

DOI: 10.37930/2782-6465-2024-3-1-41-51

Evgeny A. Gorin

Institute for Regional Economic Studies, Russian Academy of Sciences (Saint Petersburg, Russia)

POTENCIES AND REALITIES: DIALECTICS IN INDUSTRIAL PRIORITIES

Abstract: The factors determining the personnel component of industrial policy in current conditions of economic turbulence and the formation of a post-economic society are considered. The guidelines for the balanced support of industry from the field of education, the relationship between knowledge and practice in real production, as well as their dialectical mutual influence are discussed. The assessment data by the industrial enterprises of St. Petersburg of the level of training of graduates of St. Petersburg higher and secondary vocational educational institutions, changes in such an assessment in recent years are presented. As a result of the acceleration of scientific and technological progress, three foreseeable directions for industrial production development are proposed.

Keywords: vocational education, industrial policy, production, personnel, knowledge and skills, generic skills, Achilles and the Tortoise.

For citation: Gorin E.A. (2024). Potencies and Realities: Dialectics in Industrial Priorities. *Noonomy and Noosociety. Almanac of Scientific Works of the S.Y. Witte INID*, Vol. 3, No. 1, pp. 41–51. DOI: 10.37930/2782-6465-2024-3-1-41-51

戈林E. A.

俄罗斯科学院区域经济问题研究所 (俄罗斯, 圣彼得堡)

工业优先发展条件下潜力与现实的辩证关系

摘要: 文章探讨了在后经济社会正在形成且经济动荡这样的现代条件下产业政策中人力资源问题的决定因素。讨论了教育领域为工业提供对应服务的指导原则, 阐述了实际生产中知识与实践之间的辩证的相互影响关系。文中提供了圣彼得堡市工业企业对当地高等和中等职业教育机构毕业生素质情况的评估数据, 并介绍了近年来这项评估的变化。作者提出了在科技进步加速条件下工业发展的三个基本预期方向。

关键词: 职业教育、产业政策、生产、劳动集体、知识和技能、通用技能、阿基里斯与乌龟。

引用注释: 戈林 E. A. (2024) 工业优先发展条件下潜力与现实的辩证关系//智慧经济与智慧社会. 维捷新兴工业发展研究所论文选, Vol. 3, No. 1, pp. 41–51. DOI: 10.37930/2782-6465-2024-3-1-41-51

*The swift-footed Achilles will never catch up with the leisurely tortoise
if the tortoise is ahead of Achilles at the beginning of his movement
Ancient Greek philosopher Zeno of Elea (5th century BC)*

Paradigm change and industrial priorities

The national social paradigm – as a general ideological model, as a system of concepts and values accepted by the state and society – actually determines the structure of economic relations, and then forms industrial priorities, the principles of functioning of the “science-education-production” system.

Existing experience demonstrates significant conservatism of production structures; organizational innovations usually follow technological innovations, which ultimately affects the entire life of society. Let us recall the somewhat forgotten thesis today that production relations and productive forces together form a mode of production, on the basis of which the political, ideological and cultural superstructures are formed [Tumashev, Kotenkova, Tumasheva, 2011].

Russian reality in this regard demonstrates unique revolutionary transformations, often having significant negative consequences. A change in the national social paradigm inevitably provokes a serious deformation of the principles on the basis of which state institutions are built and social relations are formed, and, among other things, industrial production becomes a victim. Then the opposite socio-economic action is realized, and another dialectical pattern manifests itself [Ligostaev, 2009].

Thus, considerably rational administrative-planning system, built by the end of the last century, has been abruptly replaced by spontaneous market mechanisms since the 90s, and over the past two decades, government regulation instruments have been increasingly introduced into industrial management.

The permanent transformation of economic structures does not pose any danger; it is a natural result of a new stage of industrial development [Bodrunov, Glaziev, 2023, pp. 92-145] and reflects general global economic trends [Lane, 2022, pp. 113-133]. The only thing is that avalanche-like transformations in Russian reality, supplemented by active foreign pressure, have occurred and are occurring very abruptly and revolutionarily and therefore have a painful impact on the production base and the social relations associated with it.

The rupture in relations with Western countries that had been developing over the past three decades after February 2022 once again significantly changed the picture of industrial cooperation, making an end to the period of relatively benevolent globalization, and, as a result, led to a radical restructuring of the national economic, production and social space.

