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Modeling the Process of Deglobalization of the World Economy

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Annotation: *based on the macroeconomic indicators of exports and direct investment from the country, a model of the process of deglobalization of the world economy, which began in 2008, was developed, which became particularly clear during the pandemic. To determine the countries of the center and the periphery, the k-means method of cluster analysis was used. As a result, a clear illustration of the distribution of the roles of countries in the world economy according to the theory of world-system analysis was obtained, as well as the relationship between the macroeconomic indicators of individual countries and the share of world trade in world GDP was established. The results obtained can be used in further studies, which will be based on the data of the macroeconomic indicators of the pandemic period.*

Key words: *world economy, deglobalization, statistical data analysis, modeling.*

JEL classification: *A100, A110, A130.*

Introduction

The period of the coronavirus pandemic gave rise to global economic conflicts and a general economic downturn that was difficult to imagine a few years ago. For example, the trade war between the United States and China, which hit Chinese companies Huawei and Xiaomi [17], and the new OPEC+ deal between oil-producing countries, which reduces the overall level of oil production [12]. It can be hypothesized that the coronavirus pandemic served as a catalyst for the deglobalization of the world economy, which accelerated the processes of the world

economy to reduce the number of world transactions, trade and investment. Indeed, the closure of borders and a huge number of enterprises due to quarantine caused an economic crisis, which also affected world trade [5].

In this article, we will consider the processes of deglobalization of the world economy – a decrease in the number of world transactions, which include export transactions and international investment, and the globalization of the world economy – an increase in the number of world transactions, which include export transactions and international direct investment from countries.

The process of deglobalization of the world economy began long before the pandemic. Studies of various macroeconomic processes are constantly conducted by Russian and foreign scientists. One of these areas is the world-system analysis, developed in the 1970s by A.G. Frank, I. Wallerstein, S. Amin, G. Arrigi and T. dos Santos. As the methodological basis on which this study is based, the most common version of the world-system analysis, developed by I. Wallerstein, is used. This theory examines the holistic development of the world economy. According to the research results, the world has a three-level structure: the center, which includes highly developed states that dominate economic relations, the periphery, which includes countries that extract raw materials and supply them to the countries of the center, and semi-peripheral countries that occupy an intermediate position between the two groups described above.

The economic relations between the countries of each group can be represented in the form of a diagram shown in Figure 1.

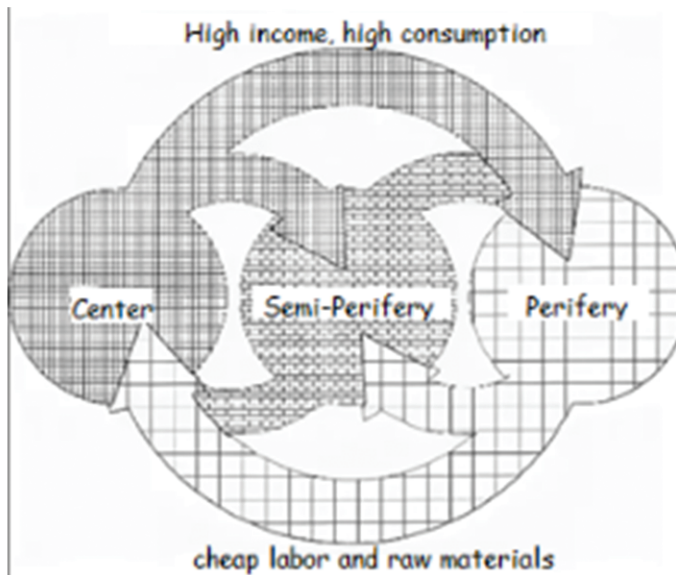


Figure 1. The scheme of economic relations of countries according to the world-system analysis

In this scheme, there are the above-described groups of countries, namely the center, semi-periphery and periphery. The periphery supplies the countries of the semi-periphery and the center with cheap labor and raw materials. In response, the countries of the center supply goods and investments in production to the countries of the semi-periphery and the periphery. The countries of the semi-periphery occupy an intermediate position, having the properties of both one and the other [4].

As a result of the study of the last 600 years of the development of the world economy, the cyclical nature of its development was revealed. The centers of the world economy developed

domestic production, after which they carried out economic expansion to the countries of the periphery, in connection with which they faced the financialization of the economy, after which capital and the role of the world economic center were transferred to other countries. Thus, in the period under review, the center of the world economy was Venice (XV–XVII centuries), Holland (XVII–XVIII centuries), Great Britain (XVIII – early XX centuries) and the United States (XX century – our time). Figure 2 schematically shows the main cycles of the world economy [19].

