

# CREATION OF HIGH-TECH WORKPLACES AS THE CONDITION OF INNOVATIVE DEVELOPMENT OF TERRITORIES

Alexandra Ugryumova<sup>1</sup>, Marina Savelyeva<sup>2</sup>

<sup>1</sup> Federal State Budget Research Institution All-Russia Scientific and Research Institute for Irrigation and Farming, Water Supply Systems RADUGA, Educational and Methodical Center  
140483, settl. Raduzny, 38, Kolomna District, Moscow Region, Russian Federation  
E-mail: feminaa@mail.ru

<sup>2</sup> Institute of Business Studies, The Russian Presidential Academy of National Economy and Public Administration,  
Department of Management, Institute of Business Studies,  
119571, Moscow, Vernadskogo av., 82, Russian Federation  
E-mail: marina.savelyeva@gmail.com

**Abstract:** *An essential reserve of the innovative scenario of social and economic development of the regions is the creation of the improvement of the functioning of high-tech workplaces (HTW). Such workplaces require clear identification and a special managerial approach for their organization. Simultaneously, these processes in the conditions of different territories need an individual approach. It is important to clearly delineate both the components of HTW and their quantitative measurement. The significance of HTW is confirmed by their high productivity and in turn requires additional investment to create them. It is especially necessary to direct the processes for the formation of HTW in high-tech and knowledge-based industries of the national economy, since the creation of HTW in technologically backward sectors can lead to a low return on investment. The study of dynamics, industry specificity and forms of HTW organization allows us to generalize positive experience in this area and develop recommendations for stimulating a progressive form of organization of workplaces.*

**Keywords:** *high-tech workplace, wages, needs of the territory*

**JEL codes:** *R12, R23, R58*

## 1. Introduction

Creating high-tech workplaces is a necessary condition today to strengthen and sustain the competitiveness of any territory. This factor contributes to the acceleration of economic development of the territory due to the increase of economic efficiency of work of high-skilled workers, attracting new professionals and high-tech companies. As a result, the level of life of citizens residing in the territory increases. The relevance of this problem is confirmed by attention of the first persons of the country - the Russian Federation President Vladimir Putin, who many times in his addresses to the Federal Assembly of the Russian Federation stressed the need for implementation of "new industrialization" of the country, and creating 25 million high-tech workplaces. In addition, the interest in this problem of the professionals is rising with time, as can be seen in the number of published articles on this topic (Cirillo et al., 2017; Coad and Rao, 2011; Dolzhenkova and Ugryumova, 2015; Isaak, 2016; Kumar, 2008; Tan, 2008; Ugryumova and Savelyeva, 2017).

According to the Chairman "Business Russia" Boris Titov, the average cost of creating one modern high-tech workplace is \$100 thousand to \$200 thousand. Therefore, the cost of workplaces creation is at a minimum 2.5 trillion rubles, or about 200 billion a year.

Such scales assume a balanced attitude to the peculiarities of the implementation of the program. In this regard, there is a need to identify the main characteristics of the high-tech workplace (HTW).