Forced to react to global transformations and a clear demonstration of the fact that the economy cannot exist “autonomously” from politics, and there is no such thing as a truly existing “free market” [Lane, 2022, p. 71], we have witnessed another change in the social paradigm and guidelines of domestic industrial policy [Gorin, Imzalieva, 2023]. As a result, industrial priorities are changing, including in relations with other public institutions, with the education sector, and with the scientific community.

Social metamorphoses and guidelines for industry

In the process of civilizational development the attitude towards a Human changes, and his status as the main driving force of this development increases. The quality of human life is the

goal of the economy, while people are the main resource of the economy. Thinking itself turns into a real productive force, on the basis of which intellectual capital is formed, acquiring the role of a basic factor in the innovation process, and then – an instrument of influence on the production process and transformation of industry as such [Gorin et al., 2013].

It is impossible to understand the essence of a human being and his place in society without establishing a hierarchy of values that form morality and ethics, and ultimately social meaning and stability¹. From a philosophical point of view, value is abstract, but unlike being, it has a high individual and social significance. This determines the place of values as “regulatory ideas” and ideals of the future, which should be oriented towards the improvement of a Man [Kant, 2015, pp. 394-397].

General philosophical considerations are not so far from practical life. The blurring of moral guidelines and reasonable goal setting has led to the fact that productive and creative activity has lost its relevance in the public mind. As a result, engineering and blue-collar professions have lost their prestige and importance as a mass educational trajectory for Russian youth. The situation, however, is changing, and the demand (so poorly secured in recent years) for qualified scientific and industrial personnel has increased on the part of the labor market.²

In its time, industrialization led to the formation of an army of semi-skilled workers who could be trained in a short time to perform simple machine production operations [Patyrbaeva, 2012]. In modern reality, the key subject of the new industrial society is becoming a representative of the professional engineering class, and the training of workers for industry acquires a corresponding orientation.

That is why modern industrial policy objectively focuses on the integration of the scientific and educational sphere with the sphere of material production in a combination of mutual complements and incentives, the creation of conditions and a combination of interests, the growth of intellectual and organizational resources. The basis for the transition to an innovative type of development is the people themselves and the nature of their internal social motivation in the process of production activities.

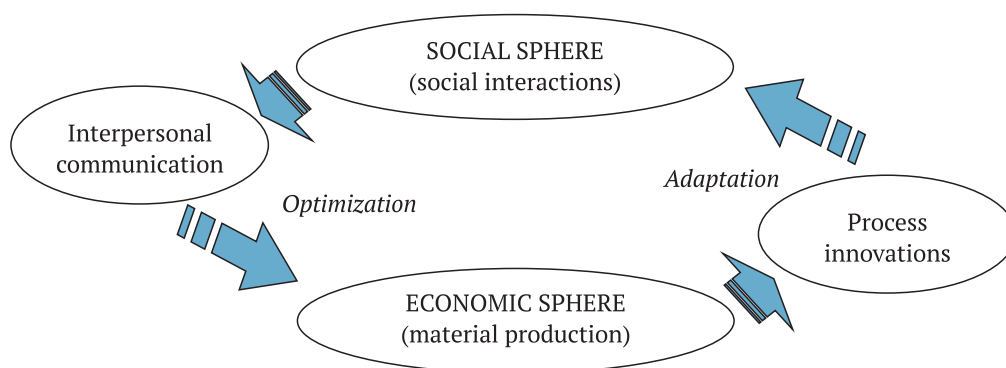


Figure 1. Dialectical connection of socio-economic relations

Figure 1 shows the dialectical connection between social relations and the sphere of material production. The practical results of scientific and technological progress are realized through

¹ The dual unity of rational-theoretical and value-worldview components of philosophy. URL: https://spravochnik.ru/filosofiya/dvuedinstvo_racionalno-teoreticheskikh_i_cennostno-mirovozzrencheskih_komponentov_filosofii/?ysclid=ismvv0qeis633220625 (Access date: 12.02.2024).

² The Main Problem of Russian Industry Is the Lack of Personnel. URL: <https://www.snta.ru/press-center/glavnaya-problema-promyshlennosti-rossii-nekhvatka-kadrov/?ysclid=lto0eog6qd119443540> (Access date : 11.03.2024).

new information and technological capabilities into the expanded potential of social relations, which, for their part, through social communication, generate new knowledge and bring it into the products of material production.

As a consequence for industry, a new type of participant in production activity is becoming increasingly in demand – a “super-industrial subject”, who does not occupy a fixed place in the collective hierarchy and is not inclined to perform routine functions, although remains highly socialized and easily adapts to changing tasks [Toffler, 2003, p. 163].