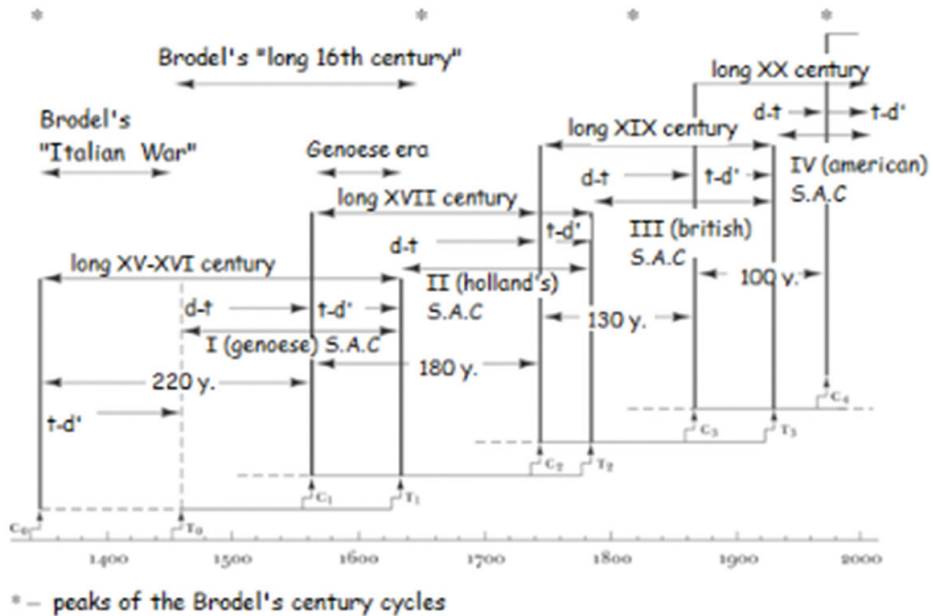


Figure 2. Global economic development cycles

Thus, the economic processes that occur in our time already in one form or another were previously encountered in various historical epochs [2]. Therefore, to justify the trends of further development of the world economy, it is necessary to study the macroeconomic indicators of countries in the twenty-first century, adhering to the basic assumptions of world-system analysis.

To test the proposed hypothesis and study trends in the process of economic deglobalization during the pandemic, a primary simplified model of economic deglobalization for the analysis of macroeconomic indicators was developed. The simulation results and their discussion are presented below.

Methodology

The study used actual indicators from an open data bank [13]. The following economic indicators were considered for each country in the period from 1980 to 2019: GDP (in US dollars), Exports (in % of GDP), foreign direct investment from the country (in US dollars). In this article, the following methods of data analysis are consistently applied: trend construction and visualization, cluster and correlation analysis.

As an indicator of the globalization/deglobalization of the world economy, the parameter of the ratio of world trade to world GDP is accepted. If this indicator increases for a certain period of time, then we can talk about globalization, its decline indicates deglobalization [11].

To determine the indicator of globalization / deglobalization, the ratio of world trade, namely the amount of exports and direct investment from the country, to world GDP for each year in the period 1980–2019 was calculated. The results are visualized using Excel tools, and the periods

of globalization and deglobalization of the world economy are established, namely, the periods of 1980–2008 and 2008–2019, respectively.

Further, to determine the countries of the center and the periphery, according to the theory of world-system analysis, a k-means cluster analysis was performed using Python, in particular the Pandas library [14]. Clustering took into account the following indicators for each country: exports of goods and services (in US dollars) and foreign direct investment from the country (in US dollars) for 2008. The first indicator was obtained from the initial data by multiplying GDP by the share of exports in it. The reason for using the 2008 data will be described in the results below.

After the cluster analysis, a correlation analysis was carried out to identify the dependence (independence) of the economic indicators of the countries of the periphery and the center between each other, as well as the indicator of deglobalization.

Groups of countries from the two upper and two lower clusters were taken to study the correlation between foreign direct investment from the first group of countries, exports from the second group of countries and the above-described indicator of globalization / deglobalization of the world economy. Since the latter parameter is the share of world trade in world GDP, the first two indicators were also taken as the share of global investment and world exports, respectively. Using the Excel language tools, a correlation table was built [10].

In this study, a simplified model of global economic deglobalization is developed, taking into account the international division of labor and general information on direct investment, without focusing on their direction. Thus, only general global trends in the development of the world economy are taken into account in the context of world-system analysis.

Results

First of all, the indicators of world GDP (in US dollars\$), indicators of world exports (in US dollars\$), calculated according to the method described above in the methods, and world investments (in US dollars \$) for 1980–2019 were considered. This is necessary to calculate the ratio of world trade to world GDP. The result is shown in Figure 3.



Figure 3. Ratio of global trade to world GDP

As can be seen from the graph, in the period from the end of the XX century to 2008, there is a globalization of the world economy, that is, an increase in the number of world transactions, trade and investment. However, in the period 2008–2019, there was a sharp decline in this indicator, which has been steadily decreasing since 2010, which indicates the deglobalization

of the world economy, that is, a decrease in the number of world transactions, trade and investment. Therefore, the period of 2008–2019 will be considered further.

Next, data on exports (in US dollars) and direct investment from the country (in US dollars) for each country for 2008 were considered to provide an overall picture of the global economy. When processing the data, Python tools were used, in particular, the Pandas data analysis library. The k-means method of cluster analysis was used. The result is shown in Figure 4.

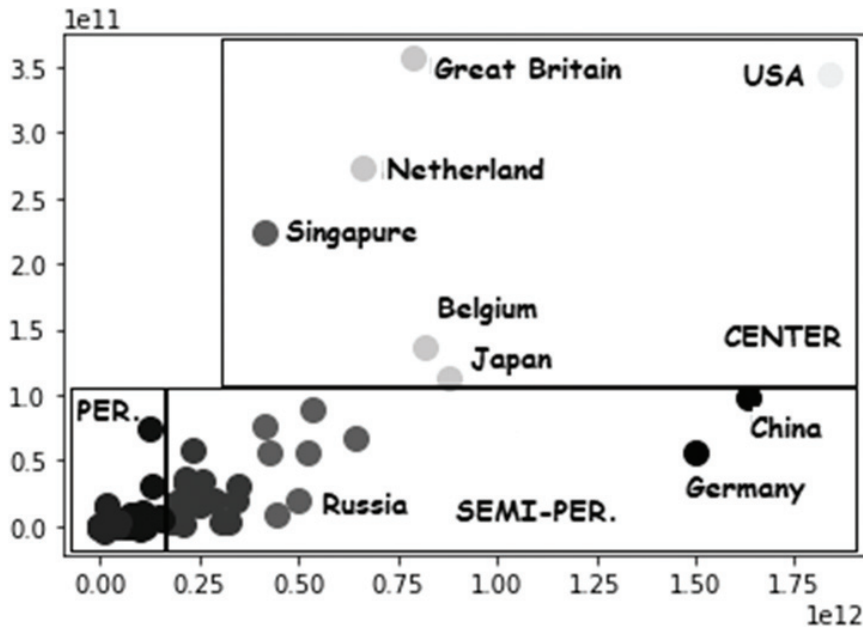


Figure 4. Results of the cluster analysis on the macroeconomic indicators of the countries for 2008

For a more detailed picture, 7 clusters were accepted. On the vertical axis, investments are deferred (in trln. \$), on the horizontal – export (in trln. \$).

