DOI: 10.34680/BENEFICIUM.2021.1(38).60-64
УДК 331.108.2
JEL L53, M12, M5

ORIGINAL PAPER

FEATURES OF HUMAN RESOURCE MANAGEMENT IN HIGH-TECH COMPANIES

S.A. Bannikov, Financial University under the Government of the Russian Federation, Moscow, Russia
O.M. Abrosimova, Financial University under the Government of the Russian Federation, Moscow, Russia

Abstract. The fourth industrial revolution, or Industry 4.0, affects all spheres of development of modern society, including the economy: high-tech companies as aggregators of the latest technologies and specialized specialists become drivers of economic development. The authors aim to study the features of human resource management in high-tech companies, taking into account the impact of Industry 4.0 and the specifics of the activities of high-tech companies. In accordance with the set goal, the article identifies the features of Industry 4.0 as a factor of changes in the personnel management system; identified key changes in Russian legislation in connection with the formation of the sixth technological order and Industry 4.0; presents domestic and international practice on the issue of dividing industries according to the level of technology; on the basis of a bibliographic review, the features of high-tech companies and their role in the conditions of new industrialization were revealed; specifics of personnel management in high-tech companies (requirements for the formation of new competencies of personnel, for the process of selection, assessment and training of personnel, for the organization of the work process, for the mode of operation, etc.); identified the problems that high-tech companies face in the context of industrialization and pandemic in the implementation of the personnel management process and presented proposals for solving the identified problems (introduction of a coaching system, introduction of a system of regular psychological assessment of personnel, automation of business processes).
Keywords: high-tech companies, Industry 4.0, pandemic, personnel management, digital vision

For citation: Bannikov S.A., Abrosimova O.M. Features of Human Resource Management in High-Tech Companies // BENEFICIUM. 2021. Vol. 1(38). Pp. 60-64. DOI: 10.34680/BENEFICIUM.2021.1(38).60-64

ОРИГИНАЛЬНАЯ СТАТЬЯ

ОСОБЕННОСТИ УПРАВЛЕНИЯ ЧЕЛОВЕЧЕСКИМИ РЕСУРСАМИ В ВЫСОКОТЕХНОЛОГИЧНЫХ КОМПАНИЯХ

С.А. Банников, Финансовый университет при Правительстве Российской Федерации, Москва, Россия
О.М. Абросимова, Финансовый университет при Правительстве Российской Федерации, Москва, Россия

Аннотация. Четвертая промышленная революция, или Индустрия 4.0, оказывает влияние на все сферы развития современного общества, в том числе и на экономику: высокотехнологичные компании как агрегаторы новейших технологий и профильных специалистов становятся драйверами экономического развития. Авторы статьи ставят целью исследование особенностей управления человеческими ресурсами в высокотехнологичных компаниях с учетом влияния Индустрии 4.0 и специфики деятельности высокотехнологичных компаний. В соответствии с поставленной целью в статье выявлены особенности Индустрии 4.0 как фактора изменений в системе управления персоналом; определены ключевые изменения в российском законодательстве в связи с формированием шестого технологического уклада и Индустрии 4.0; представлена отечественная и международная практика по вопросу разделения отраслей по уровню технологичности; на основании библиографического обзора выявлены признаки высокотехнологичных компаний и их роль в условиях новой индустриализации; определены особенности управления персоналом в высокотехнологичных компаниях (требования к формированию новых компетенций персонала, к процессу отбора, оценки и обучения персонала, к организации рабочего процесса, к режиму работы, др.); названы проблемы, с которыми сталкиваются высокотехнологичные компании в условиях индустриализации и пандемии при осуществлении процесса управления персоналом и представлены предложения по решению выявленных проблем (введение системы коучинга, введение системы регулярной психологической оценки персонала, автоматизация бизнес-процессов).
Ключевые слова: высокотехнологичные компании, Индустрия 4.0, пандемия, управление персоналом, цифровизация

Для цитирования: Bannikov S.A., Abrosimova O.M. Features of Human Resource Management in High-Tech Companies // BENEFICIUM. 2021. Vol. 1(38). Pp. 60-64. (На англ.). DOI: 10.34680/BENEFICIUM.2021.1(38).60-64

Relevance of the study of human resource management issues in companies in high-tech industries is explained by their ever-increasing role as drivers of economic development in the context of the fourth industrial revolution (Industry 4.0). At the same time, for high-tech companies, human capital is key from the point of view of strategic potential, in connection with which its development is a priority task of management.