The need for creative work, characteristic of a modern human being, is significantly increasing, since precisely this kind of work is self-motivating and becomes a need. Only interest can captivate a representative of the younger generation, set up creative motivation for him and distract him from the numerous negative temptations of the surrounding world. Cultivating positive aspirations and an appropriate orientation among young people is possible based on the formation of a social aura and the attitude towards such a task of the entire “chain” of public and educational organizations, starting from school [Gorin, Raskovalov, 2014].

Education and production: Achilles catches up with the Tortoise

In the relationship of socio-economic relations shown in Figure 1, we will try to determine the relationship between production and education from the point of view of their role in practical application of scientific knowledge. By the way, the role of knowledge itself in this relationship is contained in the somewhat paraphrased aporia of the ancient Greek philosopher Zeno of Elea, which in its original version states that *Achilles will never catch up with the tortoise*. In our case, here you can see a very moralizing philosophical meaning – competition for the minds and abilities of the younger generation coming into real material production. And not only this! The role of this young generation in scientific and technological development and material production, reflecting in practice the level of scientific knowledge as well.

The personification of the tortoise can most likely be material production with its complex infrastructure and, of course, personnel with accumulated knowledge and skills, since this is a relatively expensive and inertial object in terms of all resources, slowly moving along the path of technical progress. Achilles is the new personnel for this production, proactive and interested, capable of quickly receiving and accumulating advanced knowledge. There is one nuance: every future employee begins his journey with zero knowledge and skills, at least in his future specific production application. Therefore, let us recall once again what Zeno asserted: *the swift-footed Achilles, no matter how hard he tries, will never catch up with a leisurely tortoise if at the beginning of the movement the tortoise is in front of Achilles*.

As is commonly known, the conflict proposed by Zeno is relatively easily resolved if we clarify the starting positions of the participants of this race, which we have transferred to the intellectual plane of a practical situation.

If at each moment of time a new start is made, then the race begins from the starting position, and while Achilles makes the first movement, the tortoise will crawl further away from him and remain ahead. And so over and over again, and as a result, Achilles really cannot catch up with the tortoise. As soon as we move away from local isolated situations and rely on the continuity of the process, then, obviously, Achilles' high speed ensures his victory over the tortoise¹.

¹ Explanation of Zeno's Aporia “Achilles and the Tortoise”. URL: https://dzen.ru/a/Y75P-uLvYIB_1gll (Access date: 28.02.2024).

It is curious that, at first glance, our philosophical analogy in the real relationship “new personnel – existing production” is closer to the situation of Achilles who is constantly lagging behind. Indeed, each future employee begins with zero (or, in any case, incomplete, especially for a new production) level of knowledge and skills, which means that with each new student a new countdown begins in the movement towards knowledge and skills already applied to his new place of work. In practice, this is exactly the picture that is usually observed. As a result, production sets the pace for the accumulation and practical implementation of technical potential, which the education system monitors and prepares new workers for these production needs on the basis of accumulated knowledge. This is what Figure 1 demonstrates.

The situation changes dramatically if we take into account modern realities – the hyperactive role of science, when “knowledge plays an increasingly important role, turning into a driver of knowledge-intensive production.” In fact, knowledge, becoming the main production resource and direct productive force, largely replaces the means of production in the new industry [Bodrunov, 2018, p. 177].

Then, in the process of acquiring knowledge by a future employee, yet a student, the dialectical connection of education, science and production “works”. As shown in Figure 2, in preparation for the upcoming work activity, the student goes through the well-known path “from living contemplation... to practice” [Lenin, 1969, pp. 152-153]. And this is a process of education, which is not only completed in production, but is constantly accompanied by scientific knowledge. It is the unification of science and production, when an enterprise (each, to one degree or another, innovative), in fact, not only produces a product, but also generates scientific knowledge and makes it possible to reduce the gap in the “education-production” system. Then: *Achilles and the tortoise run in lock step.*