The yellow cluster (top right) includes the United States.

The black cluster (lower right) includes China and Germany

The cyan cluster (central upper) includes the United Kingdom, the Netherlands, Belgium, and Japan.

The Russian Federation entered the middle of the green cluster (central lower).

The purple and blue clusters (lower left) include Latin America, Africa, except South Africa, Western and Central Asia, Indonesia, the Baltic States, and Eastern Europe.

In the context of world-system analysis, the yellow and cyan clusters are the center, the black and green clusters are the semi-periphery, and the purple, blue, and red clusters are the periphery.

To study the correlation between the ratio of world trade to world GDP and the economic macro indicators of the countries included in different clusters, the indicators of direct investment from the countries of the yellow and cyan clusters (in US dollars) and exports from the countries of the purple and blue clusters (in US dollars) in the period 2008–2019 were considered. These indicators were summed up for each group for each year.

However, for further correlation analysis, it is necessary to normalize the obtained indicators. To do this, we will take the ratio of the obtained indicators to the world indicators of world direct investment and world exports, respectively, for each year. In this way, we will not consider the absolute value of investments and exports of the countries concerned, but their share in the global economy.

Using Excel tools, the following correlation Table 1 was built.

Table 1

Results of the correlation analysis

	<i>Export</i>	<i>Investments</i>	<i>trade / GDP %</i>
Export	1		
Investments	-0,163162535	1	
trade / GDP %	0,556666618	0,04057421	1

It can be concluded that there is an average correlation between the share of exports of peripheral countries and the ratio of world trade to world GDP. This result can be used in further modeling, which will be done in the final qualifying work.

Discussion

In the course of the research, several results were obtained that may not seem obvious at the beginning and need additional comments.

The resulting graph of the ratio of the world economy to world GDP (Fig. 3) can be divided, conditionally, into two sections: the end of the XX century – 2008 and 2008–2019. In the first period, there is an intensive growth of this indicator and the globalization of the world economy, while in the second – a sharp decline and, accordingly, the deglobalization of the world economy.

In 1991, the USSR collapsed and, as a result, the end of the Cold War [6]. Most of the former countries of the socialist camp switched to a capitalist economy and entered into capitalist relations with their former ideological rivals. The essence of the further development of these countries was to repeat the stages that the countries of the capitalist world had already passed in order to repeat their success.

However, in the context of the world-system analysis, such tactics for achieving the success of the countries of the center were fundamentally wrong. As a result, the former socialist countries became only a periphery for the countries of the center [16].

It is worth noting that the Russian Federation is included in the group of semi-peripheral countries. So for her, the countries of the post-Soviet space became the periphery [18].

The end of the Cold War and the collapse of the USSR gave the countries of the center not only new countries of the periphery, but also highly qualified Soviet personnel, in particular engineers and scientists [3]. The main direction of their outflow was the United States, which was the beginning of the rapid development of technology.

Thus, the globalization of the world economy and the monotonous growth of the above-mentioned indicator can be attributed to the emergence of new markets-peripheries for the countries of the center and technological progress, the main engine of which was the United States and other countries of the center [7].

In 2008, according to the chart above, there was a turning point in the development of the world economy and its trend. This is due to the global financial crisis of 2008, which began in the United States due to the financialization of the economy [8].

The period from the end of the twentieth century to 2008 can be described as the growth of large US banks, which absorbed small competitors due to weak government regulation. The growth of large US banks was caused, in particular, by the issuance of mortgage loans to the population. Of course, such a loan could only be obtained by those citizens who could guarantee timely payments, but by 2008, in order to get more profit, such loans were also issued to those categories of citizens who could not guarantee these payments.

The essence of a mortgage for banks is to earn a percentage per annum if the borrower pays the monthly amounts on time. If the borrower could not pay the loan, the bank takes the mortgage housing from him and sells it at the market price, thereby returning the money issued on the loan.

However, in 2008, due to the high number of mortgages issued, residential real estate became an illiquid asset, and when most new borrowers were unable to pay off their loan, the sale of mortgage housing at the market price was unsuccessful. Because of this, banks could not fulfill their obligations to depositors, which were both ordinary people and large companies. This event was called the mortgage crisis of 2008, which in turn gave rise to the financial crisis [15].

This problem was solved only with the help of active government intervention and a huge injection of capital into the financial sector. Because of this, of course, the rest of the economy suffered.

The main consequence of the 2008 financial crisis was, in the author's opinion, state interference in the previously free market economy and further political influence on the market and international trade, which affected further world trade.

This can be seen in the graph shown above (Figure 3), in 2009–2011. Instead of an increase in the ratio of world trade to world GDP, it reached about 40%, and then only monotonously decreased. By 2019, it had reached the 30% mark.

The decline in global trade relations has led to a decline in the economic growth of individual countries, which has exacerbated political conflicts that previously took a back seat against the background of rapid economic growth. Examples include the Syrian conflict that began in 2011, the political crisis in Ukraine in 2013–2014, and others.

In the context of the world-system analysis, due to the financialization of the center's economy, the country that would eventually become the new center of the world economy should come to the fore. Such a country, according to the author, is China. The economic background for this was the rapid economic development of the Chinese economy against the background of global economic development. Chinese companies were able to enter the market with a product that was no longer inferior to European and American ones, while it was cheaper than its analogues.

So an example is Huawei and Xiaomi, which in the mid-10s of the XXI century produced mobile phones. Unlike American, South Korean, and European brands, Chinese mobile phones were manufactured entirely in China. Thus, the costs of logistics and transportation of components were significantly lower than those of foreign competitors, which had a positive impact on the price of mobile phones for potential consumers.