The purpose of the study is to identify the features of human resource management in modern high-tech companies in connection with changes in the requirements for personnel and the conditions for their functioning in the realities of Industry 4.0 and the COVID-19 pandemic.

In accordance with the purpose, it is necessary to solve the following tasks:

- to identify the specifics of Industry 4.0 as a factor of changes in the personnel management system;
- to analyze and compare the approaches of the Federal State Statistics Service of the Russian Federation (Rosstat), the Organization for Economic Cooperation and Development (OECD) and the United Nations Industrial Development Organization (UNIDO) to the classification of industries by the level of technology quality;
- to identify the traits of high-tech companies and their role in the new industrialization;
- to determine the features of personnel management in high-tech companies (requirements for personnel competencies, the process of personnel selection and training, organization of the work process, etc.);
- to identify the problems that high-tech companies face in the new realities in the implementation of the personnel management process and submit proposals for solving the identified problems.

We will consider the fourth industrial revolution and its impact on human resource management. The term “Fourth Industrial Revolution” (Industry 4.0) was coined by the German economist, founder and permanent president of the World Economic Forum in Davos, Klaus Martin Schwab in 2017. He argues that previous industrial revolutions have freed a number of industries from manual labor, made mass production possible, and provided digital development opportunities for billions of people. However, the fourth industrial revolution is fundamentally different from the rest. It is characterized by a number of the latest technologies that unite the physical, digital and biological worlds, affect all markets and industries, change professions and introduce new necessary skills for workers [1].

Industry 4.0 usually includes the following technologies: artificial intelligence, the Internet of Things, cloud services, virtual reality, augmented reality, additive technologies, big data, cybersecurity, autonomous robots, etc. technologies – from everyday life to business transformation, as well as the systemic nature of the impact [2].

Changes are taking place in Russian legislation due to the formation of the sixth technological order and Industry 4.0.

So, in the Strategy for the development of export of services until 2025, approved by the Government of the Russian Federation in 2019, it is noted that in the context of the fourth industrial revolution, firstly, the world export of services will grow (on average, the growth will be 4.5% per year), and secondly, the sphere of information and telecommunication technologies is “the basis of the digital economy and technological transformations” and, accordingly, should be stimulated by state policy [3].

The order of the Ministry of Digital Development, Communications and Mass Media of the Russian Federation “On Approval of the Concept for the Creation and Development of 5G/IMT-2020 Networks in the Russian Federation” states that the use of 5G networks in manufacturing industries will allow the “transition to a fully automated digital production controlled by intelligent systems in real time in constant interaction with the external environment, going beyond the boundaries of one enterprise, with the prospect of uniting into a global industrial network of things and services (IIoT) (Industry 4.0)” [4].

According to the Decision of the Supreme Eurasian Economic Council dated May 19, 2020, in the new technological order, the main areas of the economy should be “high-tech spheres, based primarily on information technology and artificial intelligence, nano- and biotechnology, digital transformation” [5].

However, the changes are not limited to high-tech industries. Thus, the fuel and energy sector of the economy in connection with the change in the technological structure should contribute to other sectors of the economy in achieving national goals and solving the strategic development tasks of the Russian Federation [6]. New technologies for the extraction and processing of minerals, infrastructure development, new industries should contribute to the transition of the Russian economy to a new technological mode, which will be ensured, among other things, by the products and infrastructure of the mining and oil and gas industries [7].

In such conditions, the employee's competence profile is changing, more and more attention is paid to the soft skills of the candidate in the selection of personnel. Researchers cite emotional liter-

acy, attention management, self-learning ability, cross-culturalism as core skills of the 21st century [8]. Today the most demanded skill among employers is the ability to communicate effectively [9].

The researchers also note that in the context of the fourth industrial revolution, it is important to create a work environment that gives workers more freedom to make their own decisions, inspires them to be more involved and regulate their own workload, including work hours [10].

The challenges of Industry 4.0 also affect other HR processes (training, personnel development, talent management, etc.), as well as create new professions in the field of HR management: director of HR strategy for business, HR data collection specialist, conditions architect labor, remote work coordinator, etc. [11].

We will consider the signs of high-tech companies.

