



Fostering innovative integrated structures in russian higher education institutions

Fomento de estructuras integradas innovadoras en las instituciones de enseñanza superior de Rusia

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ABSTRACT:

The article investigates the challenges of introducing new structural and infrastructural elements of innovative activity in innovation-oriented higher education institutions, and collaboration of the latter with technology-intensive domestic companies.

Key words: innovative integrated structures, national innovation system, synergy, interregional information system, structural integration, centers for education science and innovation.

RESUMEN:

El artículo investiga los retos de la introducción de nuevos elementos estructurales e infraestructurales de la actividad innovadora en instituciones de educación superior orientadas a la innovación y la colaboración de éstas con empresas nacionales intensivas en tecnología.

Palabras clave: estructuras integradas innovadoras, sistema nacional de innovación, sinergia, sistema de información interregional, integración estructural, centros de ciencia educativa e innovación.

1. Introduction

Economic development trends worldwide ostensibly demonstrate that formation of a knowledge-based economy is the only feasible approach to Russia's further development. Underestimation of this trend could lead, in a very near future, to Russia's being squeezed out of the high-tech

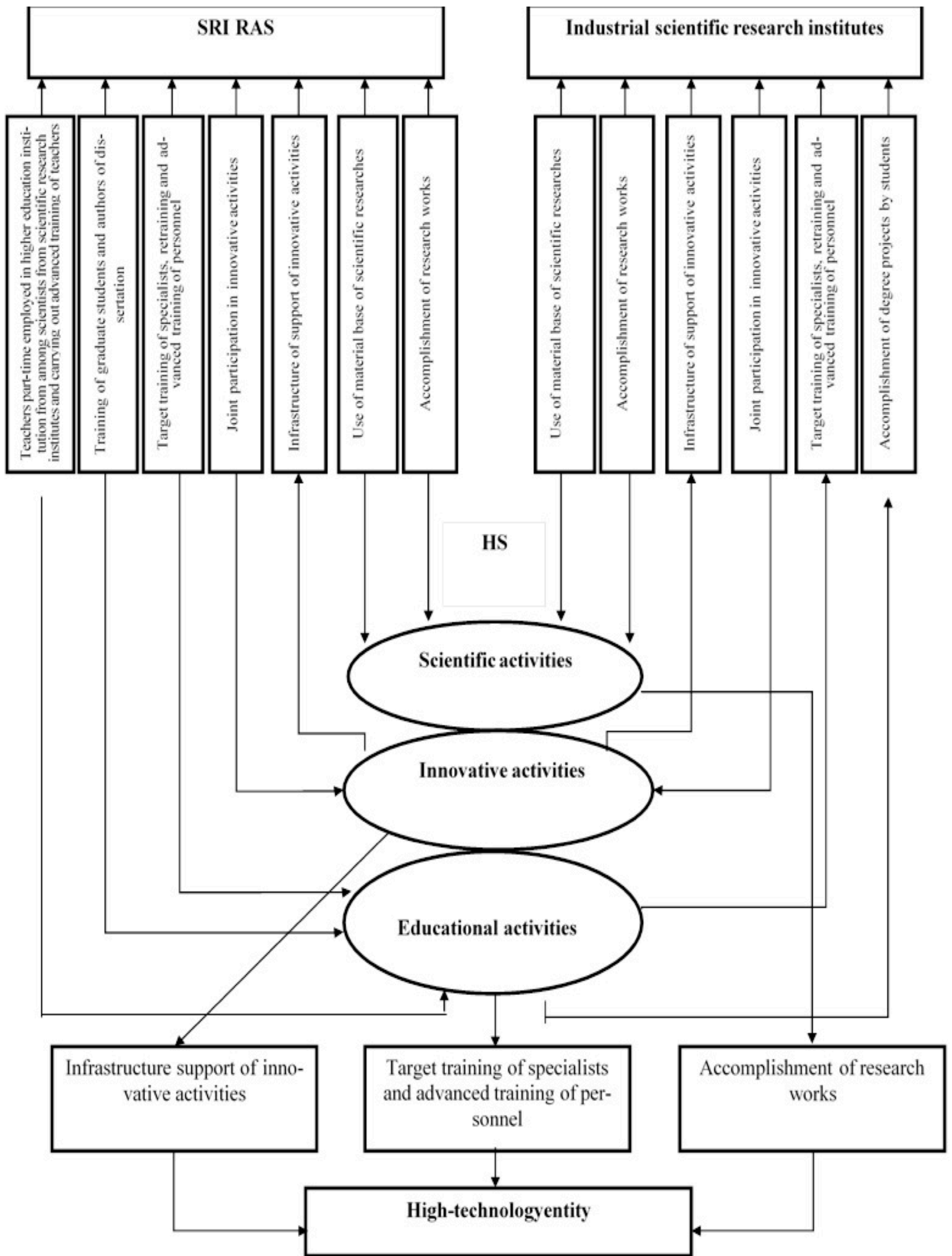
industry markets, which in turn would hamper the process of bringing the living standards of the population up to the mark, and ultimately, create a threat to national security. However, innovation activity is yet to become a sizable economic growth factor in Russia.

