

Analysis of Students' Innovative Behavior Strategies



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Abstract. The relevance of the research is determined by the need to study the influence of subjective factors and socio-cultural characteristics of actors on the realization of their innovative potential in the current conditions of tightening sanctions policy in the field of high technologies by Western countries. The aim of the study was to find a connection between the types of professional strategies formed by university students and their innovative practices within the framework of university activity. Innovative

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activity and features of professional strategies are analyzed in a regional context – using the example of three large industrial centers – Yekaterinburg, Tyumen and Volgograd, as well as two metropolitan cities – Moscow and Saint Petersburg. To study the innovative behavior of students, the authors use an activity-based approach, considering innovative activity as a social quality of a subject, implying its internal readiness to master, use, disseminate and create innovations, and highlighting the levels of innovative activity – innovative receptivity and innovative readiness. The conclusions of the article are based on the results of an empirical sociological survey of students of 2–3 undergraduate courses of leading universities of the studied megacities (N=1050), the selection was carried out according to a quota-nest sample). According to the results obtained, a significant part of the regional students is not involved in any types of innovative practices. Students of megacities especially regional are characterized, first, by insufficient innovative activity at the basic level (participation in grant competitions, scientific conferences and seminars, research practices), and second, by a low degree of involvement in scientific and technological creativity and business design. Using the clustering procedure, a typology of students' professional strategies has been developed, five types of strategies have been identified: “professional employment”, “academic career”, “delayed self-determination”, “emigration and uncertainty” and “independent entrepreneurial”. Using correlation analysis methods, it was found that, first, the “academic career” strategy, which promotes active research and inventive practices, and, second, the “independent entrepreneurial” strategy, which correlates with the active implementation of innovative practices in business planning, development of creative and start-up projects, have the greatest innovative potential. “Emigration and uncertainty strategy” is less associated with active innovative activity and is characterized by the lack of formation of professional plans for the near future and intentions to seek work abroad. The “professional employment” strategy, which does not promote active innovative and creative practices, also has low potential. It is pointed out that the dissemination of latest strategies reduces the potential contribution of students to the innovative component of the Russian economy.

Key words: innovative activity, professional strategies, student youth, quantitative survey, cluster analysis.

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Introduction

Attention to the innovative activity of various social groups, including youth, increased in 2010–2015, and the peak of interest of the scientific community in this topic occurred in 2015 and 2016. The growth of scientific interest is recorded by the number of scientific publications in authoritative Russian economic and sociological journals. Thus, an analysis of publications in the Russian Science Citation Index scientometric database shows that from 2010 to 2019 the number of scientific articles that somehow address the topic of innovation in

connection with socio-economic development amounted to more than 4,500 publications, or an average of about 460 publications per year¹. However, further we observe a noticeable decline in interest in this topic (from 2020 to 2024 approximately 1,370 articles were published, i.e. only 274 on average per year), which we find

¹ The search for publications in the RSCI database was carried out using the key words “innovative activity”, taking into account morphology over five-year intervals: 2005–2009, ... up to 2024.

extremely unjustified, since in the context of the tightening of sanctions policy in the field of high technology against Russia by the European Union and the United States, it is especially important to unlock the potential for economic development by introducing and creating own innovations. Therefore, today it is necessary not only to study the institutional possibilities of innovative development of the economy of a country or regions (the state of innovation infrastructure and innovation institutions), which is mainly the focus of economic scientists (Gokhberg, 2011; Erokhina, Kuznetsova, 2015; Bizhoyev, 2019; Glazyev, Kasakyan, 2024, etc.), but also to pay attention to subjective factors like the innovativeness of various social actors, which is more relevant to sociological science. Value-motivational barriers, features of social interaction and behavioral characteristics of business entities can slow down or impede the implementation of innovative intentions (Karacharovskiy, Shkaratan, 2019); however, with a properly structured social and economic policy they can be managed via corrective decisions. Such subjective factors include the choice and construction of professional strategies by the student youth, the most promising social group in terms of potential contribution to economic development (Vishnevskiy, Vishnevskiy, 2012).

In our study we tried to identify typical characteristics of students' professional strategies and correlate them with practices related to the implementation of innovative potential mainly within the framework of university activity.

Megacities and metropolitan-type cities with wide opportunities for realizing the innovative potential of young people, but differing in their socio-cultural status and socio-economic significance, were chosen as the research space. We analyzed professional strategies and innovativeness of students in the capital regions – Moscow and Saint Petersburg, as well as in large regional centers, using the example of Volgograd, Yekaterinburg and Tyumen students.

Moscow and Saint Petersburg are the most attractive clusters for the accumulation of promising and skilled human capital, primarily young people and students. This is largely due to the current uneven cultural and socio-economic development of Russian regions, including the inequality between the center and other regions, which is reflected in resource provision, infrastructure development, amount of investment, etc. (Nefedova et al., 2022). According to the scientific expertise of the Institute for Urban Economics, the contribution of the gross urban product (GUP) of the urban agglomerations of Moscow and Saint Petersburg to GDP significantly exceeds the contribution of the other 17 largest Russian agglomerations: the contribution of the Moscow agglomeration is 22.8%, the Saint Petersburg agglomeration – 7.6%, followed by the Yekaterinburg agglomeration – 1.9%, and the Volgograd agglomeration – 0.8%², which ranks 16th.