One of the main indicators of the division of industries according to the level of technological intensity in various methods is the indicator of manufacturability, i.e. the ratio of R&D costs to revenue. Rosstat identifies high-tech industries, medium-high-tech industries, medium-tech industries, low-tech industries. The OECD uses the following categories to classify industries: high, medium-high, medium and low technology intensity. The UNIDO methodology has combined medium-tech and high-tech industries into one group of Medium-high technology (CBT, medium and high-tech industries). This is done in order to more adequately assess the economies of developing countries in which high technologies, such as pharmaceuticals, aircraft construction, are underdeveloped. Medium technology industries mainly include the processing of mineral resources. Low-tech industries are predominantly comprised of agro-processing industries.

The high-tech industries in Russia include three industries that are also recognized as high-tech according to the OECD methodology – pharmaceuticals, computer production, aircraft construction and spacecraft production. In the UNIDO methodology, these industries are included in the group of high-tech and medium-high-tech. The OECD also classifies the telecommunications industry as high-tech, which is considered science-intensive in the Rosstat methodology. Rosstat's medium-high-tech industries are almost similar to the OECD's medium-high-tech industries, with the exception of equipment repair and installation, which the OECD classifies as medium-tech. Rosstat also distinguishes a group of "knowledge-intensive industries", which include scientific research, education, telecommunication technologies, etc. [12-14].

Based on the analysis of scientific literature [15-22], we can distinguish the characteristics of high-tech companies:

- the main activity of the company relates to high-tech sectors of the economy;
- the company has technological (product and process), marketing or organizational innovations;
- high Research and Advanced Development costs – at least 8% of revenue;
- highly qualified personnel, as a rule, with higher specialized education and developed teamwork skills;
- systematic professional development of personnel;
- presence of intangible assets in the structure of assets (patents, etc.).

The features of human resource management in high-tech companies include the following.

1) The selection of personnel usually takes place according to the following scheme: application and resume submission – video interviews – video interviews with a recruiter – interviews with the head of the department. Most applications are rejected after the second round.

2) Knowledge management. As a rule, high-tech companies have departments that regularly assess personnel, drawing up the most effective teams for projects based on the employee's knowledge profile. Training is one of the key processes in human resource management of such organizations, since high-tech industries are rapidly developing, and with them new requirements for personnel knowledge appear.

3) High level of employee responsibility. Errors and omissions of employees can be critical for consumers and society as a whole (for example, in pharmaceuticals, manufacturing of medical devices, software development, etc.).

4) Remote operation mode. In connection with the latest developments in the spread of coronavirus infection, more and more technology companies are transferring their workers to remote mode [23].

5) The problem of professional burnout. In tech companies, the problem of professional burnout is quite serious [24]. About 60% of these workers experience burnout [25]. Up to 42% of healthcare workers experience similar symptoms [26]. The spread of a new coronavirus infection has become another negative factor affecting the psychological state of workers in technological industries [27].

In the context of the COVID-19 pandemic, companies in all industries are forced to adjust their HR strategy. General recommendations for human resource management in the current environment can be: formation of an educational platform for employees, ensuring the development of digital literacy skills; determination of the methodology for assessing the performance of employees, taking into account international professional standards; the formation of a strategic way of thinking among staff, which should become part of the corporate culture of the organization [28].

As suggestions for overcoming the problem of burnout and increasing the motivation of employees of high-tech companies, the authors propose the following:

1) to introduce a coaching system; it may include such specialists as an attention coach, a staff engagement coach, a "second action" coach (a specialist who helps middle-aged people overcome fears and doubts on a career path);

2) to introduce regular psychological assessment of personnel; develop the qualities of adaptability in employees in relation to changes, which will help them maintain health and strength;

3) automate business processes and, as a result, reduce the workload on staff; for example, automating big data analysis or uploading data to dashboards.

Thus, Industry 4.0 has an impact on all spheres of human life, including the economy. High-tech companies as aggregators of the latest technologies and specialized specialists are becoming drivers of economic development.

High-tech companies are characterized by high investment costs, regular staff development and a relatively large share of research and development costs. At the same time, human resources are key from the point of view of the company's strategy.

Nevertheless, personnel in such companies face the problems of professional burnout, loss of motivation, which affects the health of employees and production efficiency. The spread of Covid-19 has become another negative stressor for workers. To address this problem, companies can introduce a coaching system for employees, conduct regular psychological assessments of staff, and automate business processes whenever possible.

Authors' Liability Statement

The authors declare no conflicts of interest related to the publication of this article. The article reflects the results of the joint research of the authors.