The hypothesis of a new economic world center in China is confirmed by an additional similar cluster analysis based on 2019 data, the results of which are shown in Figure 5.

So the blue cluster (top right) includes the United States and China. Thus, in 2019, there were already two economic world centers in the world, approximately equal in terms of macroeconomic indicators.

Of course, it would be highly undesirable for the United States to lose its global leadership, which was partly expressed by former US President Donald Trump politics. Thus, during the presidency of D. Trump, the migration policy was tightened and, most importantly, in the context of the issue under consideration, the return of production from the countries of the periphery and semi-periphery began [7; 9]. This has had a positive impact on the US unemployment rate, which has shown record lows over the past 10 years. Of course, large companies suffered from this, because of the expensive labor force relative to the peripheral countries.

This policy of the United States led to an aggravation of relations with China, which resulted in a trade war, which was especially talked about in the media in 2020. It is worth noting the peculiarity of the sanctions imposed on Chinese companies by the United States. The sanctions

on Chinese companies, namely the aforementioned Huawei and Xiaomi, were a ban on the use of intellectual property.

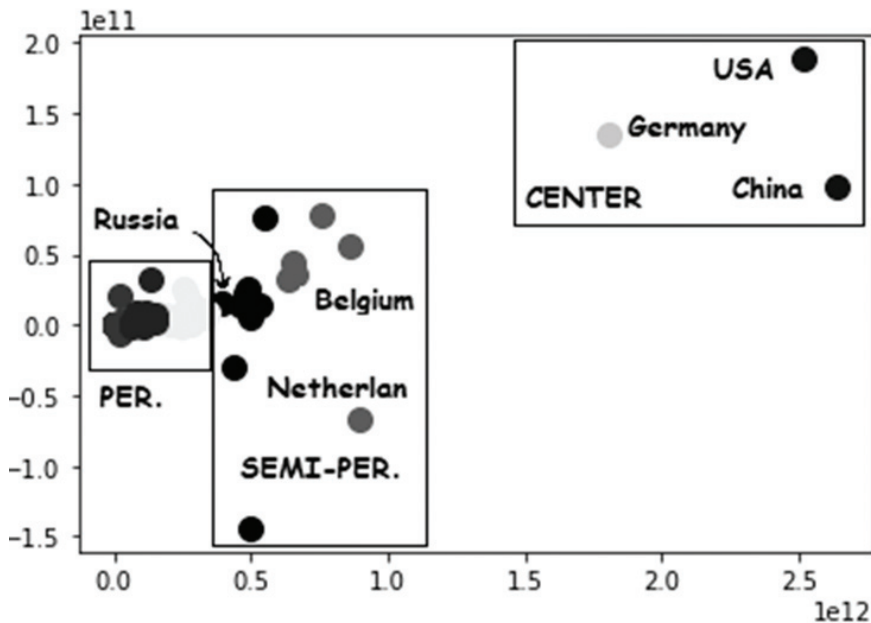


Figure 5. Cluster analysis of countries' macroeconomic indicators for 2019

For example, the new Huawei smartphones have lost support for the services of the American company Google, which, due to the monopoly on Android smartphones, have become an integral part for the consumer [20]. Thus, the deprivation of Google services exposed the new Huawei smartphones in a worse light compared to competitors in the global market. It is worth noting that this decision could not deal a serious blow to the Chinese company, thanks to the Chinese market, in which Huawei smartphones were very popular even without Google services, which, due to the policies of the Chinese Communist Party, were already unavailable in the country.

Therefore, a new round of trade confrontation between the United States and China was the pressure on the European company Arm from the United States [1]. Arm owns the intellectual property rights of the Arm architecture, which is used in the production and development of mobile processors. The company's policy was to freely license its architecture to any country, but due to the trade standoff, it changed in relation to China, namely Huawei. So there is a real threat in the production of new smartphones based on Huawei's own processors, based on the Arm architecture.

The trade conflict also affected China's IT companies. So in the summer of 2020, the United States announced the imposition of sanctions on the Beijing company ByteDance, which created the Tik-Tok application, if it does not conclude an agreement with an American IT company that will distribute the application in the United States. This was done, according to the official version, because of the theft of personal data of Tik-Tok's users by a Chinese company, so for security reasons, it is necessary to include an American company in the chain, which will not allow the theft of user data in favor of China.

When conducting cluster analysis, there were difficulties in providing economic macro indicators, namely, in normalizing indicators, that is, the ratio of exports or investments from a country to the country's GDP. However, this analysis showed that the top clusters are not the United States and large European countries, but the islands of Cyprus and Malta. This can be

attributed, in relation to Cyprus, to the large number of offshore companies registered on its territory.

The resulting correlation table (Figure 5) is also of interest, namely, a rather weak relationship between the share of investments of the center countries in the world and the share of exports of the periphery countries in the world, and also a negative one. This can be attributed to the floating economic role of the countries under consideration. For example, it can be seen that in the period from 2008 to 2019, only the United States remained in the top clusters. Thus, in further studies, it is worth taking this point into account and considering other investor countries.

To build a further model, the considered indicators will not be enough, since the problem of deglobalization of the world economy is a multifactorial one, and does not depend only on the international distribution of labor. Further research should also take into account other macroeconomic indicators.

It is also necessary to consider the future economic situation of Russia in the post-pandemic period. It will certainly vary depending on the current economic policy. In this article, the author will try to form his own vision of an economic policy that can ensure a better position and role for Russia in the world economy.

First of all, it is necessary to resume the development of technologies that were in the USSR and did not receive proper support in the subsequent history of Russia. In particular, it is worth paying attention to the Elbrus processors developed at the beginning of the XXI century by the Russian company MCST, which at one time could adequately compete with Intel processors that were released in the same time period.