Nevertheless, the regional centers we have selected for the study also have significant demographic and socio-cultural potential for innovative development. As megacities with a population of more than one million people (as of January 1, 2022, Yekaterinburg – 1,493.6 thousand people, Volgograd – 1,001.2 thousand people), or approaching a million in the case of Tyumen (as of January 1, 2022, 828.6 thousand people)³, they form large urban agglomerations, have their own scientific and industrial infrastructure⁴ (Deev et al., 2022; Drozdova, 2023; Sushchaya, 2022, p. 118); that is, they can potentially act as points of

² The economy of Russian cities and urban agglomerations. Issue 8: Gross urban product of the largest urban agglomerations of Russia in 2013–2021. Moscow: Institute for Urban Economics Foundation, 2023. P. 8. Available at: <https://urbaneconomics.ru/research/project/ekonomika-rossiyskih-gorodov-i-gorodskih-aglomeratsiy> (accessed: July 27, 2024).

³ Regions of Russia. Main socio-economic indicators of cities: Statistical collection. Moscow: Federal State Statistics Service (Rosstat), 2022.

⁴ Monitoring of Yekaterinburg's industry. 2022. Yandex DataLens. Available at: <https://datalens.yandex/3nh40w51fcdos?tab=yLK>

attraction for educated and skilled youth as a space for their self-realization, professional and personal growth.

However, there are also significant differences between them, primarily in the socio-economic situation. Although Yekaterinburg and Tyumen, like Volgograd, experienced deindustrialization in the 1990s, associated with a reduction in the share of industrial production in GRP, including high-tech, in comparison with Volgograd they demonstrate a more successful strategy of socio-economic development by attracting financial flows to the region and developing the service sector (in the case of Yekaterinburg) and hosting business units and subsidiaries of oil producing and refining companies (in the case of Tyumen). This is clearly reflected in the main socio-economic indicators of recent years and in the materials of special research on the development of regions and urban agglomerations. In particular, according to Rosstat, in 2021, the average monthly nominal accrued wage of employees of organizations in Yekaterinburg amounted to 63,818.0 rubles, and in Volgograd it was significantly lower – 44,800.7 rubles, and Yekaterinburg is characterized by a significantly higher volume of investments in fixed assets (from 177,624.2 million rubles in 2019 to 174,942.8 in 2021) in comparison with Volgograd (from 67,106.1 to 70,732.6 million rubles for the same period)⁵. In addition, based on the results of a study by N.V. Tonkikh, A.V. Verbenskaya and T.A. Komarova, we can note that Yekaterinburg ranks third after Saint Petersburg and Kazan in the ranking of million-plus cities by urban development in terms of attractiveness for young families with children, while Volgograd ranks 14th out of 15 megacities (Tonkikh et al., 2023). Tyumen is significantly inferior in population to both Yekaterinburg and Volgograd; however, by focusing strategic

development priorities on the IT cluster, oil refining and petrochemicals (Deev et al., 2022), it surpasses them according to a number of socio-economic indicators, in particular in terms of the average monthly nominal accrued wage of employees of organizations (in 2021 in Tyumen it amounted to 71,705.6 rubles); in terms of investments in fixed assets Tyumen lags behind Yekaterinburg, but is significantly ahead of Volgograd (from 68,998.8 million rubles in 2019 to 94,379.3 million rubles in 2021)⁶. According to a study by A.S. Deev, N.V. Krasovskaya and S.I. Chernomorchenko, the advantages of Tyumen that enhance its potential attractiveness to young people include a high level of urban improvement and infrastructure development: for a number of years Tyumen has ranked third in the framework of the All-Russian competition “The best well-maintained city in Russia” (Deev et al., 2022).

Thus, the context of youth's formation of professional development strategies and the objective conditions for unlocking their innovative potential in the megacities under consideration can be determined both by similar socio-cultural characteristics in the development of metropolitan cities and million-plus cities, and by the specifics of their current socio-economic development.

Research methodology and methods

The theoretical and methodological framework of the study is determined by the interpretation of two concepts, which, from our point of view, are interrelated: innovative activity of young people and their professional strategies. Before analyzing this relationship at the theoretical and empirical levels, let us focus on what innovative activity means, in what forms it can exist, and what characteristics available to the sociological dimension it includes.

Mostly, “innovation” is interpreted as a complex process of commercialization of novelties, which is

⁵ Regions of Russia. Main socio-economic indicators of cities: Statistical collection. Moscow: Federal State Statistics Service (Rosstat), 2022.

