed journals and English language bias), have experienced a moderate rise from an average of 0.6% in 1996 to 7.8% in 2014, but this number is still lower than in the majority of Eastern European EU members. Social sciences output in those countries has also risen from an average of 3.6% to 11.6% in 2014. Baltic countries are clearly the leaders here: Lithuania (from 2.9% to 21.5%), Estonia (from 2.2% to 17.2%) and Latvia (from 1.5% to 10.4%).

On the whole, our data is consistent with earlier studies. Russia, despite its recent reforms and a major move towards developing world-class universities, has exhibited only modest shift towards typical a US/EU17 research landscape, which is increasingly dominated by life sciences and medicine. The same applies to Belarus, Ukraine, and Kazakhstan. Poland, Czech Republic and other ex-COM-ECON EU members, on the other hand, had already by 1996 become closer to EU17, and later succeeded in pursuing this integration route.

We also highlight the problem of local vs. global academic communities in Russia, where the structures of national and international research output are partly inverted. This radical difference between Scopus and RSCD data poses further questions and suggests that all bibliometric comparisons should be drawn with due consideration for database limitations.

## References

- [1] Yang, L. Y., Yue, T., Ding, J. L., & Han, T. (2012). *A comparison of disciplinary structure in science between the G7 and the BRIC countries by bibliometric methods*. *Scientometrics*, 93(2), 497-516. doi:10.1007/s11192-012-0695-8
- [2] *Uzbek Academy of Sciences, for example, still operates 28 research centres including Institute of Ion-Plasma Technologies and Institute of Bioorganic Chemistry.*
- [3] *We excluded all countries with fewer than 500 SciVal publications in 2014.*
- [4] *Several of these journals are included in Scopus but for a large part are indexed so badly that Scopus has no information on author affiliations and addresses, so it is impossible to count them as 'Russian' articles.*

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# What Determines the Divide between Soft and Hard Sciences in Soviet and Post-Soviet Kazakhstan

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## Soviet Past

The contemporary divide between hard and soft sciences in Kazakhstan originated in the pre-World War II period, when the republic's research system, embodied in the Kazakh branch of the Soviet Academy of Sciences, was originally established. The Soviet government was very practical in cultivating research capacity of the Kazakh Soviet Socialist Republic. Research priorities were set, infrastructure was developed, and funding was distributed in accordance with the needs of the military, industrial, agricultural, and public health initiatives in the region. Economically, Kazakhstan's primary role was to supply a variety of natural resources for the plants and factories at the later stages of the production process, which were geographically concentrated in the European parts of the Russian Federative Socialist Republic and its western neighbours.

Much of the research activity, conducted predominantly in Russian in collaboration with the Russian Academy of Sciences, was concentrated on the geographic mapping of mineral resource locations, on assessing the composition of the locally extracted ores and rocks. In addition to that, Soviet Kazakhstani research was concerned with the exploration of the most economically efficient approaches to extract minerals out of the ores and rocks. In military-sector-driven research agenda, three lines were particularly important: (a) research related to the exploration of space; (b) research related to nuclear weapons production and testing; and (c) research related to biological weapons production and testing. Given the strategic view of Kazakhstan as the main agricultural production region of the Soviet Union, Kazakhstan had a strong capacity in research connected with exploration of the regional biodiversity, plant and animal breeding, veterinary science, and applied research related to testing of herbicides and pesticides. Finally, as the environmental conditions and health of the local population deteriorated as a result of the implementation of biological and nuclear weapons testing, as well as heavy use of pesticides and herbicides, research in medical

and pharmaceutical sciences started to play a more prominent role in the region.

In general, by the time the USSR collapsed, given the above-described combination of roles in economic and military system of the Soviet Union, Kazakhstan had developed a strong capacity in such research disciplines as chemistry, physical chemistry, material science, astro-physics, astronomy, nuclear physics, biology, geology, ecological science, plant science, veterinary science, and mathematics. In addition to that, Kazakhstan had developed a minor capacity in pharmaceuticals and health sciences.

Due to ideological control, true research in social sciences and humanities was virtually non-existent in Kazakhstan. Numerous publications, which were produced by social scientists and researchers in humanities, were severely self-censored, often re-stating the main principles of the Communist Party ideology. In addition to that, data necessary for quantitative analysis was difficult to obtain since it was centrally collected and controlled, and was not reliable due to a high degree of manipulation in the strife of organizations to meet the strategic planning goals set by the government. Qualitative research would be impossible due to the hegemony of one politically accepted ideology. Every citizen of the country was expected to adopt the Communist Party ideals and the ideological control pervaded all social interactions, including any potential interactions with researchers. Any qualitative explorations of larger societal discourse would inevitably reflect the official discourse of the Party documents and public speeches. Hence, social scientists were preoccupied with mere reproduction of the official discourse in their papers directly citing the key speeches and official documents rather than collecting data in the field.

However, to say that social sciences and humanities were completely non-existent in Kazakhstan would not be completely accurate. Having exterminated the national intelligentsia by the 1930s, the Soviet government did invest some effort in the development of linguistics, literary criticism, ethnomusicology, ethnoanthropology, archaeology, and history. All of these disciplines served instrumental purposes of the ethnical policy and ideological control in the country. Linguistics was minimally supported during the early years of the Soviet Union, when development of Cyrillic script and linguistics analysis of the Kazakh language was necessary to achieve universal literacy in the country. Basic understanding of Kazakh literature, culture, and history was important for the development of the official storyline on cultural, social, and political development of Kazakhstan before and during the Soviet rule, which would clearly demonstrate how the Kazakhs had benefited from becoming a part of the Soviet Union. This storyline required only minimal research, which would then be presented in school and university textbooks, as well as in the official public discourse.