References

[1] Schwab K. The Fourth Industrial Revolution. PortfolioPenguin, 2017. 192 p.

[2] Schwab K., and Davis N. Shaping the Future of the Fourth Industrial Revolution. Portfolio Penguin. 2018. 288 p.

[3] Order of the Government of the Russian Federation of August 14, 2019 No. 1797-r "On Approval of the Strategy for the Development of Export of Services until 2025" (2019). Russian Government. (In Russ.). URL: http://government.ru/docs/37669/ (accessed on 22.01.2020).

[4] Order of the Ministry of Telecom and Mass Communications of the Russian Federation of December 27, 2019 No. 923 "On approval of the Concept for the creation and development of 5G / IMT-2020 networks in the Russian Federation" (2019). Ministry of Digital Development, Communications and Mass Media. (In Russ.). URL: https://digital.gov.ru/ru/documents/6990/ (accessed on 21.01.2021).

[5] Decision of the Supreme Eurasian Economic Council dated May 19, 2020 No. 6 "On the main guidelines for the macroeconomic policy of the member states of the Eurasian Economic Union for 2020-2021" (2020). Consultant Plus. (In Russ.). URL: http://www.consultant.ru/cons/cgi/online.cgi?req=doc&base=LAW&n=355028&fld=134&dst=1000000001,0&rnd=0.9925243416182141#041413911240617973 (accessed on 21.01.2021).

[6] Order of the Government of the Russian Federation dated 09.06.2020 No. 1523-r "On approval of the Energy Strategy of the Russian Federation for the period up to 2035" (2020). Consultant Plus. (In Russ.). URL: http://www.consultant.ru/document/cons_doc_LAW_354840/ (accessed on 21.01.2021).

[7] Order of the Government of the Russian Federation of December 22, 2018 No. 2914-r "On approval of the Strategy for the development of the mineral resource base of the Russian Federation until 2035" (2018). Consultant Plus. (In Russ.). URL: http://www.consultant.ru/document/cons_doc_LAW_314605/ (accessed on 21.01.2021).

[8] Skills of the future (2020). WorldSkillsRussia. (In Russ.). URL: https://worldskills.ru/assets/docs/media/WSdoklad_12_okt_rus.pdf (accessed on 21.01.2021).

[9] This is the most in-demand skill on job listings right now (2020). FastCompany. URL: https://www.fastcompany.com/90556370/this-is-the-most-in-demand-skill-in-job-listings-right-now (accessed on 21.01.2021).

[10] Kamentsova E.A. Industriya 4.0. i ee vliyanie na upravlenie personalom v nemeckih kompaniyah [Industry 4.0. and its influence on personnel management in German companies] / Sovremennye problemy upravleniya vneshneekonomicheskoj deyatel'nost'yu [Modern problems of foreign economic activity management]: collection of articles of the II International Scientific Conference of Students and Postgraduates. All-Russian Academy of Foreign Trade of the Ministry of Economic Development of Russia. Moscow: All-Russian Academy of Foreign Trade of the Ministry of Economic Development of the Russian Federation. 2020. Pp. 291-299. (In Russ.).

[11] 21 HR Jobs of the Future (2020). Harvard BusinessReview. URL: https://hbr.org/2020/08/21-hr-jobs-of-the-future (accessed on 21.01.2021).

[12] Order of the Federal State Statistics Service of December 15, 2017 No. 832 "On approval of the Methodology for calculating the indicators "The share of high-tech and knowledge-intensive industries in the gross domestic product" and "The share of high-tech and science-intensive industries in the gross regional product of the constituent entity of the Russian Federation" (2017). Garant.ru. Information and legal portal. (In Russ.). URL: https://www.garant.ru/products/ipo/prime/doc/71756596/ (accessed on 21.01.2021).

[13] UNIDO (2020). URL: https://stat.unido.org/content/learning-center/classification-of-manufacturing-sectors-by-technological-intensity-%28isic-revision-4%29 (accessed on 21.01.2021).

[14] ISICRev. 3 Technology Intensity Definition (2011). OECD. URL: https://www.oecd.org/sti/ind/48350231.pdf (accessed on 21.01.2021).