⁶ Regions of Russia. Main socio-economic indicators of cities: Statistical collection. Moscow: Federal State Statistics Service (Rosstat), 2022. Pp. 336–337.

initiated by the presence of a problematic situation and ultimately contributes to economic growth (Singh, Aggarwal, 2021). However, economic growth in modern society is determined by the quality of human resources, which correlates with such properties as creativity, intelligence, cognitive and learning abilities, i.e., in fact, the innovative characteristics of specific social groups with the greatest potential are emphasized. This determined our research position regarding the interpretation of students' innovative activity as an activity associated with a wide range of intellectual, creative and entrepreneurial practices.

The generalization of research concepts that have now emerged in the scientific literature has allowed us to identify two main approaches on the basis of which it is possible to study innovative activity: the institutional approach, practiced to a greater extent by economic scientists, and the activity-based approach, put forward within the framework of sociological science.

From the standpoint of the economic (institutional) approach, innovative activity is studied as an integral indicator characterizing the degree of economic development of a country, region, industry or organization, and is analyzed mainly within the framework of the "triple helix" concept (Klyucharev, Chursina, 2021; Strand et al., 2017; Etkowitz et al., 2023).

The sociological (activity-based) approach implies that the focus of research is the innovative activity of individuals, social groups, or society as a whole as a specific type of social activity. Adhering to the sociological approach, we will consider innovative activity as a social quality of a subject (actor of socio-economic processes), in this case, student youth, implying their internal readiness to master, use, disseminate and create innovations.

Considering innovative activity as a social property of the subject of activity, we identify several levels in its structure. We have identified their specific components based on established theories of

innovation and creativity, as well as using the results of a number of empirical studies on innovative behavior.

First, at the basic level, young people develop innovative openness (or innovative receptivity) – the ability of agents to realize the importance and necessity of innovations, the need to receive information about innovations and the ability to integrate them into their daily and professional lives (Bannikova, Ermakov, 2020). Sociologists and economists, since the times of human capital theorists, have pointed out the key role of education and training in this process (Mincer, 1958; Becker, 1964). According to the research of Russian sociologists I.G. Dezhina and G.A. Klyucharev, lifelong additional education is especially important for an innovative economy (Dezhina, Klyucharev, 2018). In relation to the objectives of our research, this means that the innovative openness of young people determines their ability to improve professionally and raise their educational and skill levels.

Research shows the positive impact of youth research activity on the development of knowledge-intensive production, as it contributes to the development of competencies necessary for an innovative economy. In particular, students' grant and publication activity, participation in research and scientific events have a positive impact on the innovative qualities of young people, as they form the intellectual ability to comprehend reality (Stromov, Sysoev, 2017; Vasilyeva, 2019).

Second, a higher level of innovative activity – innovation readiness – is determined by young people's degree of creativity and their willingness to realize their creative potential. R. Florida and C. Landry (Florida, 2002; Landry, 2000) drew attention to the increasing role of creative strata and groups in modern innovative society. Russian scientists also point out the existence of a link between innovative behavior and creativity (Buzgalin, 2017; Lugin, Didkovskaya, 2022). The creative potential of young people can be realized in

various practices, including in project activities. In this regard, two more forms of innovative activity can be distinguished – participation in youth creative and startup projects and youth entrepreneurship. A number of authors point out that scientific and technological startups promote the innovative sector of the economy and represent generators of ideas and creative developments (Lobareva et al., 2018; Milyuchikhina, 2020), other scientists associate the innovative activity of young people with participation in entrepreneurial projects. At the same time, there are two points of view on this issue. According to the first one, innovative activity should primarily include only participation of young entrepreneurs in small businesses and exclusively in scientific and technological startups, which, unlike large businesses, can significantly shorten the path from a creative idea to a ready-to-implement innovative solution (Frolova, 2015). We are more in solidarity with the second point of view: young people who offer their business ideas and, in principle, participate in entrepreneurship, are already demonstrating a creative approach; accordingly, the willingness of young people to get involved in entrepreneurship and implement their business ideas can well be attributed to creative innovation practice.

Following I.E. Belogortseva and colleagues, in the framework of students' scientific research creativity, we emphasize inventive activity, which characterizes the level of effectiveness of creative intellectual activity in the field of engineering and technology and can be measured, for example, through patent activity (Belogortseva et al., 2015).

Thus, we relied on the following methodological provisions:

- youth's innovative activity is a sought-after social activity aimed at creating, mastering and using innovations and based on the innovative openness and creativity of young people;

- at the basic level, innovative activity is implemented in practices related to ensuring innovative openness or receptivity, and is

characterized by the ability of young people to improve their skills, practices of participation in scientific research, scientific conferences and seminars, and student grant activity;

- at a higher level, students' innovative activity is associated with creativity and generation of their own ideas, involves various types of project activities (primarily participation in creative projects), and implementation of inventive and entrepreneurial practices.

We believe that successful implementation of innovative practices, primarily within the framework of university student activity (it is in this area that we consider the range of possible manifestations of youth innovation) depends on institutional factors like a favorable innovation environment (in the university, city, region, society as a whole). But no less important are subjective motivating factors, which to a certain extent reflect the quality of the human resource of innovation. In this case, we are referring to the immediate subject of our research – young people's ability to design their professional future, i.e. build professional strategies that can act as a kind of motivational mechanism that promotes/hinders the implementation of innovation-related intentions of the younger generation.