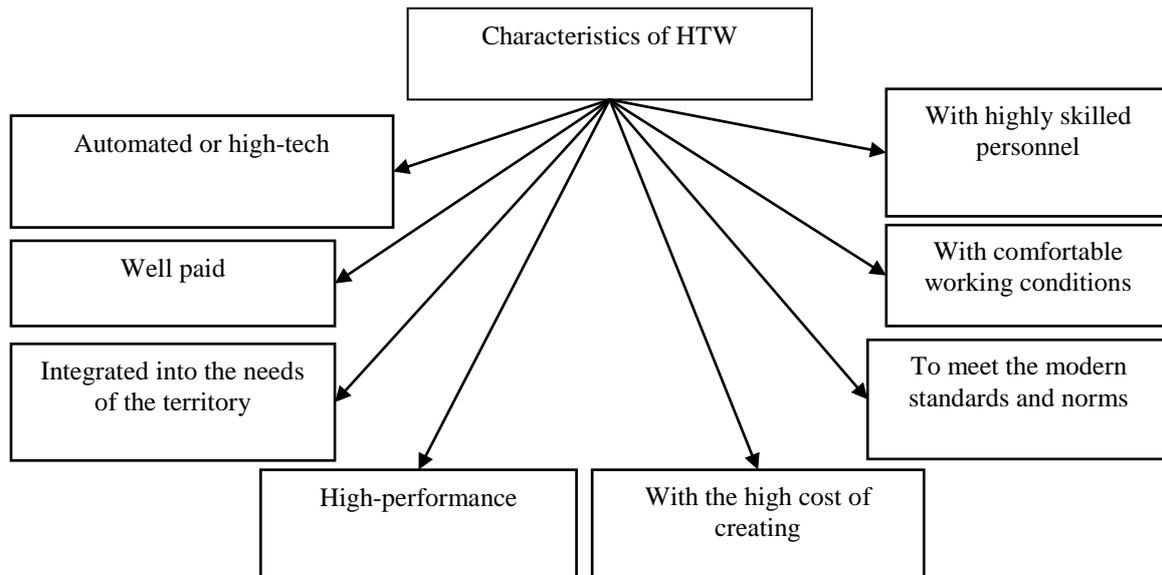
## 2. Methodology

The first characteristic is the use of advanced technology on working places (Balatsky and Ekimova, 2013; p.10).

The experts identify, among other signs of high-tech space, the following: high production efficiency (labour productivity); working conditions that meet the strict modern standards; quality education and high qualification of the specialists who work at the workplace; the high wages of such employees; the significant cost of creating a new job (Balatsky and Ekimova, 2013, p.11).

At the same time, characteristics of HTW (high-tech workplace) must be supplemented by the integration of these workplaces into key needs of the territories. The increase of VRM in the core sectors of economy of the territory sets conditions for the rapid realization of its potential (figure 1).

**Fig. 1** A list of the main characteristics of the high-tech workplace



Source: Compiled by the authors.

In addition, components of the HTW, like automatization of the workplace, integration into the needs of the territory, compliance with modern standards and requirements, comfortable working conditions, highly qualified staff can be evaluated qualitatively. At the same time, the determination of the level of the wage, performance, value creation is carried out through quantitative indicators. These indicators create conditions for confirming or denying the high-tech workplace.