Despite the fact that the development of its own processors will be costly and long-term research, it will be in demand in the face of large Chinese companies, which were discussed above. The developed architectures will be able to compete with Arm and x86 architectures in the long term, which will allow Chinese large companies to become more independent from American ones, and Russian companies will be able to conclude mutually beneficial partnership agreements with China, which can become a new global economic center.

It is also worth considering investing in the Russian IT sector to create competitive products that can replace American applications and services in the long term. Similar to the previous idea, this step will help set up partnerships with Chinese companies.

According to the author, it is quite difficult to predict the winner in the trade war between the United States and China, and which of these two countries will eventually become the center of the world economy. If we adhere to the theory of world-system analysis, then China will become the new center, but the US economic policy is aimed at preventing this. This issue depends on many factors, and Russia may become one of them.

Conclusion

The study confirmed the original thesis that the process of deglobalization of the world economy began long before the coronavirus pandemic and the causes of its occurrence are much deeper than they seem at first glance, and are rooted in past historical events.

The results of modeling the process of deglobalization demonstrated the consistency of the hypotheses put forward by the world-system analysis. In the process of modeling, the center was found, in accordance with expectations, namely the United States and the highly developed countries of Western Europe, the semi-periphery, which unexpectedly included the Russian Federation, and the periphery, which included the countries of Africa, Latin America and Western and Central Asia.

Further development and forecasting of the economy should be considered not only with the help of data for 2020 during the pandemic, but also, at least, based on data from 2010. It is also worth considering the economic theory of world-system analysis, for a clearer understanding of the economic picture of the world.

Also, as a result of the research, the beginning of the process of transferring the role of the world economic center from the United States to China became clearly visible, which gave rise to a trade war between these countries.

The obtained primary models will become more complex in future studies, the results of which will be reflected in the final qualifying master's work with the same topic.

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Neural Network Analysis of Art Paintings

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Annotation: *the article examines the ability of modern neural networks to create new works of art based on ready-made works and styles embedded in the software. Exploring the possibilities of neural networks, the researchers paid attention not only to the technical, computer side of the problem, but also to the artistic result and the attractiveness of the images obtained from an aesthetic point of view.*

Key words: *artificial intelligence, neural networks, software, artistic.*

JEL classification: *A100, A110, A130.*

Introduction

In the modern conditions of the development of digital technologies, a new direction of working with digital content is being formed. Intelligent neural networks allow you to create new works of art based on existing digital sources of information using built-in styles, filters and other settings. Today we see the active development of parallel digital reality [2]. Within its framework, the emphasis is on the possibility of changing existing works of art to new works of art with the help of artificial intelligence. Algorithms used in artificial intelligence [4] are considered in many scientific studies, and allow us to assert that artificial intelligence systems will be actively developed in the near future and will find their application. We can say that we are observing new trends [9] in the formation of a digital data ecosystem [10].

Methods

Modern intelligent systems with the technology of processing the received digital discrete signals [19] are actively developing and the results of their work can be analyzed using open sources. Neural networks are represented in the Internet environment by various commercial organizations. The availability of neural networks via the Internet makes it possible to study

them from anywhere in the world to any categories of users. Students studying in the areas of "Information Technologies", "Business Informatics", "Applied Informatics" are primarily interested in studying the possibilities of open neural networks. The importance of education is considered by a team of authors in the works "Self-marketing of university graduates and young specialists in the system of personnel policy of the organization" and "Transformation of education in the digital economy" [8; 11]. An additional advantage is the involvement of various segments of the population in the educational process [1]. Universities and organizations join forces [5]. The study of the possibilities of such networks is carried out by both students of educational institutions and business representatives.

Teaching students about the current trends present in the information technology market is an important aspect of education. In the works of Veretekhin S.V., Mnatsakanyan O.L. "...an overview of innovations in education is conducted and a socio-economic justification for the use of virtual educational environments is given on the example of the Russian State Social University, Moscow" [15]. Modern teaching methods used in the RSSU are demonstrated in the scientific work of A.V. Kirillov and S.V. Veretekhina [3].

Modern technologies for processing digital content are presented in various scientific works of scientists [16; 13]. The studies given in the work of Veretekhina S.V. and Veretekhina V.V. indicate that in the future, supra-professional skills will be in demand, such as "the ability to create art, the presence of aesthetic taste" [18]. Students actively explore the possibilities of neural networks, paying attention not only to the technical, computer side of the problem, but also to the artistic result, the attractiveness of the images obtained from an aesthetic point of view.

This publication is dedicated to the memory of the outstanding scientist, economist, teacher Pochinok Alexander Petrovich [6; 7].

Unfortunately, we have to state that domestic products for processing digital images are not popular enough. And even if the developer of the service is a Russian, it is not customary to advertise it. But in our opinion, domestic software developers, including neural network developers, are not inferior to their Western colleagues in the qualification and quality of their products. And they often create more modern and popular services. Advanced technologies influence the development of modern industries [17]. Software developers should actively develop, promote and advertise competitive programs so that the Ministry of Communications can include them in the "universal software fund" [14].

Modern neural networks offer a variety of options for processing the original digital images: from removing the background (<https://www.remove.bg/>) and retouching old photos (<https://www.nvidia.com/research/inpainting/>) before animating static images or "animating" objects by adding eye movements, head movements, etc. (<https://www.myheritage.com/deep-nostalgia>). There are services that can replace faces in photos (<https://reflect.tech/>). The neural network not only replaces the faces in the photo, but also preserves the facial expression, its color and other characteristics. In it, you can replace faces on statues, paintings, in frames from cartoons and screenshots from videos. There is a large list of resources on the Internet that process photos. There are options for desktop computers, resources for working on mobile devices with different operating systems (Android or iOS), fully Internet services.