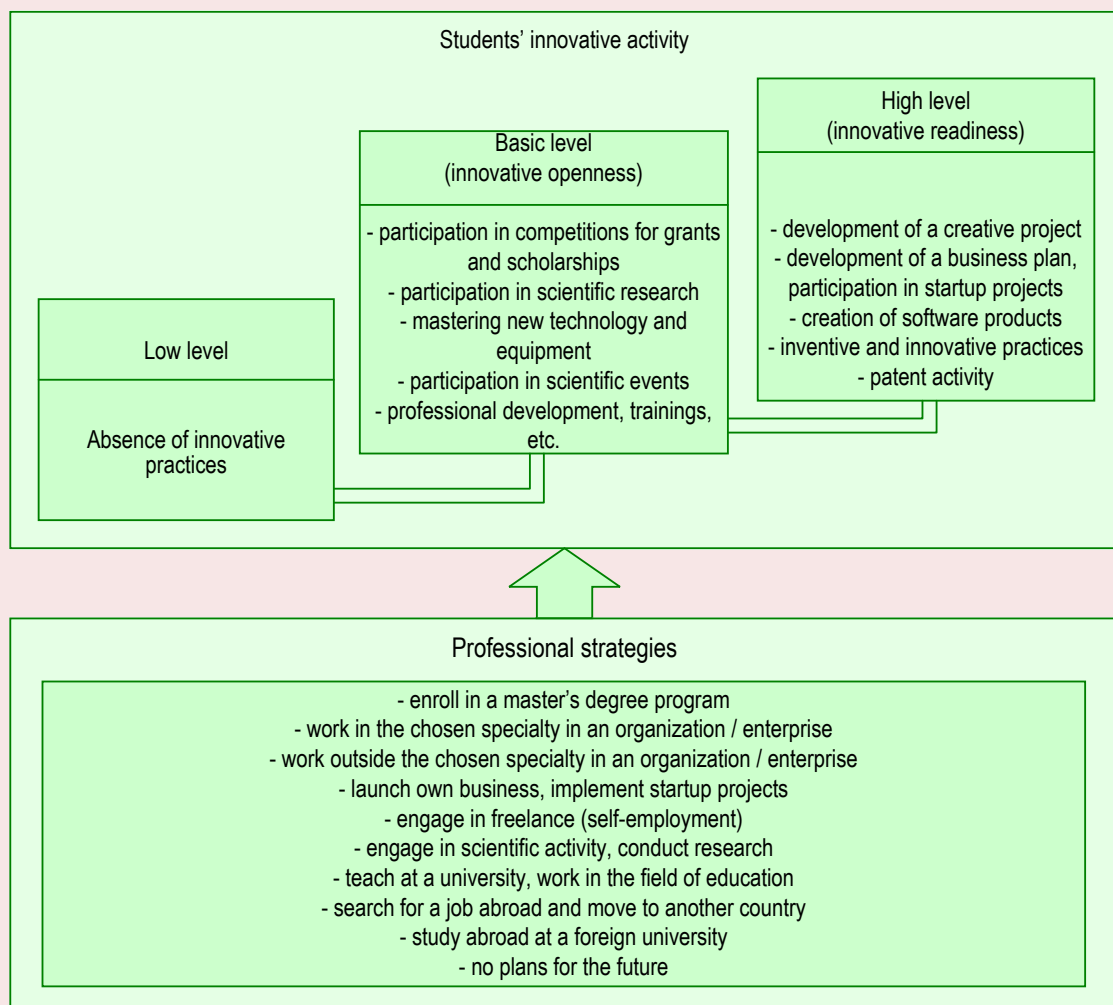
Sociological science has developed a fairly stable understanding of professional strategies as a variety of life strategies covering the sphere of work, professions and education, reflecting the subjectivity of youth in designing their own individual socio-professional and educational trajectories. In other words, professional strategies are life strategies, considered through the prism of human labor and employment (Omelchenko, 2023). According to the classics of Russian personality sociology, the most important characteristics of individuals' strategic behavior are the processes of goal setting and planning (Abulkhanova-Slavskaya, 1991; Reznik, Smirnov, 2000). The formation of strategies (professional, personal, and life strategies) ensures self-regulation of young people's lives: strategies determine ways of constructing life based on

culturally determined life-meaning guidelines (Zubok, Chuprov, 2020).