[15] Leontyeva V.B. Narashchivanie stoimosti vysokotekhnologichnoj kompanii za schet intellektualnoj

sobstvennosti [Increasing the value of a high-tech company through intellectual property] // Intellektual'naya sobstvennost. Promyshlennaya sobstvennost [Intellectual property. Industrial property]. 2013. Vol. 4. Pp. 44-48. (In Russ.).
[16] Goraeva T.Y., and Shamina L.K. Attributive sigh high-tech enterprises // Scientific journal NRU ITMO. Series "Economics and Environmental Management". 2014. Vol. 2. P. 38. (In Russ.).
[17] Gavrilova S.V. The fundamentals of high-tech sector and high-tech companies operation // Statistics and Economics. 2014. Vol. 2. Pp. 53-57. (In Russ.).
[18] Vostrikov V.S. High-tech companies as a factor in strategic development of the domestic economy // Creative Economy. 2015. Vol. 9(4). Pp. 473-484. (In Russ.).
[19] Zawislak P.A., Fracasso E.M., and Tello-Gamarra J. Technological intensity and innovation capability in industrial firms // Innovation & Management Review. 2018. Vol. 15(2). Pp. 189-207. DOI: https://doi.org/10.1108/INMR-04-2018-012
[20] Tyutyukina E.B., Abdikeyev N.M., Obolenskaya L.V. Factors hampering innovative activity of Russian enterprises: regional aspect // Economics and Management: problems, solutions. 2017. Vol. 1(8). Pp. 3-13. (In Russ.).
[21] Hernandez M.A. Unveiling International New Ventures' Success: Employee's Entrepreneurial Behavior // Administrative Sciences. 2019. Vol. 9(3). P. 56. DOI: https://doi.org/10.3390/admsci9030056
[22] Gobble M.M. Human Resources as an Engine of Innovation // Research-Technology Management. 2016. Vol. 59(3). Pp. 68-71. DOI: 10.1080/08956308.2016.1161414
[23] Dropbox permanently moved employees to remote locations (2020). VC.RU. (In Russ.). URL: https://vc.ru/office/166900-dropbox-navsegda-perevela-sotrudnikov-na-udalenku-ofisy-kompanii-stanut-mestami-dlya-soveshchaniy (accessed on 21.01.2021).
[24] Employee burnout is a huge problem in the tech industry. This survey shows which companies have it the worst (2018). Business Insider. URL: https://www.businessinsider.com/employee-burnout-tech-companies-silicon-valley-blind-survey-2018-5?r=US&IR=T (accessed on 21.01.2021).
[25] Close to 60 Percent of Surveyed Tech Workers Are Burnt Out — Credit Karma Tops the List for Most Employees Suffering from Burnout (2018). Blind Blog – Workplace Insights. URL: https://www.teamblind.com/blog/index.php/2018/05/29/close-to-60-percent-of-surveyed-tech-workers-are-burnt-out-credit-karma-tops-the-list-for-most-employees-suffering-from-burnout/ (accessed on 21.01.2021).
[26] Physician burnout: Which medical specialties feel the most stress (2020). AMA. URL: https://www.ama-assn.org/practice-management/physician-health/physician-burnout-which-medical-specialties-feel-most-stress (accessed on 21.01.2021).
[27] Tech workers are showing the effects of COVID-19-related burnout (2020). FastCompany. URL: https://www.fastcompany.com/90515519/tech-workers-are-showing-the-effects-of-covid-19-related-burnout (accessed on: 21.01.2021).
[28] Kazadaev M.S., and Bannikov S.A. Pandemic personnel management strategy // CSU Bulletin. 2020. Vol. 6(440). Pp. 144-150. (In Russ.).

Информация об авторах / About the Authors

Сергей Александрович Банников – канд. экон. наук, доцент; доцент, Финансовый университет при Правительстве Российской Федерации, Москва, Россия **/ Sergey A. Bannikov** – PhD in Economics, Docent; Associate Professor, Financial University under the Government of the Russian Federation, Moscow, Russia
E-mail: sabann@bk.ru
SPIN РИНЦ 9726-6857
ORCID 0000-0002-6418-0034
Ольга Михайловна Абросимова – студент; Финансовый университет при Правительстве Российской Федерации, Москва, Россия / **Olga M. Abrosimova** – Student; Financial University under the Government of the Russian Federation, Moscow, Russia
E-mail: abrosimovaom22@gmail.com
SPIN РИНЦ 9437-5576

Дата поступления статьи: 10 февраля 2021
Принято решение о публикации: 20 марта 2021

Received: 10 Feb 2021
Accepted: 20 March 2021