## Contemporary Period

The divide between hard and soft sciences in Kazakhstan continues to exist nowadays. The analysis of Web of Science publications from Kazakhstan over the period from 1991 till 2011 shows that only 8% (385 out of 4,612) of publications in the country are in social sciences, while less than 1% (7) are in humanities. There are two factors that have contributed to domination of hard sciences over soft sciences in the present-day national research portfolio. One is the legacy of the Soviet times. Kazakhstan used to have a stronger research capacity in hard sciences at the beginning of independence. Despite the fact that numerous physicists, chemists, biologists, and other hard sciences researchers, many of whom were non-Kazakhs, had left the country at the early days of independence, the few that stayed were better equipped to survive the period of limited government funding and demand. Some benefited from past ties with Russian and other Soviet republics' research centres. Some were able to use the interest of the international community in the previously unavailable Soviet research to create new partnerships outside of the former Soviet bloc and to support them through grants from donor agencies. One such example is environmental research on the problems of the Aral Sea and the consequences of the nuclear and biological weapons testing which got support from both the government and the international community. Some researchers were able to reorient towards the needs of the newly emerging private sector, as happened in the case of many chemistry labs testing the content of mineral rocks and ores for new extraction-oriented companies. In addition to that, even during the worst times of the economic turmoil, Kazakhstan and Russia continued cooperation in collaboratively funded nuclear science and space research due to the strategic importance of maintaining military cooperation in the region.

In the later stages of independence, as Kazakhstan entered the stage of oil-driven economic growth and massive reforms, the second determinant of the imbalanced development of research in the country came into play. Much of the reforms package in Kazakhstan, timely provided by international development agencies, has been greatly influenced by neo-liberal reform agenda. National economic development strategy has been based on the endogenous growth theory, which views innovation, knowledge production, and highly productive human capital as the main drivers of economic growth. Constrained by limited public resources, the government set specific priority areas for development in its industrial-innovation strategy, which underlies economic reforms in the country. These areas include some globally pursued emerging broad-application technologies (biotechnology, nanotechnology, IT, new energy), as well as areas that have been forecasted to provide competitive

advantage for the country, including agriculture, and oil and gas sector. Educational and research grants provided by the Ministry of Education, as well as international training and experience provided within the Presidential Bolashak scholarship, are allocated in accordance with the strategic areas identified in the industrial-innovation policy and clearly favor hard sciences. For example, our analysis of the official statistics for the grant period of 2013–2014 shows that only 14% (320 out of 2,273) grants for research projects were allocated to humanities and social sciences. All other things equal, a researcher or student from social sciences or humanities has much fewer chances of being supported with government funding than a natural scientist or a researcher in engineering due to their minor strategic relevance.

The social sciences which do get support from the government of Kazakhstan are essentially the same as in the Soviet times for — ultimately — the same reason: their importance in formulating official ethnical policy and ideology. The only difference is that researchers in the fields are now pre-occupied with re-interpreting the past story of the cultural, political, and economic development of Kazakhstan to provide evidence of greater importance of the Kazakh ethnos and its culture and history than previously argued. In addition to that, linguistics is actively supported too as it plays tremendous role in the present-day language policy aimed at increased use of the Kazakh language in the country.

Finally, two areas of applied research in social sciences are becoming more important in Kazakhstan due to their importance for reforms success. One area is business administration and management, which was non-existent in the Soviet Union and which has, as a result, become highly influenced by and quickly integrated into the international research agenda. An analysis of Web of Science publications in Kazakhstan during the period 1999–2011 shows that business and economics research occupies the fifteenth place (86 out of the total of 4,612 journal publications) in terms of publication count, following a number of historically highly productive disciplines in natural sciences. They are published in both Russian and international business and economics journals. Another area is public policy and political science, capacity building in which was supported by both the government and donor agencies in order to assure basic evaluation of the conducted reforms and to inform subsequent initiatives.



## The Plod of Sectorial Higher Education? The Case of Agricultural Universities in Russia

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### Sectoral Approach to State Education Policy to Be Revised

The focus on engineering education has become locus communis and subject of special attention on behalf of the state in many countries. In the case of Russia, this trend has its specific features in the context of transformation of the Soviet quasi-corporate model of cadre production for industries.<sup>1</sup> Russia still has a lot of universities aimed at training specialized personnel for particular sectors of the economy that are subordinate to sectoral ministries. Recently there have been a lot of discussions around the new role of sectoral ministries in higher education. Do higher education sectors previously aligned to industries still need some specific state regulation in terms of subordination to corresponding ministries, particular resource management and curriculum? Does sectoral approach have a right to exist in the new social reality and market-shaped economy, and what are the limits and constraints?

This essay addresses the issue as regards to agricultural higher education. We think that our findings might have significance for other sectors of higher education as well.

### Machine for Cadre Production: Historical Context

One should understand the history of agricultural education in Russia. The Soviet system of higher education addressed the needs of a centrally planned economy. It was characterized by disciplinary separation, and universities were controlled by sector ministries.