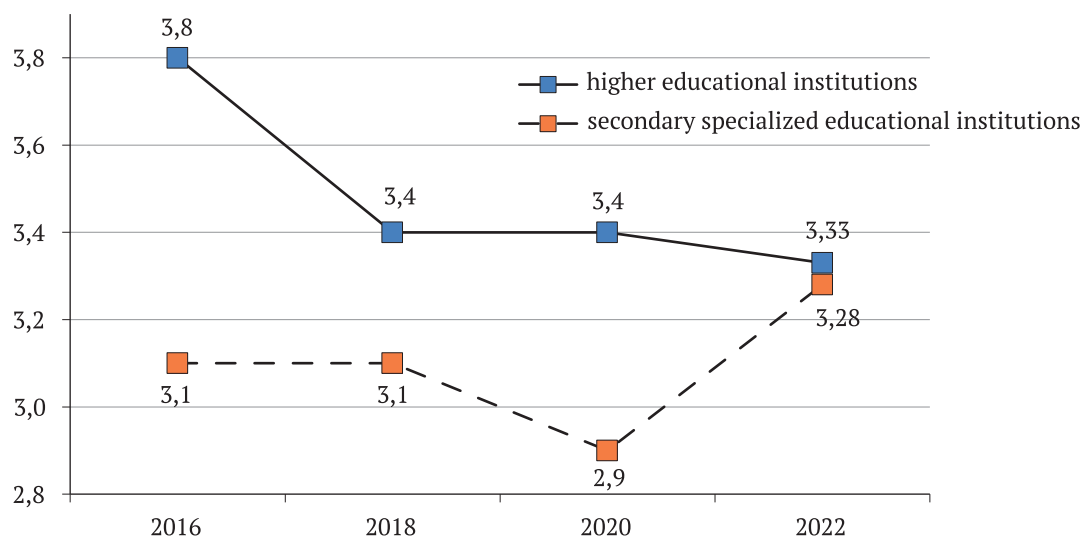


Figure 2. The dialectical connection between education, science and production in the process of acquiring knowledge by the younger generation

In such a setting, can Achilles outrun the tortoise?

Apparently, he can, since modern science makes it possible, within the framework of the educational process, to prepare specialists whose knowledge is ahead of the level of even the most

advanced production. Then a contradiction will arise: such new employees “overflowing with potentialities” will come to existing production, which is unlikely to be able to quickly absorb their knowledge, which has not yet been absorbed by the industry. This means that the practical application of innovations and the next step along the path of scientific and technical progress will take time. Here is the result: *Achilles will be slowed down, Achilles and the tortoise will run in lock step.*

A practical example of this situation in its successful form is the activity of national research universities, since the purpose of their creation was to form teams of practical specialists whose knowledge and skills are ahead of the level achieved by existing production and are capable of introducing new knowledge and becoming locomotives of industrial development. And even more, making a workable prototype or even a practically working product. It is then that the following scenario shall be realized: *Achilles will drag the tortoise!*

Education and production: dialectical unity

Next, we shall present some results of practical assessment monitoring made by the employers, of training quality of the graduates of higher and secondary vocational educational institutions who start working in St. Petersburg industry [Gorin, 2016; Kuznetsov, Gorin, Imzalieva, 2023], on a five-point scale.

Expectations and realities combined with the scope of potential and specific actions of all participants in the personnel training process, the system of motivation in the public mind and in the youth environment – all this determines the specifics of forming the structure of production personnel and selecting new employees for specific enterprises, dedicated groups of economic entities subjects and of the economy as a whole.

Multidirectionality of the presented estimates and their alteration over time depending on the changing economic situation should be taken into consideration. On the one hand, this is the attractiveness and quality of educational training, youth (public) preferences, and on the other hand, the requirements of employers and their expectations. All factors undergo changes over time, and in our “dynamic century” they are changing quite actively. If we add to this the significantly changing order of interaction between “school – college – university – enterprise” and the forms of state (public) participation in this process, then the relationships are becoming more and more complicated.

In our case, let us turn only to assessing the level of universal competencies of graduates, that is, characteristics associated with general knowledge, value-semantic attitudes and personal qualities. It is universal competencies that allow a person to realize creative potential and adapt to changing conditions, and help solve problems regardless of their usual field of activity. This also implies a very important quality – willingness to take up responsibility and demonstrate leadership abilities.

Figure 3 shows an assessment of the level of universal competencies and the dynamics of such assessment regarding the graduates of higher and secondary specialized educational institutions hired in 2016–2022 by enterprises and organizations that are members of the Union of Industrialists and Entrepreneurs of St. Petersburg. University graduates do not yet meet employers’ expectations, although the deterioration of the situation has clearly slowed down, despite the increase in labor market requirements for holders of higher education diplomas in recent years.