Introducing new structural and infrastructural elements of innovation activity in innovation-oriented higher education institutions, and merging them with existing capabilities would be particularly pertinent to the process of building up Russia's national innovation system. It is noteworthy, that a key issue of establishing university-based innovative integrated structures has not been sufficiently studied, however such structures might be able to effectuate sustainability of collaboration and close interconnectedness of higher education institutions, academic and sectoral think tanks, and high-tech companies, based on their involvement in shared specific fields of operation (Gretchenko 2016).

2. Methods of research

Competent resource-sharing (human resources, intellectual property, information, R&D facilities and equipment, production capabilities, etc.) among higher education establishments, scientific research institutions, and high-tech business might and will create synergies across the innovation fields of the stakeholders, each of which occupies a certain position in the innovation cycle. (Akhmadeev and Manakhov 2015).

The main goal of a higher education institution within this structure is to provide target workplace-specific training of specialists (including highly-qualified workforce), as well as reorientation and career development trainings to meet the needs of potential partners. The list of potential partners could include academic scientific research institutions of the Russian Academy of Sciences; sectoral R&D institutions; small and medium-sized innovation businesses; large production enterprises; science, development and production facilities (NPO) and federal state unitary enterprises (FGUP). Higher education institution should avoid imposing traditional curricula on its partners, rather to the contrary, it is a partner, as the end user of the university production outputs - graduate students, who should elaborate on workplace-specific staff requirements, desired skill lists, and put out staffing requests in the form of agreements. Instead, higher education institution should concentrate on developing relevant courseware, educational materials and methodological support (partner involvement in the process is essential), as well as select teaching staff, undertake organization of events and ensure smooth educational process. These functions are chartered in fig. 1 (Akhmadeev and Manakhov 2015).



It is important for higher education institutions and scientific research organizations to have capacity to assign their personnel to work at universities as tutors-at-large in case the latter lack faculty members. It is also worth mentioning that target workplace-specific education and training would, to a certain extent, help solve the problem of postgraduate employment, which is of burning relevance practically everywhere.

Further on, speaking of scientific research at higher education institutions, one should see beyond their merely consuming the fruit of fundamental scientific research pursued by the academic institutions of the Russian Academy of Sciences, but rather recognize the role of the universities as co-performers of, and sometimes contributors to, the academic research. The reason why is, that higher education institutions, against all odds in modern times, managed to retain (to a certain extent, as compared to the Russian Academy of Sciences research institutions) a substantial scientific potential represented by qualified scholars on the faculty, who come from a broad range and diverse fields of scientific schools, and whose authority is universally recognized by Russian and international scientific community (Nikulin, Gretchenko and Demenko 2016).

To bear in mind, the higher education institutions often possess sufficient facilities and resources to pursue R&D, including fundamental research, e.g.: measuring, testing, analyzing laboratory hardware, field-specific scientific research equipment and facilities, including scientific and technological equipment, control and measuring tools and instruments, automation and interpretation devices and software for recording research outcomes. In some instances, such facilities and resources are unique in nature, what makes the members of the Russian Academy of Sciences strive for access.

3. Results

In all fairness it should be added that in recent years some higher education institutions have been able to purchase expensive, cutting-edge research equipment using target asset allocations, available through active participation in competitions of innovative educational programs within the framework of national priority project "Education". As these fund allocations are not accessible to the Russian Academy of Sciences, it would be reasonable to assume, that resources and facilities at the disposal of higher education institutions outnumber those of the Russian Academy of Sciences. Therefore, one could state with a fair amount of certainty, that higher education institutions and the Russian Academy of Sciences have interests in common, to pursue fundamental research and share outcomes (Akhmadeev and Manakhov 2015).

Similarly, higher education institutions have interests in common, to pursue theoretical and applied scientific research and development, with sectoral research institutions. Sectoral research bodies are interested in the outcomes of fundamental research, pursued by higher education institutions, so as they could use these outcomes as a starting point in their own explorations, however they are also being drawn by university human capital, and technical capabilities. Higher education institutions, on the other hand, aspire to promote their research outcomes, and encourage chargeable engagement of their faculty members, postgraduates and students in sectoral R&D. This approach helps universities to ease their financial constraints, reduce internal social tensions, and prevent brain drain (Moiseev 2016).