Processing digital images using neural networks allows marketing specialist and graphic design specialists to work more effectively with illustrations and advertising materials. Modern software products allow you to create new unique images and edit existing files. When creating advertising materials, it is important to use the author's unique content, which is effectively created using neural networks. For example, a service that generates human faces <https://thispersondoesnotexist.com/>. Photos of human faces are generated automatically based on millions of images from the service's database. The system analyzes the faces and creates a collective image. Each time the page is updated, a new face appears. You might think that the face is familiar to you, but in reality

such a person does not exist. This is a completely collective image created in a single version. This service is for those who do not want to violate copyright when using photos of people.

In the work of any company, it is important to have your own corporate style, in which an important element is an individual logo. Creating a logo is a creative, painstaking work of graphic designers. Neural networks can significantly reduce the creative stage of logo design. For example, the service <https://looka.com/> generates logos by analyzing information about your company. In his work, he uses Tensor Flow algorithms from Google. To get several variants of logos, you need to provide the neural network with certain information. You will need: specify the scope of the company's activity; choose from the database five or more logos that you like; decide on two sets of colors; choose three exact colors that will be used in the logo; specify the name and slogan of the company that will be displayed on the logo; limit yourself to five characters that characterize your company.

As a result of processing the data provided by you, the neural network will generate 12 variants of logos. You will be able to choose the option that suits your company to the maximum extent.

And in the twenty-first century, we are still faced with black-and-white images. Quite often there is a need to convert a black-and-white image to a color one. An interesting resource is the service created by the Russian company G-Core Labs based on the open source DeOldify project – <https://colorize.cc/>. The neural network is able to color black-and-white photos and videos in realistic colors.

To get the finished image, you need to upload a black-and-white illustration and specify the email address. Processing takes from 10 seconds to 30 minutes. After processing the submitted file, a link for downloading the finished color image is sent to the specified email address. The result is very good, "live" color photos and video files. This service can be used both for correcting personal photos from the family archive, and for processing commercial photos. As you know, modern content users perceive color images much better, so there is always a need to colorize old photos. Of course, if you have to process a large number of images and increase the download limit to 10,000, you will have to purchase a paid tariff. The paid version has added functionality for retouching old photos. Colorize.cc restores photos-removes noise, restores the face, removes scratches and creases on images, etc.

Despite the active use of online services, programs running on local computers do not lose their position. A fairly well-known «Movavi» program for Windows systems works like a regular editor. Its functionality now includes the ability to restore old photos. The work of this program is also based on neural network algorithms.

The program can remove scratches, restore damaged fragments of images, remove "noise" and completely repaint black-and-white photos, making them color. The program is installed on a personal computer, which allows you to work with images in the comfortable conditions of your workplace. In addition to restoring old photos, the program allows you to:

- remove unnecessary objects from images;
- make black and white images more vivid by coloring in natural colors;
- change the color of the eyes and hair, apply the makeup effect to the faces in the photo, remove defects not only of the background, but also of the skin of the people depicted in the photo;
- apply filters to enhance and modify photos;
- create collages;
- and much more.

With the help of modern digital image processing programs, you can prepare content for the social network Instagram and other social networks or process photos for a personal or corporate website so that they look bright and attract the attention of visitors and users.

A resource «<https://letsenhance.io/>» can be a useful tool for professional designers and ordinary users. The service works on the basis of neural networks that learn to restore details based on data about frequently encountered textures and objects. The developers used super-

resolution machine learning technology, which allows the neural network to restore details, as well as preserve clear lines and contours of objects, based on their knowledge of typical objects and textures in the real world.

With this resource, you can increase the image resolution to four times without losing quality. This is a necessary functionality if you have small-resolution images that are interesting in composition or content.

This project allows you to «zoom in» individual sections of the images and improve the photos as a whole. At the same time, the quality does not suffer.

The system is able to remove «JPEG» artifacts and quadruples the resolution of the image. The system can also finish drawing objects as needed. In addition to improving the quality, the service allows you to work with textures by adding them to the image; improve the color scheme of the image; make illustrations clearer and more beautiful.

The «PRISMA» application, developed for smartphones with the Android operating system, works on the basis of neural networks. It was created by the studio «Prisma Labs», which is headed by a former employee «Mail.ru».

The application works like a regular photo editor: it allows you to apply different styles to the photos taken. It is enough to choose the style in which you want to design the image. The resulting photo can be downloaded or shared on social networks. The creative approach of the designer, who selects the combined textures and styles, will allow you to create a unique image that has its own artistic feature.

Within the framework of this article, the work of free services available on the Internet was considered.

The research of young scientists presented in the article “The result of an experiment on neural network training of a person in the art of drawing” [12] prompted us to conduct our own research on this topic. Students of the Russian State Social University analyzed the state of software for processing graphic images that have Internet versions in 2021. The goal was to analyze what results will be obtained when processing the same source image by different neural networks. Which of the proposed algorithms will create the most interesting object. A team of researchers compared the results of processing black-and-white digital photos with different artificial intelligence programs. Since each of the neural networks uses its own set of filters and templates, the most similar initial parameters were selected for processing the analyzed file. We used templates with a calm color scheme, blue and red shades.

The source file is a black-and-white photo of Valentina Nikolaevna Tereshkova. Taken from open sources – URL: <https://yandex.ru/images/> according to the search word «tereshkova skafandr» with a filter – «black and white style of image» (28.05.2021) (Figure 1).

A file was selected on which the image is well drawn, there are no small details. It is assumed that different colors will be used for different parts of the image when coloring. The system will be able to distinguish the area of the face and paint it in a neutral color.

The following handler programs were selected for the experiment:

- URL: <https://www.ostagram.me/> (28.05.2021) [20];
- URL: <https://deepart.io> (28.05.2021) [21].

To work with the selected programs, you need to pass a simple registration on each of the sites. Specify your email address, come up with a username and password. After authorization, the section for downloading the source image and selecting the applied filter becomes available.