If at the beginning of the observation period college graduates showed almost no noticeable dynamics, then in recent years, not without reason, we expect positive changes.

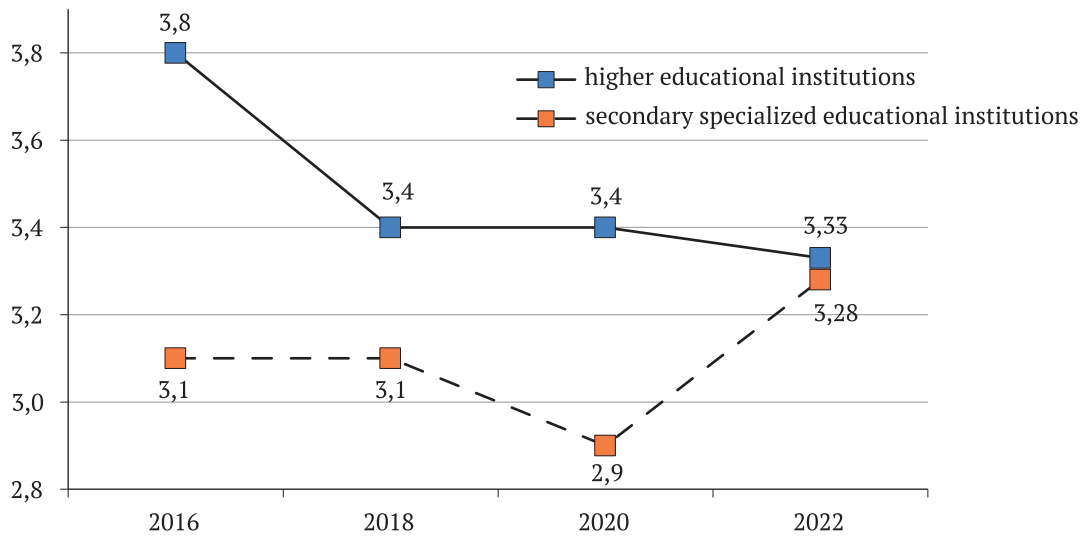


Figure 3. Assessment of the level of universal competencies of graduates of higher and secondary specialized educational institutions hired in 2016–2022 by enterprises and organizations – members of the Union of Industrialists and Entrepreneurs of St. Petersburg

Similar data are presented for various production groups: large industrial enterprises (Fig. 4); medium and small industrial enterprises (Fig. 5); scientific and technological organizations (Fig. 6).

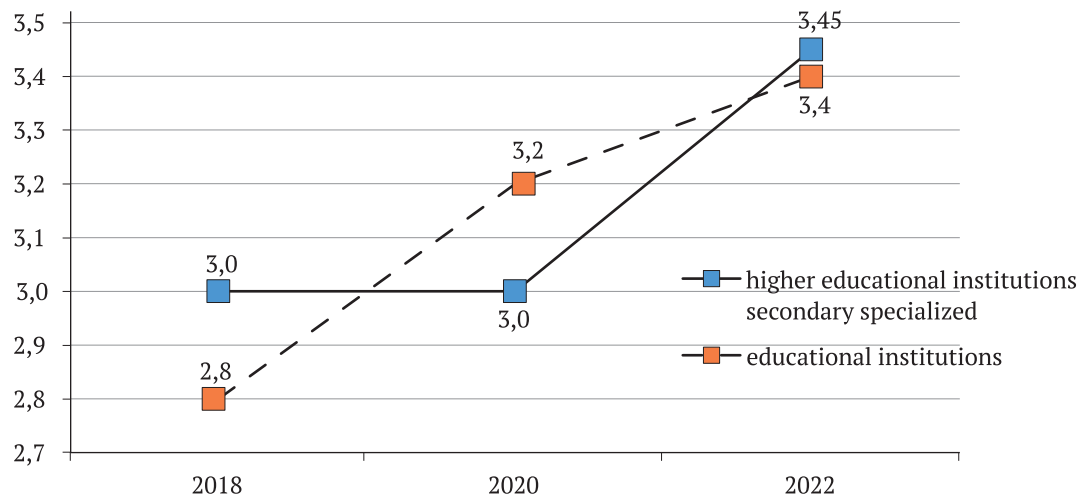


Figure 4. Assessment of the level of universal competencies among graduates of higher and secondary specialized educational institutions hired in 2018–2022 at large St. Petersburg industrial enterprises

For all economic entities, quality level of graduates coming to large industrial enterprises both from colleges and universities tends to increase based on this parameter. At the same time, heads of small and medium-sized industrial enterprises, scientific and design organizations show a noticeable decline in their assessments of university graduates. Apparently, the operating conditions of this sector of the economy have become noticeably more complicated, the problems faced by managers have increased, and the exigencies for the new employees have become stricter.