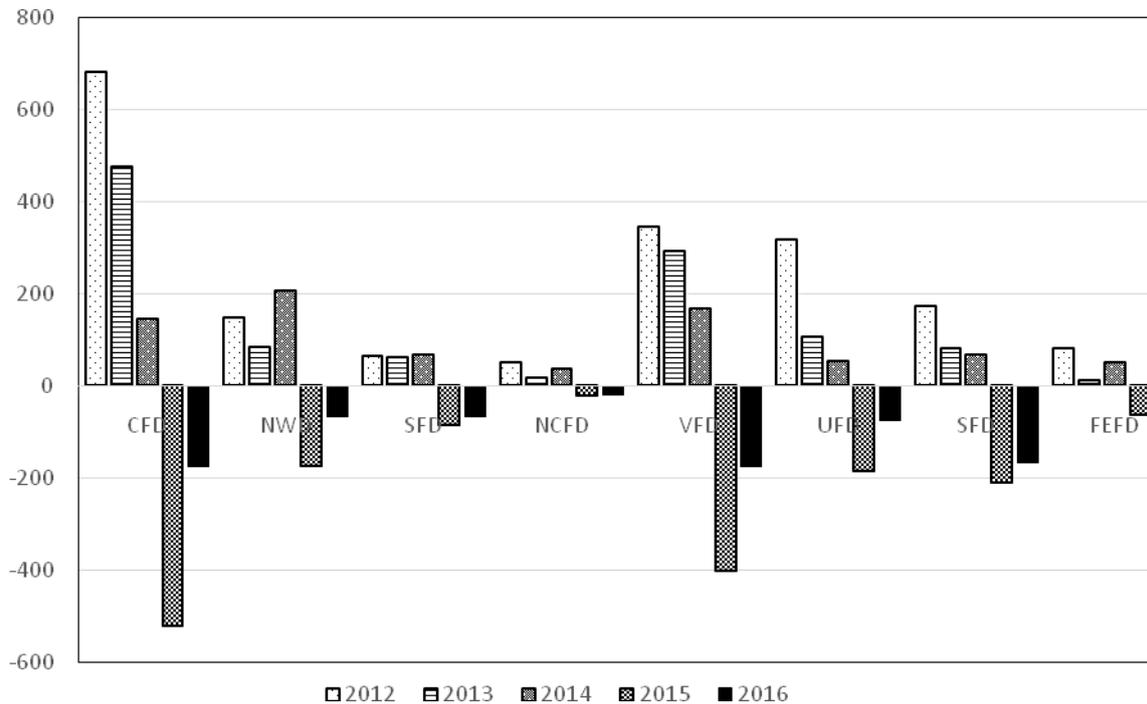
## 3. Results and Discussion

The Agency for Strategic Initiatives (ASI) suggested that the level of wages in the high-tech workplace must be not less than 30 thousand rubles per month and profit not less than 900 thousand rubles per employee per year. According to ASI there are 12 million positions corresponding to these criteria.

At the same time, selected high-tech workplaces are distributed among Russian regions nonuniformly. This is evidenced by the data (table 1) which shows that the growth of high-tech workplaces in relation to the level of the previous year falls practically in all Federal Districts of the country.

Data visualization of table 1 is presented in figure 2, which shows that the increase in high-performance workplaces declined significantly in the period from 2015 to 2016.

**Fig. 2** The growth of high-performance workplaces, in % to the previous year



Source: Compiled by the authors based on the data of Rosstat.

The greatest decrease of growth of such workplaces in 2016 was recorded in three Federal districts: Volga Federal district, Central Federal district and the Siberian Federal district.

Specific conditions in each Federal district, but also of the region imprinted on the mechanism and features of creating and trends in the number of workplaces for high performance.

Other experts suggest that performance in high-tech workplaces may be 3.5 times higher than the average productivity in the country (Balatsky and Ekimova, 2013, p. 10). However, for Russia, this means only the achievement of the average level of performance in Ireland, Luxembourg, Norway and some other developed countries (Expert RA, 2013, p. 5). In this regard, experts have yet to determine the level of productivity in high-tech workplaces.

At the same time, the Agency "Expert RA" pointed out that, if high-tech manufacturers reach the planned level of performance, they do not need to increase their staff permanently. In addition, such enterprises do not need a lot of employees (Expert RA, 2013, p. 12). This should be taken into consideration in assessing the impact of the decision on the creation of several million high-tech workplaces.

At the same time, the Ministry of economic development of the Russian Federation has established the cost of creating such workplaces in the amount of from 100 to 300 thousand dollars (Balatsky, Ekimova, 2013, p. 11). These thresholds are under discussion.

At the same time, there is a need to clarify the conditions of successful implementation of this solution. In this regard, the authors agree with the colleagues that it is necessary to ensure the quality of skilled personnel training and creating a favorable institutional environment for investments in this process in addition to creating new high-tech workplaces.

22 September 2017 a series of regional events to create high-tech jobs were initiated in the Russian regions. So in Moscow high-tech workplaces are concentrated in technoparks, technopolises and industrial parks mainly. There are preferential taxation of profit, property, land, tax holidays in such business zones. Now Moscow has 31 industrial Parks, in which there are more than 1 700 companies and 30 industrial complexes.

According to the business Ombudsman A. Goncharov 344 thousand units HTW were recorded in the Chelyabinsk region in 2016. The greatest number of such workplaces was in the manufacturing industry – 300 thousand units, education – about 130 thousand units, and trade. One of the criteria for designation of HTW was value added per workplace.