We should note that the concept of “professional strategies” is far from being similar to the concepts of “Life Course” and “Life Transition” used in Western studies on the professional, educational and life trajectories of the younger generation (Clausen, 1993; Evans, Furlong, 1997; Bovenberg, 2008; Buhl et al., 2018; Barretta, Barbee, 2022; Mortimer, 2022). Considering the strategic aspect in young people’s professional behavior, we focus not on the actual movement and promotion of young people in the sphere of social and professional positions, but

on their orientations regarding desired or possible statuses and roles aimed at the near or distant future. From this point of view, we consider an individual’s professional strategy as a subjective planning of future work life events, which can be adjusted as it is implemented. Accordingly, we have operationalized professional strategies by measuring the availability of more or less formed professional and educational plans of young people for the near future and their content orientation. The conceptual approach to correlating students’ innovative activity and their professional strategies, as well as operationalization of research concepts are shown in *Figure 1*.

Figure 1. Research concept and the operationalization of definitions



Source: own compilation.

A quantitative survey of second- and third-year undergraduate students was used as a method of collecting empirical data. Students of the largest and most significant universities: Lomonosov Moscow State University, Moscow Institute of Physics and Technology, National Research University Higher School of Economics in Saint Petersburg, St. Petersburg University, Saint Petersburg Electrotechnical University "LETI", Volgograd State University and Volgograd State Technical University, Ural Federal University named after B.N. Yeltsin, University of Tyumen, Industrial University of Tyumen, located in the megacities that made up the research space participated in the survey.

To select the respondents, a quota sample with nest elements was used ($N = 1,050$), the quota features were the place of study and residence of the respondents (city), as well as the field of study at the university (STEM fields and social sciences/humanities), student groups of the relevant fields

of study were considered as nests, in which a continuous survey was conducted.

The data was processed using Vortex 10.30 software. The students' professional strategies were typologized using the K-means cluster analysis. Binary variables measuring the availability and orientation of students' professional and educational plans are taken as typologizing features. Further, the obtained clusters were fixed as a secondary variable, a search was made for the relationship of variables that capture innovative student practices with types of strategies using correlation analysis procedures, and Cramer's correlation coefficient was used as the most optimal for nominal scales.

Results

Students' innovative activity

According to the results obtained, certain types of innovative practices are typical for the majority of students (about 80%), the highest level of participation in innovative practices was recorded among students of Saint Petersburg (90%), the

Table 1. Students' innovative activity, % of responses*

Types of activities that students engaged in over the past year	City					
	Moscow	Saint Petersburg	Yekaterinburg	Volgograd	Tyumen	Array on the whole
Innovative readiness (high level)						
Participated in the development of a creative project	39	44	53	28	50	40
Created or improved devices, technical tools for personal consumption (for own use, for family, friends)	20	20	12	17	16	16
Created software products	28	36	15	9	20	19
Developed a business plan and offered it to the bank, investors, etc.	7	10	12	11	11	11
Registered patents for inventions	1	5	3	2	0	2
Innovative openness (basic level)						
Mastered new technology, new equipment	43	49	28	27	34	34
Took advanced training courses, trainings, etc.	28	40	29	27	43	31
Made presentations at scientific conferences or seminars	38	28	23	27	34	30
Participated in scientific research	43	44	27	18	42	32
Participated in competitions for grants, scholarships	29	30	13	8	15	17
Lack of activity (low level)						
None of the above	15	10	20	30	15	20
* Respondents could mark several responses. Source: survey results.						

lowest among students of Volgograd (70%). Nevertheless, on average, 20% of university students are not involved in any activities related to the realization of their innovative potential (*Tab. 1*).

In general, the basic-level innovative activity (innovative openness/receptivity) is more common among students than the activity related to creative attitudes, especially a small number of students practice invention, technological innovation, and create software products. These results confirm the earlier data obtained by I.E. Belogortseva, N.V. Posokhova and M.E. Merezko, who recorded an extremely low degree of inventive activity among regional students; while according to the scientists, it is difficult for students to enter the inventive field of activity, because they need knowledge not only in the field of their scientific activities, but also in law and economics (Belogortseva et al., 2015, p. 51).

In addition, students are very little involved in business practices. However, if patent registration, programming, and business planning are quite specific types of activities and are often associated with the specifics of students' professional training in their chosen fields (it is clear that one should not expect that a humanities student would create a software product, and this partly explains the low prevalence of these types of practices), then participation in research work, presentations at scientific events, participation in scholarship and grant competitions is not determined by the student's training profile and should form an important part of the university training for a modern specialist for the purposes of an innovative and competitive economy. Nevertheless, it follows from the survey data that these types of practices also cover a smaller proportion of students – no more than a third, and in the case of grant activity – only 17%. Moreover, a particularly low level of participation in grants is typical for students of regional universities: only 15% of students participate in grant competitions in Tyumen, 13% in Yekaterinburg, and 8% in Volgograd.

A comparison of the results by city shows that the situation with the realization of students' innovative potential at both the basic and higher levels is more favorable in metropolitan universities (Moscow and Saint Petersburg) than in regional ones; the extent of student participation in Volgograd is especially low (significant differences are highlighted in color in Table 1). First of all, the differences are typical for research practices, the practice of mastering new technologies and equipment, and the creation of software products. However, students from Yekaterinburg and Tyumen significantly outperform both Moscow and Saint Petersburg students in terms of participation in the development of creative projects. Apparently, active implementation of project-based learning at Ural Federal University⁷ and Tyumen universities in recent years has produced some results. Perhaps there is a positive trend here in general: for example, according to the research by O.A. Milyuchikhina, in 2020 more than 90% of students had no project experience, and the focus on employment in startup projects was less than 20% (Milyuchikhina, 2020, p. 288).