The first program (<https://www.ostagram.me/>) can color images in the colors of other illustrations. The second program (<https://deepart.io>) forms the original image in the style of the selected template (design style). For example, you can create an abstraction from a simple photo or turn a portrait into something futuristic, make special content for social networks or create unique illustrations for a website.

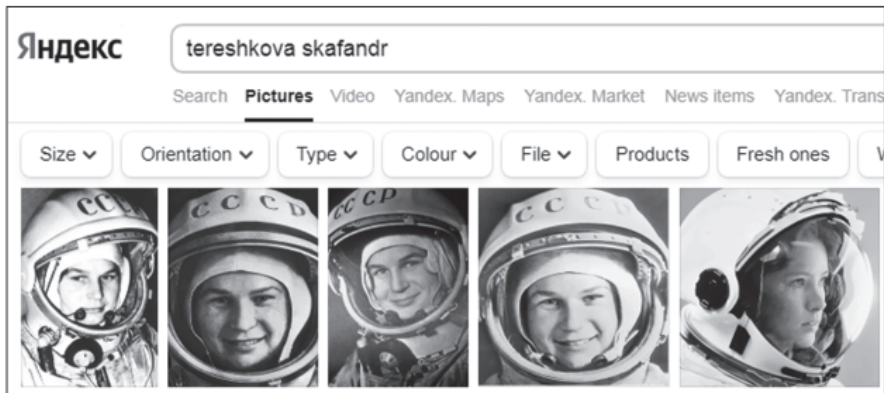


Figure 1. Selection of the original image on the site <https://yandex.ru/images/>

To start processing, it is enough to upload the original image to the site, select a color scheme (or filter). After processing, an independent work of art in the chosen style is obtained. The task of a person is to choose a color palette and a filter that will best match the original image. It is necessary to take into account the combination of colors, the level of blurring of color boundaries, their brightness, etc. The neural network copes with the task perfectly.

On the website <https://www.ostagram.me/> a template with the image of a man in a helmet was selected (Figure 2). The merging of the color scheme with a black-and-white image and the presence of an oval face suggested a good quality of combining the two images. The result is a color image in which Tereshkova's face is presented without distortion. The only inaccuracy when combining was that the face was colored blue (the system did not recognize this part of the image as a face and did not paint it with a lighter body color). The areas of the final image are filled in "under tracing paper" with the selected image, so the area of Tereshkova's face turned out to be under the blue area, and the helmet area was analyzed by the system as the lightest and was painted with the lightest tone from the selected template.

Despite the strange coloring of the areas, the final result of image processing turned out to be quite recognizable with a small degree of futurism, which may be acceptable for the space theme of the original image. In general, the result of the system showed that with proper selection of the source image and filter, very interesting results can be achieved – from ordinary to fantastic (depending on the task).



Figure 2. Template from the site <https://www.ostagram.me/>

Figure 3 shows the result of processing the original image in the program <https://www.ostagram.me/> with standard settings: brush scale-1; line thickness-3000; connection of color palettes of both images.

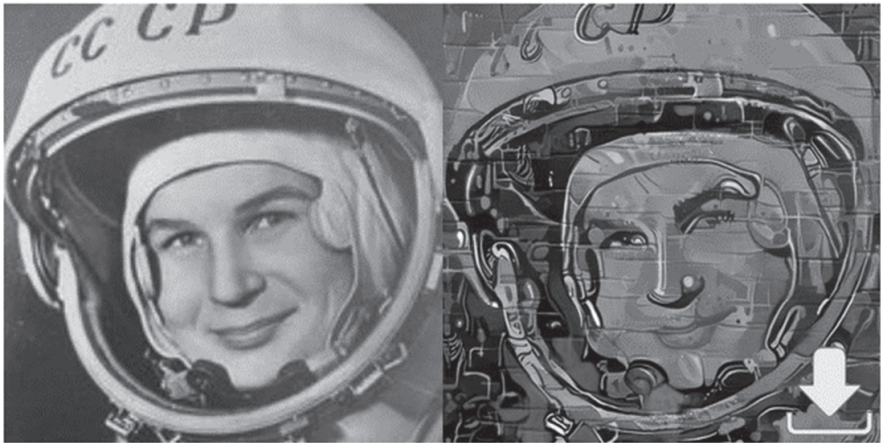


Figure 3. The result of processing in the program <https://www.ostagram.me/> with standard settings

As an experiment, personal settings were set when processing photos on the site <https://www.ostagram.me/>. The following parameters are set: the brush scale is increased to 1.5; the line thickness is reduced to 300 (Figure 4). When using personal settings, the image turned out to be more smoothed (Figure 5), less sharp compared to using basic settings. Adjusting these parameters allows you to create a personalized image. The main task of the experimenter is to choose values at which the final image will not be distorted beyond recognition.

Style scale: ?

1.5

Style weight: ?

300

Use content colors: ?

Off

Click for uploading
content images
(10 max)

Figure 4. Personal settings on the website <https://www.ostagram.me/>

Results

Figure 5 shows the result of processing a photo with personal filter settings.

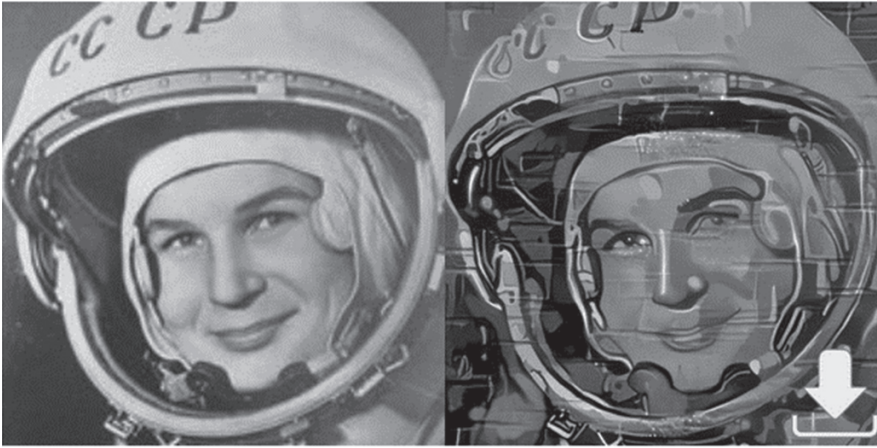


Figure 5. The result of processing in the program <https://www.ostagram.me/> with personal settings