Based on the analysis of the process under study, the authors identified territories and industries in which high-tech workplaces dominated. For example, territories predisposed to a high concentration of HTW include urban, industrial, commodity agglomerations, and also regions-technological leaders. The sectors with a high

share of the HTW include the consumer sector, the services sector, the metallurgical industry, the oil and gas and pharmaceutical industries, the production of office equipment and computers, the production of medical equipment, the production of equipment for radio, television and communications, the production of aircraft, etc. (figure 3).

**Tab. 1** The growth of high-performance workplaces to the previous year

Region	2012		2013		2014		2015		2016	
	thousands of units	%	thousands of units	%						
<b>Russian Federation</b>	1849.1	12.7	1122.8	6.9	788.1	4.5	-1671.9	-9.1	-799.1	-4.8
<b>Central Federal district</b>	680.4	17.0	476.1	10.2	145.0	2.8	-523.1	-9.9	-174.7	-3.7
<b>The North-Western Federal district</b>	147.2	9.1	82.6	4.7	205.9	11.1	-176.4	-8.6	-65.6	-3.5
<b>Southern Federal district</b>	62.8	5.9	60.3	5.3	65.9	5.5	-85.7	-6.8	-65.3	-4.9
<b>The North Caucasian Federal district</b>	48.7	11.3	15.5	3.2	37.0	7.5	-22.1	-4.2	-20.7	-4.1
<b>Volga Federal district</b>	343.8	11.6	291.6	8.8	165.3	4.6	-404.3	-10.7	-176.2	-5.2
<b>Urals Federal district</b>	315.2	20.4	104.3	5.6	53.0	2.7	-186.6	-9.3	-74.1	-4.1
<b>Siberian Federal district</b>	170.6	8.2	80.8	3.6	65.7	2.8	-210.4	-8.8	-165.4	-7.6
<b>Eastern Federal district</b>	80.4	9.9	11.6	1.3	50.4	5.6	-63.3	-6.6	-57.1	-6.4

Source: form № P-4 "Information on numbers and salaries of employees"; No. PM "Information on main indicators of activity of small enterprises"; No. MP (micro) "Information about key performance indicators of microenterprise"; № 1-IE "Information about activities of individual entrepreneurs", No. 1-IE-Torgovlya "Information on the activities of the individual entrepreneur in the retail trade" (www2). Methodological notes: Methodology of calculating the indicator "Growth of high-performance workplaces in percentage to previous year" approved by order of Rosstat from November 14, 2013 No. 449 (with additions from 18.02.2014 № 115 from 26.08.2014, No. 532) and posted on the Rosstat website (www1).