In addition, it is worth considering that the mutual work of educational institutions and human resources services of large industry have become much better organized.

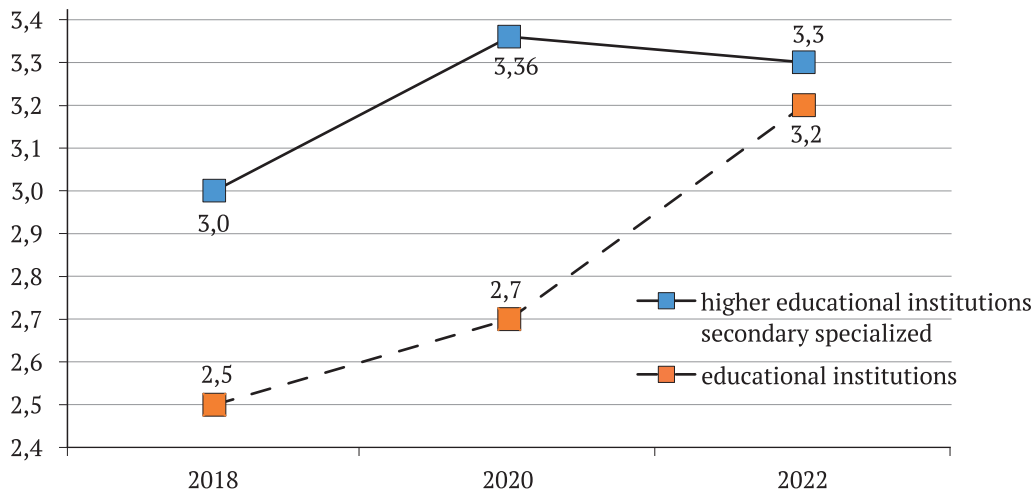


Figure 5. Assessment of the level of universal competencies among graduates of higher and secondary specialized educational institutions hired in 2018–2022 at medium and small St. Petersburg industrial enterprises

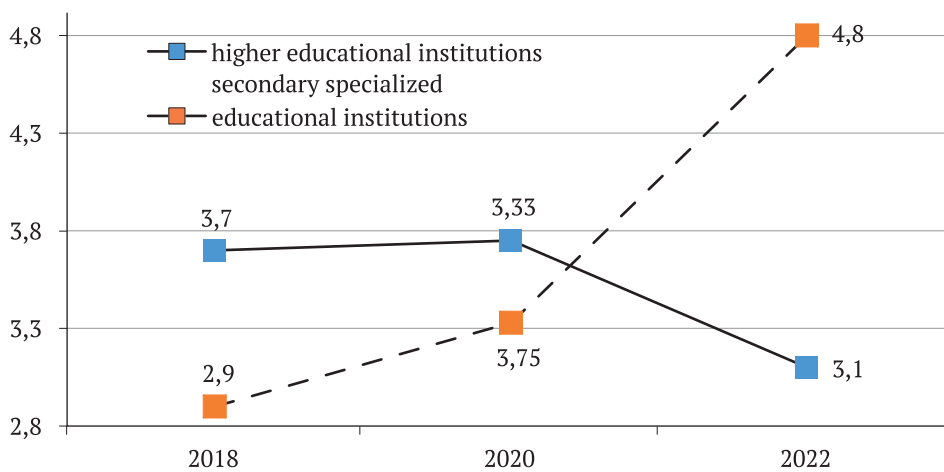


Figure 6. Assessment of the level of universal competencies among graduates of higher and secondary specialized educational institutions hired in 2018–2022 in St. Petersburg scientific and technological organizations

Basis for a new social paradigm

Not only the system of higher engineering education today is capable of becoming a serious driver of technical progress, outstripping the production of even an innovative industrial enterprise. Just look at the list of competencies for which the All-Russian Professional Skills Championship is held. The competition is based on already existing labor functions and real types of production activities that are in demand in the domestic labor market, confirmed by employers and within

the framework of ongoing areas of secondary (!) vocational education¹. Here are just a few of the 45 such competencies: web technologies, information security, corporate protection against internal threats to information security, neural networks and big data, space systems engineering, flying robotics, mechatronics, geospatial digital engineering, laser technologies, etc.