Typology of professional strategies

In order to be able to compare innovative practices of young people within the framework of university activity with the projective attitudes toward the professional future, we initially typologized professional strategies of students. As a result of the clustering, five types of professional strategies were formed (the values of the final centers of the clusters are shown in Table 2, the most significant differences are highlighted in color).

⁷ UrFU Regulations on project-based training (Order 335/03, dated April 15, 2021). Available at: https://gsem.urfu.ru/fileadmin/user_upload/site_15921/students/shgup/bachelor/project_learning/2021-2022/Polozhenija_o_proektnom_obuchenii_2021.pdf (accessed: August 15, 2024).

Table 2. Final cluster centers in the typologization of students' professional strategies

Final cluster centers	Cluster 1 Professional employment strategy	Cluster 2 Deferred self-deter- mination strategy	Cluster 3 Academic career strategy	Cluster 4 Independent entrepreneurial strategy	Cluster 5 Strategy of emigration and uncer- tainty
Set up my own business, implement a startup	0.000	1.000	0.414	0.067	0.306
Engage in freelancing (become self-employed)	0.000	0.220	0.157	0.704	0.141
Work in an organization/ enterprise in the chosen specialty	0.000	0.144	0.086	0.654	0.224
No plans for the future.	1.000	0.682	0.100	0.626	0.000
Engage in science, conduct research	0.012	0.016	0.014	0.006	0.318
Teach at the university, work in the field of education	0.198	0.249	0.657	0.061	0.106
Look for a job abroad, go to live and work in another country	0.058	0.033	0.957	0.039	0.082
Work outside my specialty in an organization / enterprise	0.291	0.039	0.029	0.173	0.635
Set up my own business, implement a startup	0.186	0.115	0.171	0.173	0.212
Go to study abroad at a foreign university	0.151	0.092	0.171	0.034	0.188
Cluster volume	124	439	101	257	122

Source: own compilation.

Cluster 1. “*Professional employment strategy*” (124 respondents) implies a strict orientation of students toward working in their specialty in any organization or enterprise: all respondents who fall into this cluster plan to work in their specialty, while none of the respondents in this cluster plans to enroll in a master’s degree program after getting their bachelor’s degree; they also do not plan to launch their own business or startup, or become self-employed. This linear strategy is quite common among students from all the cities under consideration, but somewhat more common among students from Saint Petersburg, Volgograd, and Tyumen (Fig. 2). In our opinion, it reflects the acceptance of very common ideas about a possible successful life after graduating from the university (Didkovskaya et al., 2023; Kisilenko, Shapovalova, 2023) and means embedding young people in the familiar socio-economic employee – employer relationship.

Cluster 2. “*Flexible deferred self-determination strategy*” (439 respondents) is distinguished by the fact that students who adhere to it are not always

ready to work in an organization or enterprise after graduation, but plan to enroll in a master’s degree program (all respondents from this cluster). It is obvious that their professional self-determination is far from the completion stage, and this strategy is more flexible (non-linear) in comparison with the previous one. The respondents in this cluster have a wider range of professional plans, and in addition to continuing their education, their orientations include a possible job in an organization, and they do not exclude a research trajectory or setting up their own business. This is the largest cluster; it is almost equally represented in all cities and, one might say, represents the “mainstream” professional trajectories of students.

Cluster 3. “*Academic career strategy*” (101 respondents) is less common in the surveyed population than the rest. It is characterized by two main orientations in designing a professional trajectory: to engage in science, conduct research and/or teach at a university, and work in the field of education. We should note that in the whole array, traditionally for the last decades, there are quite a