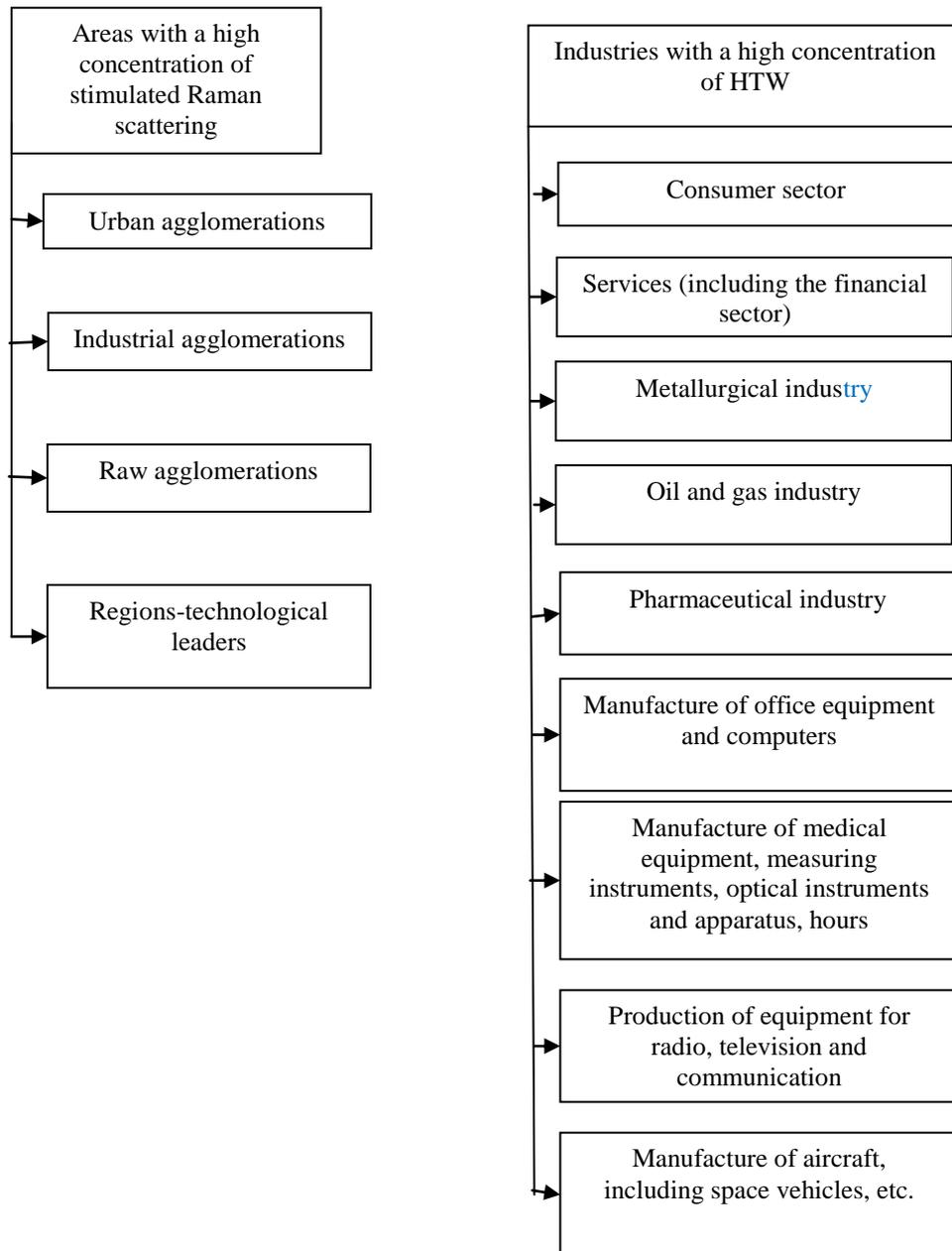
Defining the types of such territories and areas allows purposefully organizing process of creating high-tech jobs, attracting investment and implementing training.

At the same time, most of the created HTWs in modern Russia are not related to industry. This is due to such trends as the formation of assembly production in the most modern enterprises. It doesn't create a large number of workplaces according to the technological processes. There are much fewer workers working in the enterprises that are being formed today than they used to work in similar Soviet ones. The five latest industries listed in (figure 3) in the sectoral specialization section are classified as High technology.

Unfortunately, the agriculture also takes one of the last places in terms of the number of HTW created. This is due to the insufficiency of financial resources and the need for significant investments sent to regions with a significant potential of agricultural land.

In particular, the leading position according to this criterion is metallurgy, wholesale and retail trade and operations with real estate.

**Fig. 3** Types of territories and industries with a high concentration of HTW



Source: Compiled by the authors.

Professions presupposing the existence of the HTW are of particular interest. One person with the qualification of an engineer-technologist can replace 60 turners or milling machine operators per shift, with a two-shift work such specialist replaces 120 people. More recently, the scientists of the SKOLKOVO have presented the Atlas of new professions, which includes 163 fundamentally new professions. 30 of them will be needed in approximately over the 10 years. Some of the listed professions can be classified as high-tech (figure 4).