In this case, the growing interest of young people in studying at reputable colleges is understandable. Competition for admission in 2023 to receive secondary vocational education at the Zh. Ya. Kotin Academy of Mechanical Engineering even for traditional specialties was as follows: “Operator of computer-controlled machines” – 7.8 people/place (after 9th grade); «Foreman of instrumentation and automation” – 5.76 people/place; “Additive technologies” – 5.42 people/place (after 9th grade); “Mechanical Engineering Technology” – 5.28 people/place (after 11th grade)².

The atmosphere in engineering training is changing even more. The experts note the pragmatism of today’s youth and focus on results. The prestige of the diploma and its marketability in the labor market have begun to play a major role; the students are taking a more responsible approach to the process of acquiring professional knowledge from the first years of study, gravitate toward research work, and are able to quickly find the necessary information and grasp its essence³.

The federal project “Advanced Engineering Schools” is aimed at integrating science and education with production to train highly qualified engineers of the new generation, capable of providing the country not only with technological sovereignty, but also with scientific and industrial advance⁴. Each of the leading engineering schools, and 50 Russian universities have already joined the project, is working in one or more relevant scientific and technological areas that correspond to the profile and needs of key partner companies and are designated as priorities in the national «Strategies for scientific and technological development of the Russian Federation»⁵. The integration of science, education and production in such Schools is complemented by internships and practical training for students at enterprises, the involvement of company employees in teaching and the improvement of the practical competencies of university professors.

Production: dialectics in differentiation

After a very optimistic picture that determines the formation of an effective team of qualified and creative employees, whose knowledge and skills have been developed in the “school-college-university” system, the connection of science allows us to look beyond the industrial production that actually exists today. The question arises about the production itself: will it become a tortoise, dragged along by the swift-footed Achilles on a high-tech leash?

Indeed, scientific and technological progress sets its priorities, potentials and desires are superimposed onto possibilities and practical feasibility. But dialectical diversity [Tsyrendorzhiyeva,

¹ Competencies. All-Russian Championship Movement in Professional Skills. URL: <https://pro.firpo.ru/kompetent-si/?ysclid=lt6vos8k8y758623753> (Access date: 28.02.2024).

² Average Score of Applicants’ Certificates. Nevsky Machine Builder. 2023 (October). Vol. 13. No. 2. P. 4. URL: <https://academykotin.ru/file/news/np/N%20%20%2813%29%20oktyabr%202023%20r.pdf> (Access date: 11.03.2024).

³ Rumyantseva A. Professors of Russian Universities Talk About How Students Have Changed Over Ten Years . Jan. 25th 2024. URL: <https://russian.rt.com/russia/news/1262908-studenty-izmeneniya-vuzy> (Access date: 25.01.2024).

⁴ Advanced Engineering Schools: What Is This Project and Who Is Involved in It . Feb 2 2024. URL: <https://skillbox.ru/media/education/peredovye-inzhenernye-shkoly-chto-eto-za-proekt-i-kto-v-nyem-uchastvuet/?ysclid=lt75kgywt331557305> (Access date: 28.02.2024).

⁵ Decree of the President of the Russian Federation of February 28, 2024 No. 145 “On the Strategy for Scientific and Technological Development of the Russian Federation.” URL: <https://www.garant.ru/products/ipo/prime/doc/408518353> (Access date: 28.02.2024)/

2012] has not been canceled! Let us consider that "... in the evolution of society, culture and personality, the breadth of the nonlinear spectrum is incomparably greater than in the development of natural systems – greater precisely because the choice of movement trajectories is determined by the free goal-setting of individual and group subjects, reaching special strength with the entry of a story of an individual into the arena" [Kagan, 2002, p. 47].

Apparently, modern industrial production will be implemented in three consistent and related, but very different and independent directions, such as: multi-batch automated, small-batch innovative and individual creative direction.

The criteria for their difference are quite obvious, and they can be characterized by formal characteristics by: the number of employees; means of production used (areas); shares in total production or GDP; efficiency (profitability, contribution to technological development or to the functioning of society). Finally, a factor that is difficult to quantify is social significance.

Industrial production, as a socially important and dialectically developing complex, is increasingly "immersed" into scientific and technological progress, maintaining the possibility and necessity of differentiation, while remaining in the dialectical unity of diverse social needs.