Further on, let us have a brief overview of the types of innovation activity, which meet the needs of higher education institutions, research institutions and high-tech companies alike. Beyond all doubt, the higher school is leading the national innovation system. A large number of higher education institutions engage in inter-university innovation science and technology programs, to gain precious experience in innovation management and implementation. These universities are cultivating sophisticated systems of innovative enterprises and enterprises with innovative infrastructure (business-incubators, techno parks, innovation technology centers, innovation production complexes, information centers, re-orientation centers for specialists in innovation fields, consulting agencies, technology transfer centers, marketing, copyright protection, et al.).

Most of the higher education institutions with a successful performance record today have developed educational materials and methodological support of their own. They have accomplished a number of innovative projects, created new hi-tech products and technologies, and amassed a whole wealth of experience and know-how in commercialization (Gretchenko and Demenko 2014).

Innovation needs information support critically; hence, a corporate inter-regional information network was developed by a cluster of universities, under the support of the Russian Ministry of Science and Education, as part of the inter-sectoral program for innovation activity incentive in science and technology. The network offers access to information support of innovation activity to leading universities in all economic zones of the Russian Federation. An inter-regional information system [MIS] was also developed by higher education institutions, and had a test run in a few regions; it represents a platform for business communications, designed to search for partners and enter into contracts in the Offer and Acceptance mode. MIS database allows users to prepare and distribute bids to purchase or sell goods and services, or production orders, by using the International (Nice) Classification of Goods and Services. The system processes the information and singles out matching partners for the user's business (Gagarina, Moiseev, Ryzhakova and Ryzhakov 2016). The deal concluded via inter-regional information system is just as legal and enforceable as traditional paper contracts signed in ink. Availability of inter-regional information system should stimulate further collaboration between high-tech industries and higher education institutions.

Significant innovation capabilities of higher education institutions allow to assume, that a potential partner could benefit from them while developing specific innovative products, as illustrated on pic. 1, as much as performing any other type of innovation activity, saving on extra efforts and resources (Moiseev, Manakhov and Demenko 2016).

As can be seen from the above, that principal functions of higher education institutions (educational, scientific and innovative) lay the ground for alliances between universities, research institutions and hi-tech business. Elaborating further, these alliances will depend on sustainability and durability of their connectedness. In practical terms it could be achieved through fostering university-based innovative integrated structures, with formats varying from "university - academic research institution of the Russian Academy of Sciences" type, or "university - sectoral research institution" type, to mixed "university - academic research institution of the Russian Academy of Sciences - sectoral research institution", "university - sectoral research institution - business" types, et al. Having mission, goals and objectives in common, the latter type could share partner facilities and resources. It is noteworthy that integrated structures would differ in organizational format (e.g. a complex, directorate, section, centre, department branch, scientific research laboratory, center for collective use, et al.) depending on scalability, commonality or specificity of their missions. The integrated structure is presented on pic. 2 (Gretchenko and Gretchenko 2016). It allows for setting several integrated structures based on the partner's specific operation field (structural integration), however the pattern could be optimized provided just one integrated structure is set using the university base. A structure like that could interact with any combination of partners, such as two and more academic research institutions of the Russian Academy of Sciences, sectoral research institutes and business.