**Tab. 2** New high-tech professions

Sphere/Industry	New high-tech professions
<b>Medicine</b>	IT-medic, architect of medical equipment, clinical bioinformatics, IT Genetics
<b>Building</b>	The designer of the infrastructure of the «smart house», BIM-manager-designer (BIM-Building Information Modeling), the designer of the accessible environment, the designer of 3D-printing in construction
<b>Scope of security</b>	Remote security coordinator, ergonomic designer of wearable safety devices
<b>Aviation</b>	Unmanned Aviation Interface Designer, developer of Intelligent Dynamic Dispatch Control Systems
<b>Education</b>	Coordinator of the educational online platform
<b>Tourism and Hospitality</b>	The designer of the augmented reality of the territories, the concierge of robotics, the architect of the territories
<b>Media and entertainment</b>	Media policeman, virtual architect, designer of virtual worlds
<b>Biotechnology</b>	Architect of living systems
<b>Energy generation and energy storage</b>	Designer of wearable energy devices, meteorology, specialist in local power supply systems, energy storage designer, projector of recovery systems, developer of microgeneration systems
<b>Agriculture</b>	Agroinformatik / agrokibernetik, GMO-agronomist, operator of automated agricultural machinery
<b>Power Grid and Energy Management</b>	The developer of systems of power consumption, the system engineer of intellectual energy networks, the adjuster / the controller of power networks for the distributed power
<b>Ground transportation</b>	The architect of intelligent control systems, the engineer for transport network safety, the operator of automated transport systems, the builder of "smart" roads, the designer of composite structures for vehicles, the designer of high-speed railways, the technician of intermodal transport solutions, the designer of intermodal transport nodes, the operator of cross-logistics
<b>Water transport</b>	Specialist in navigation in the Arctic, Marine Systems System Engineer
<b>Space</b>	Space engineer, cosmogeologist, life support engineer, cosmobiologist, lifecycle designer of space structures
<b>Extraction and processing of minerals</b>	Engineer of robotic systems, telemetry data interpreter
<b>Metallurgy</b>	The designer of the equipment of powder metallurgy, the designer of new metals, the eco-recycler in metallurgy
<b>New materials and nanotechnologies</b>	Designer of "smart materials", glazier, recycling technologist, designer of nanotechnology materials, system engineer of composite materials
<b>Robotics and machine building</b>	Designer of home robots, designer of medical robots, designer of neurointerfaces for robot control, designer of children's robotics, engineer-composer, ergonomic designer, operator of multifunctional robotic complexes, designer of industrial robotics
<b>Light industry</b>	Programmer of electronic "clothing recipes", clothing recycling specialist, designer of new fabrics, developer of IT interfaces in light industry
<b>IT sector</b>	Neurointerface designer, cybertechnician of intelligent environments, cyber researcher, Big Data model developer, digital linguist, interface designer, information system architect

Source: Compiled by the authors based on the data of The Atlas of New Professions (www3).

So, for example, in the field of medicine, the new professions are IT-physician, architect of medical equipment, clinical bioinformatics, IT-geneticist; in construction: the designer of the infrastructure of the "smart house", BIM-manager-designer (BIM-Building Information Modeling), the designer of the accessible environment, the designer of 3D-printing in construction; in the field of security: a remote security coordinator, a designer-ergonomist of wearable security devices, etc. Thus, the opportunities for creating high-tech workplaces are greatly expanded through the development of existing industries, and through the emergence of new ones.

#### 4. Conclusions

Thus on the basis of presented analysis, we can draw the following conclusions:

- There is a need for a systematic approach to qualitative and quantitative characteristics of modern HTW.

- The processes of formation of HTW in various regions have a distinct sectoral focus, which requires an appropriate conjugate of tax and investment support.
- There is a need to implement current and prospective monitoring of HTWs to control the situation by launching an innovative scenario of development in the regions.

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- (www3) <http://atlas100.ru/catalog/>