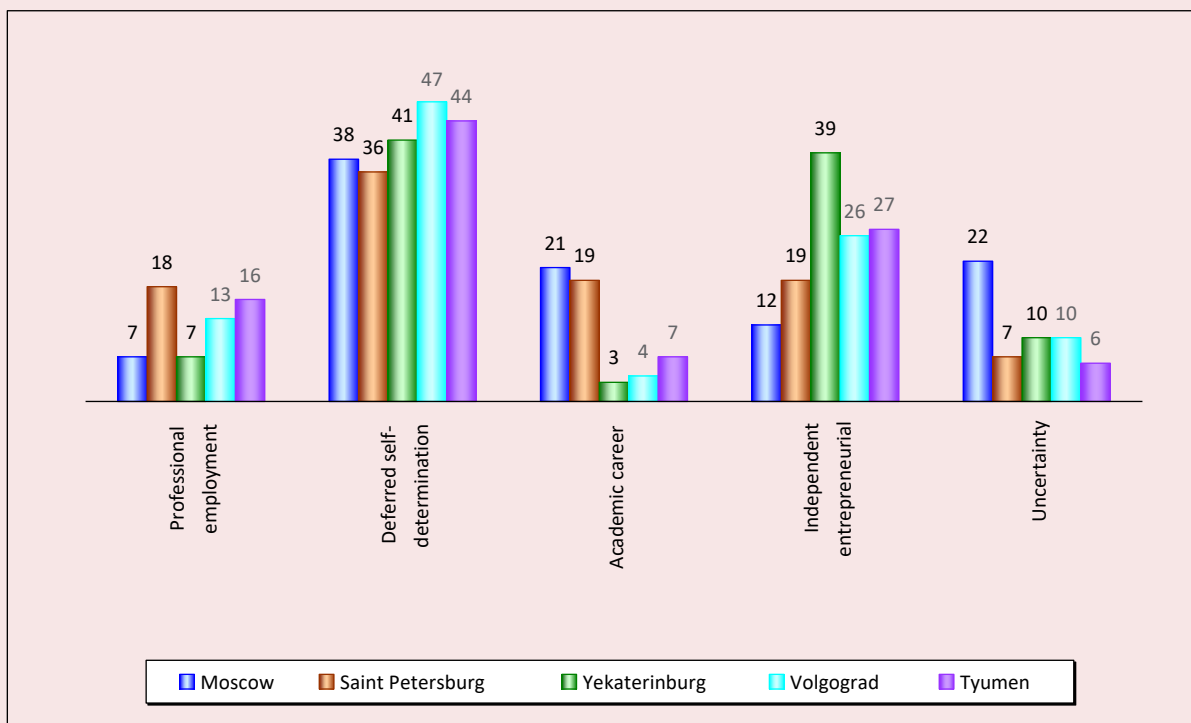
few students who plan to pursue science or teaching in the future, but of those who plan, the majority fall into this cluster. The prevalence of this strategy has a pronounced regional specifics – it is more typical for students of metropolitan universities than regional ones (see Fig. 2). It is obvious that Moscow and Saint Petersburg, having a more serious educational and research infrastructure, initially attract young people with higher academic performance and research potential.

Cluster 4. *“Independent entrepreneurial strategy”* (257 respondents). The respondents who adhere to this strategy have the most well-formed system of professional plans: there are practically no students in this cluster who have no plans for the future. The *“independent entrepreneurial strategy”*

combines several attitudes that are generally not very widespread among the entire population of respondents. First, the attitude toward freedom from organizational frameworks and an independent source of income – the respondents focus on freelancing and implementation of their own business projects; second, it has a practical orientation – the respondents express practically no desire to continue formal education and engage in scientific activities. This strategy is more widespread among students in Yekaterinburg than in the whole range, and is least represented in Moscow (see Fig. 2).

Cluster 5. *“Strategy of emigration and uncertainty”* (122 respondents) is characterized by vagueness or lack of professional plans for the

Figure 2. Prevalence of professional strategies among students of the megacities under consideration, % of respondents



(Cramer’s V coefficient [0.1]: 0.186, Probability of error (significance): 0.000)

Source: own compilation.

future. This cluster mainly includes respondents who have not formed any plans: neither going into business or freelancing, nor continuing their education make up their projective attitudes. Moreover, this is the only cluster where professional plans completely lack a focus on work in their specialty. Its other characteristic feature is the respondents' desire to move abroad so as to live and work there. This strategy is much more widespread among Moscow students in comparison with universities in other cities (see Fig. 2).

Innovative potential of professional strategies

The results of the correlation analysis demonstrate the existence of a certain relationship between the types of professional strategies and innovative practices of students (Tab. 3).

It is obvious that the “strategy of emigration and uncertainty” has a low innovative potential and, in general, does not contribute to the manifestation of

innovative activity. Students who adhere to this strategy are significantly less likely than students from other clusters to participate in the development of creative projects, as well as business plans and startups. On the contrary, the proportion of respondents who answered that they do not engage in any innovation-related activities at all is higher (31%, while the average for the array is only 21%). Similarly, students who adhere to the “professional employment strategy” have a low level of innovative activity: among them, there are few practices related to business planning and professional development, as well as courses and trainings, compared with other types of strategies, and a significant part of the respondents in this group do not engage in any activities related to innovation (29%).

The “academic career strategy” and “independent entrepreneurial strategy”, on the contrary, assume a fairly high level of innovative activity,

Table 3. Innovative potential of students' professional strategies, % of responses

Types of activities that students engaged in over the past year	Professional strategies					
	Professional employment strategy	Deferred self-determination strategy	Academic career strategy	Independent entrepreneurial strategy	Strategy of emigration and uncertainty	Array on the whole
Innovative readiness (high level)						
Participated in the development of a creative project	36	39	39	45	35	40
Created or improved devices, technical tools for personal consumption (for own use, for family, friends)	17	16	26	14	12	16
Created software products	21	17	24	13	26	18
Developed a business plan and offered it to the bank, investors, etc.	5	11	10	15	4	10
Registered patents for inventions	1	2	7	1	1	2
Innovative openness (basic level)						
Took advanced training courses, trainings, etc.	15	32	37	33	29	30
Mastered new technology, new equipment	30	34	41	27	35	33
Made reports at scientific conferences or seminars	20	33	54	22	26	30
Participated in scientific research	26	31	67	23	25	31
Participated in competitions for grants, scholarships	14	17	39	10	20	17
Lack of activity (low level)						
None of the above	29	19	9	20	31	21
* Cramer's V coefficient [0..1]: 0.151, Probability of error (significance): 0.000. Source: survey results.						