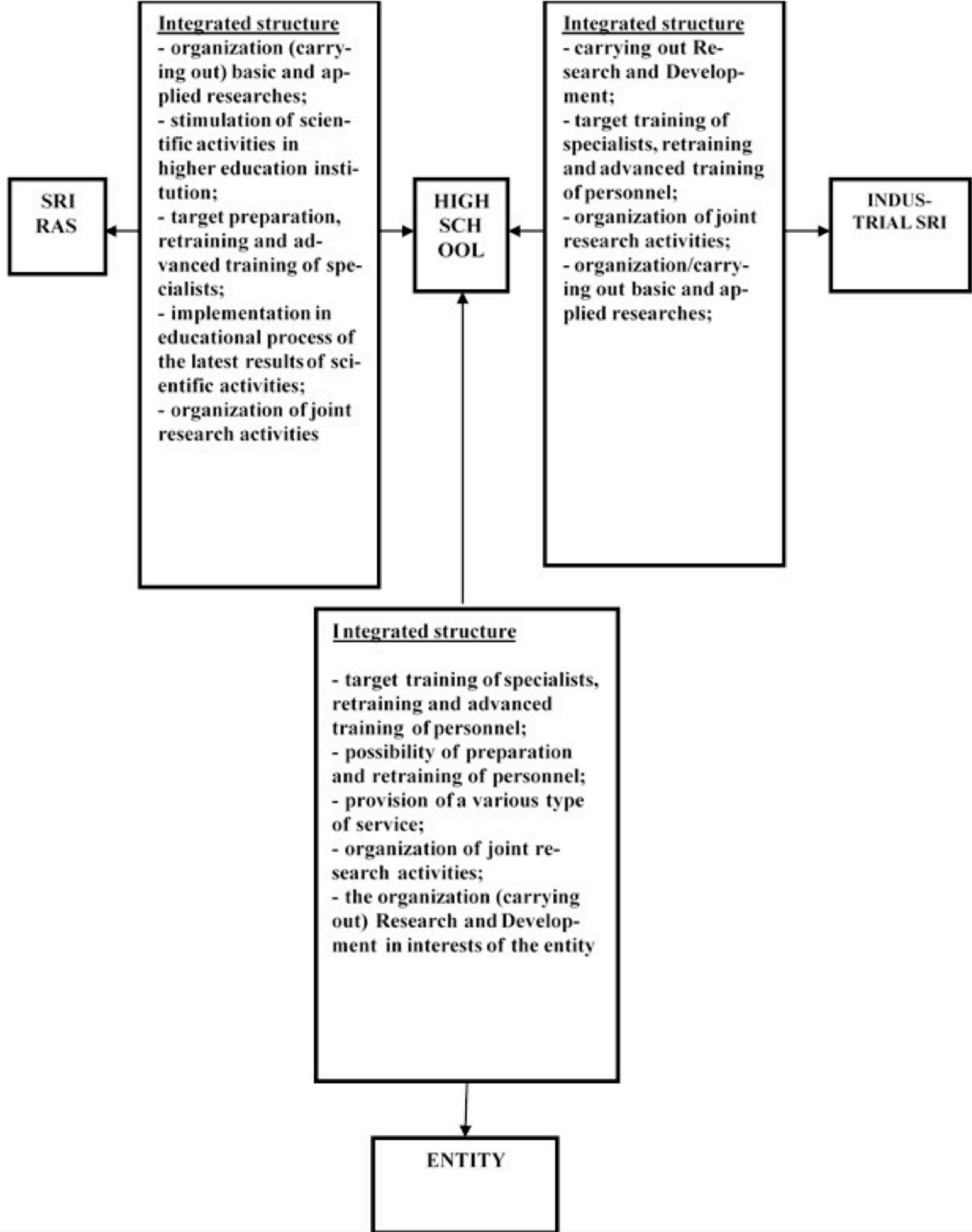


Figure 2 University-based integrated structures and their functions.

Analyzing the pattern, one can see how perfectly streamlined such integration in fact is, as it covers simultaneously those operation fields, that are essential for the performance excellence. Partners could collaborate immediately through an integrated structure, reducing redundancy and increasing efficiency of operations (Gretchenko and Gretchenko 2016).

4. Discussion

Globalization puts the powerful pressure upon world educational space, under its influence the system of higher education around the world is exposed to fixed structural transformations. There

is a lot of objective reasons and consequences of it. First, new criteria for evaluation of efficiency of activities of universities (patents, publications, grants, success of graduates) appeared. Secondly, sources of their financing are diversified (the state, private firms, venture funds). Thirdly, the higher education institutions of research and entrepreneurial type creating around themselves innovative clusters amplify. Fourthly, transition to economy of high technology productions requires optimization of the directions of preparation and system of lifelong retraining. Fifthly, universities create political and economic elite of society (for example, in Japan all highest government positions are held only by graduates of the Tokyo university). Sixthly, ensuring compatibility of different education systems within the Bologna Process is necessary that will simplify system of nostrification of diplomas about education and the academic mobility. Seventhly, forms of educational activities are required interactive (including gaming) because students become more and more susceptible to information technologies.

5. Conclusion

It is worth mentioning that a number of higher education institutions are successfully moving along the way of creating such structures. For instance, prompted by sectoral demands in innovation management, some higher education institutions set up centers for science, education and innovation in the form of noncommercial partnerships. Such centers make up a system of continuous target education and training of specialists in disruptive, information and innovative technologies, to staff business programs and projects in various industries. Moreover, to fulfill obligations under signed contracts, the centers offer target workplace-specific education and training, re-orientation and carrier development of specialists in innovative technologies, IT, quality management of products and services; these centers also pursue scientific research and development in critical technologies on the federal level, using the most advanced hi-tech equipment. This is the scope of responsibility of centers for collective use.

Yet, the examples are few, this type of interaction is still very much a work in progress, which calls for meticulous procedural elaboration, including drafting documentation that would regulate the relationship between business partners.

Gratitude

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