

# Chapter 41

## Monitoring of Staffing Nanoindustry

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### ABSTRACT

*Leading organizations of the national nanotechnology network (NNN) monitor staffing and develop mechanisms for coordination of educational processes of enterprises of the nanotechnology industry. To estimate the current state of training for nanotechnology industry in the leading universities of the Russian Federation, a study of their publications indexed in the Scopus database in 2012, 2014, and 2015 years in the subject area of “nano” was made. As a result of analysis, the universities, which form the background for the production of highly qualified specialists in the field of nanotechnology, were determined.*

### INTRODUCTION

Quality higher education of employees is one of the main indicators of the development potential of the companies involved in high tech projects in nanotechnologies. Heads of engineering companies and research groups point out the significant shortage of qualified personnel in this industry for more than one year experts. (Troshin A., 2015). On the one hand, among the traditional qualified engineers and

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## ***Monitoring of Staffing Nanoindustry***

workers training issues, of particular concern is the low level of training of scientific employees who are engaged in scientific-research and design activity in enterprises. On the other hand, constant improvement of qualification of almost all employee groups is needed due to dynamic development of nanotechnology and nanotechnology market products. Such constantly modernized educational process is possible only with the involvement of scientists actively conducting researches in the field of nanotechnology. Therefore, despite the large number of educational programs in the field of nanotechnology, the real training of professionals in this area had to be carried out by educational organizations that have certain conditions for scientific activity in the subject area of “nano-”. The definition of such organizations and to coordination of its educational activities with the enterprises of nanotechnology industry will allow increasing employability of graduates and solving the problem with employees skill level. There are specialized institutions to develop and coordinate the activities of nanotechnology companies, universities and enterprises: the national nanotechnology network (NNN, Ministry of education and science of the Russian Federation), Fund for infrastructure and educational programs, national inter-branch Association of nanoindustry (SC “Rosnano”), Nanotechnological society of Russia, etc. Coordination of educational activities in the NNN is carried out by the heads of the organization, that are NRNU MEPhI and St. Petersburg State Electrotechnical University “LETI”. In particular, currently, there is a project aimed at the development and introduction of mechanisms of interaction between parent organizations on the activities of NNN with companies focusing on creation of nanotechnological products, in terms of training.

The first task of monitoring of staffing supply in the nanotechnology industry, in addition to identifying the total need for specialists, was to estimate the research and educational potential of leading Russian universities in the subject area of “nano-” based on publication activity. Analysis of universities publication activity is one of the main ways to determine the qualifications of teaching staff and the quality of the educational process. The number and quality of publications are of the most important and objective indicators in determining the position of an educational organization in the main and subject lists of global university rankings. For instance, the contribution of the publication activity to the ranking is up to 20% for the QS World University Rankings (QS) (QS World University Rankings® 2015/16, 2015) and up to 30% for the Times Higher Education World University Rankings (THE) (World University Rankings 2015-2016, 2015).

While charting the ratings publications indexed in the Web of Science database (WoS) and Scopus are considered. Scopus database is the largest multidisciplinary bibliographic and abstract database that covers more than 18 thousand scientific journals and about 13 million US Europe and Japan patents, as well as the materials of scientific conferences (Scopus, 2015). Therefore, the analysis of the Scopus database may provide a complete assessment of publication activity in organizations. The aim of this study was to assess the development potential of scientific research universities in the subject area of “nano-” on the results of the analysis of the quantity and quality of publications indexed.

## **THE OBJECTS OF STUDY**

It is generally accepted that the position in the major international rankings of universities quite accurately reflects the level of education of the university compared to the global level in the subject. Getting into the top 100 rankings, such as the aforementioned Times Higher Education World University Rankings and QS World University Rankings or the Shanghai Academic Ranking of World Universities is possible

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