but somewhat different in nature. The “independent entrepreneurial” strategy is associated with the implementation of practices of the creative spectrum, it distinguishes students with a well-formed innovative willingness – they participate more than others in the development of creative and business projects. The “academic career strategy” promotes the implementation of innovative potential in the field of scientific research and technological developments, demonstrating at a relatively high level both innovative openness (innovative receptivity) – students participate in research, make scientific reports at conferences, master new technologies and equipment, and innovative readiness – students create or improve devices and tools, create software products.

The “deferred self-determination strategy” occupies a middle position between the other types of strategies: it certainly does not promote innovative activity to the same extent as the previous two, but among the students who adhere to it, there is a fairly high proportion of those who implement basic-level innovative practices: mastering new equipment and technologies, delivering reports at scientific events, participating in scientific research.

Conclusion

Summarizing the theoretical and empirical results obtained, we can point out the following.

The analysis of students’ innovative activity from the standpoint of an activity-based approach made it possible to structure the phenomenon of youth innovative behavior, identifying two inter-related levels in it: first, innovative receptivity, which allows students to successfully and effectively master and use ready-made innovative solutions, and second, innovative readiness based on it, related to the ability of young people to develop creativity and implement their own ideas and projects. Optimal innovative development requires expanding opportunities for young people to implement innovative practices at both levels.

The current analysis has shown that a significant proportion (from 10 to 30%) of students at leading universities in the cities under consideration are not involved in any types of innovative activities. The situation in Moscow and Saint Petersburg universities and partly in Tyumen is somewhat more favorable than in regional universities in general and especially in Volgograd; however, the following general trend is typical for students of the megacities under consideration: insufficient prevalence of basic-level innovative practices (participation in grant competitions, scientific conferences and seminars, research activity) and a low degree of involvement in scientific and technological creativity (innovation and inventive activity), programming and development of business projects.

The professional strategies formed by students during their studies at the university are a significant factor for the innovative activity among regional students. It has been found that specific strategies can contribute to or hinder students’ realization of their innovative potential within the framework of university activity. Having discovered typical characteristics of students’ professional strategies, we linked each selected type of strategy to a specific range of innovative practices.

The “academic career strategy” has significant innovative potential, involving a focus on research and teaching at the university, contributing to the implementation of various innovative practices from participation in research projects and grants, to inventing and creating software products.

A sufficiently high innovative potential is demonstrated by the “independent entrepreneurial strategy”, which aims to go beyond the “organizational framework” of professional self-realization and is focused on finding an independent source of income (entrepreneurship, freelancing, startup). It promotes the active implementation of innovative business planning practices, the development of creative and startup projects.

To a certain extent, the “deferred self-determination strategy” seems promising for the development of innovative potential, implying flexible orientations of young people toward continuing their education, a wide range of options for professional plans, and associated with such types of innovative activity as conducting scientific research, business planning, and creating software products.

The remaining strategies – the “professional employment strategy” and the “strategy of emigration and uncertainty” – are adaptive rather than innovative and are less associated with students' active innovative activity. Although they are not widely practiced by students, they can nevertheless pose a certain problem, since it will be more difficult for these groups of students to integrate into the modern economic process and meet the demand for specialists in the new “knowledge economy”. In addition, the dissemination of these strategies reduces the potential contribution of students to the innovative component of the Russian economy.

The analysis of students' innovative behavior strategies allows us to formulate some practical recommendations on targeted impact on them. First of all, it is necessary to comprehensively develop the innovative potential of the student youth in the regions, providing opportunities for the implementation of innovative practices both at

the level of receptivity (the introduction of ready-made solutions), and at the level of creativity and the development of their own projects. This will optimize students' innovative development and their contribution to the innovative urban economy. Second, special attention should be paid to increasing student engagement in a wide range of innovative practices, from participation in scientific conferences and competitions to the development of start-ups and business projects. Third, it is necessary to create conditions for students to develop professional strategies that are most favorable in terms of innovation, such as “independent entrepreneurial strategy” and “academic career strategy”. Their support will make it possible to maximize the innovative potential of students. Fourth, targeted solutions are needed for students who adhere to strategies with weak innovation potential, in particular, strategies of “emigration and uncertainty” and “professional employment”. It is necessary to provide such students with assistance in professional orientation and the development of their innovative readiness. Intensifying measures in the framework of these areas will have a positive impact on the comprehensive development of students' innovative potential, increasing the involvement of young people in various types of innovative activities, as well as stimulating the most productive professional innovative strategies.

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