Conclusion

To sum up the attempt to understand the relationship "science – education – production", it should be noted that modern requirements inevitably "paint" the image of an employee joining an enterprise team as a specialist with a broad outlook, deep knowledge and professional skills, possessing communication skills and leadership qualities, capable of solving non-standard problems. It is on this path that a dialectical and progressive combination of potentials and realities is possible.

References

- Bodrunov S.D. (2018). *Noonomy. M.: Cultural revolution*. Publ. 432 p. (In Russ.).
- Bodrunov S.D., Glaziev S.Yu. (2023). *Regularities of the Noonomy Foundations Formation as Future Social Order: To Know and Operate*. St. Petersburg: S.Y. Witte INID; Moscow: *Centercatalogue*. 340 p. (In Russ.).
- Gorin E.A. (2016). The Effectiveness of Russian Economy and Modernization of Production Process. *Bulletin of Science and Practice*. Vol. 13. No. 12. Pp. 280-285. (In Russ.).
- Gorin E.A., Imzalieva M.R. (2023). Modern Industrial Policy: Technological Sovereignty. *Bulletin of Science and Practice*. Vol. 9. No. 1. Pp. 238-245. (In Russ.).
- Gorin E.A., Krasikov A.A., Raskovalov V.L., Romanovskaya E.V. (2013). Social Goals of the Innovation Process: The Human Factor. *Innovations*. Vol. 173. No. 3. Pp. 39-45. (In Russ.).
- Gorin E.A., Raskovalov V.L. (2014). Professional Guidance of Schoolchildren and Increasing the Significance of Engineering Activities in the Public Consciousness Are the Basis for the Implementation of Socio-Economic Development Programs. In: *Formation of the Prestige of the Engineering Profession Among Modern Students*. Proceedings from the Second Interregional Scientific and Practical Conference. St. Petersburg: Linguistic Center "Taykun". 135 p. Pp. 34-38. (In Russ.).
- Kagan M. S. (2002). The Synergetic Paradigm Is the Dialectic of the General and the Specific in the Methodology of Cognition of Different Spheres of Existence. In: *Synergetic Paradigm. Nonlinear Thinking in Science and Art*. Moscow: *Progress-Tradition*. 495 p. Pp. 28-49. (In Russ.).

- Kant I. (2015). *Critique of Pure Reason*. Moscow: Eksmo. 736 p. (In Russ.).
- Kuznetsov S.V., Gorin E.A., Imzalieva M.P. (2023). National Technological Sovereignty and Three Levels of Industrial Human Resource Endowment. *Economics and Management*. Vol. 29. No. 8. Pp. 938-955. (In Russ.).
- Lenin V.I. (1969). Summary of Hegel's Book "The Science of Logic". In: *Complete Works of V.I. Lenin*. Vol. 29. Moscow: Politizdat. 783 p. pp. 77-218 (In Russ.).
- Ligostaev A.G. (2009). Historical Alternativeness in the Development of Societies. *Bulletin of ISU. Series: Philosophy*. Vol. 7. No. 2. Pp. 58-62. (In Russ.).
- Lane D. (2022). *The Capitalist Transformation of State Socialism: The Making and Breaking of State Socialist Society, and What Followed*. Moscow: S.Y. Witte INID; Centercatalogue. 320 p. (Series "Modern Economic Thought"). (In Russ.).
- Patyrbaeva K.V. (2012). Modern Society, Labor and People in the Concepts of Post-industrial Society. *Bulletin of Perm University. Series: Philosophy. Psychology. Sociology*. Vol. 10. No. 2. Pp. 53-68. (In Russ.).
- Toffler A. (2003). *Shock of the future*. Moscow: AST Publishing House. 557 p. (In Russ.).
- Tumashev A.R., Kotenkova S.N., Tumasheva M.V. (2011). *Economic Theory in Two Parts. Part 1. In- troduction to Economics. Microeconomics*: Textbook manual for students of non-economic specialties. Kazan: Kazan University. 204 p. (In Russ.).
- Tsyrendorzhieva D. Sh. (2012). Dialectics of Unity and Diversity in the Development of Social Systems. *Bulletin of Buryat State University*. No. 6. Pp. 17-20. (In Russ.).

Information about the author

Evgeny A. Gorin

Chief Research Fellow of the Institute for Regional Economic Studies, Russian Academy of Sciences, Doctor of Economics, Professor (38 Serpukhovskaya St., Saint Petersburg, 190013, Russia)

E-mail: gea@spp.spb.ru