The analyzed photo was tested by the second Internet resource <http://deepart.io/>. When processing the photo, this program selected a color scheme similar to the template from the program <https://www.ostagram.me/> -red-orange palette, the style of a picture painted with paints. As a result, the black-and-white image was transformed into an interesting painted picture, which improved the artistic perception of the person represented in the photo. No image distortion is observed. It turned out to be an artistic work of art that can act as an independent object. The result of image processing by the program <https://deepart.io> is shown in Figure 6.



Figure 6. The result of processing in the program <https://deepart.io>

Discussion

In conclusion, it should be noted that modern digital image processing technologies have prospects for use both in the daily life of Internet users, social networks, etc., and in the professional activities of artists, computer graphics, designers. As a result of the work of neural networks, we get independent works of art that can compete with those created by people in manual mode.

Conclusion

The conducted experiments have shown that the responsibility for the final result remains with the person who must correctly select the original image and think about which style option

will suit the selected image in the best way. The choice of the principles of combining the two images at this stage is left to the person. A computer program performs only a technical task, combining two different images.

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The Formation of the Institutional System of Russian Small and Medium-Sized Business in the Service Sector in a Period of Global Instability

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Annotation: *the problem of the formation of the institutional system of the Russian organization of the service sector is considered. The process of formation of the term “institution” is traced and the definition of the concept “institutional system of an enterprise in the service sector” is formulated. A structural model of the institutional system of small and medium-sized enterprises is proposed, as well as an approach for filling it. The classification of business organizations according to the type of the institutional system formed in them has been determined and their strengths have been identified. A method for transforming an informal institutional system into a formal one is proposed, which in turn is intended to determine the vector of the formation of the institutional system of the Russian organization of the service sector in the period of global instability.*

Key words: *Institute, Institutional System, Institutional Economics, Norms, Rules, Transactional Costs.*

JEL classification: *A100, A110, A130.*

Introduction

In 2021, Russia, as a full-fledged participant in international economic and political life, was affected by the problem of global instability. In addition, the protracted transition period in the economy and politics within the country itself continues. Given these factors, research aimed at increasing economic stability in society seems to be extremely important.

Since today in Russia the most large-scale sphere of economic activity of citizens is the service sector (in 2020, the volume of paid services in the Russian Federation was provided at 8 690 851 934.150 rubles) [20] enterprises in this sphere can become a locomotive for the development of the domestic economy and increase the welfare of citizens during a period of global instability. However, the development objective must be based on predictable patterns of economic behavior. This is due to the fact that the level of transaction costs and opportunistic behavior, which are receiving significant attention today, is directly proportional to the degree of information uncertainty in economic processes.

Proceeding from this, the importance of studying the essence and structure of the institutional system (IS) of an enterprise in the service sector becomes especially obvious, since stability in most domestic small and medium-sized businesses depends on the effectiveness of this system.

At the moment, foreign and domestic scientists have studied quite well the problems of the formation and functioning of institutions at the level of macroeconomics, but the problem of forming an institutional system at the level of organizations in the service sector of small and medium-sized businesses has not been sufficiently studied. To some extent, this issue is

affected by work on the study of corporate culture, however, in them the main bias is directed towards the formation of the cultural environment, without taking into account the problem of formulating clear rules for the interaction of institutional subsystems and sanctions for their violation.

Methods

In this article, based on an analysis of research in the field of institutional economics and corporate culture, as well as on the basis of observing the activities of real organizations, the main prospects and possible directions for improving the institutional system of Russian small and medium-sized businesses in the service sector are considered.

Results

In order to understand the problem posed, it is necessary to turn to what the concept of “institutional system of small and medium-sized enterprises in the service sector” is. To do this, first of all, it is necessary to define the term “institution”, the meaning of which was formed in the process of a long path of development.

In the studies of T. Hobbes, basic institutions are defined as “the result of the conclusion of a social contract between people who lived in a society without a state and caused damage to each other in pursuit of profit” [20]. D. Hume argues that “an important factor in the formation of an institution is repetition these or those interactions, which fixes stable rules, and institutions that arise in this way benefit the entire society” [9]. Later, the development of the term “institution” was studied by such economists as T. Veblen, W. Mitchell and J. Commons. They believed that economic and non-economic problems are interdependent [1]. T. Veblen believed that institutions are established customs of thought, common to a particular society, which make the economic behavior of actors understandable and predictable for others [21; 22]. J. Commons defined institutions as rules, and considered legal norms to be their basis [3]. D. Knight believed that institutions are rules that structure socio-economic interactions in a special way. These rules provide information on how people will act in certain situations. They must be recognized by the members of the relevant group as the rules to which others obey in these situations, and the strategic choices of individuals must be structured in such a way as to lead to equilibrium results [10]. Nobel laureate D. North also defines institutions as “the rules of the game, including formal and informal restrictions, as well as the enforcement of both” [16]. According to D. Diermeier, “an institution is a balance, an equilibrium that stimulates the interaction of individuals. Institutions are needed because they make interactions predictable” [6].

In some works, the concept of “institutions” approaches the term – “rules of the game.” They are restrictions on certain actions or an indication of the conditions under which certain persons are allowed certain actions. Proceeding from this, some authors identify “norms” as the main element of the institutional system, as a term that is even more specific than “rules of the game”. The “norm” in this perspective is presented as a prescription for a certain behavior that must be fulfilled. Its function is to maintain order in the system of interactions [7].

The definition of institutions as rules of behavior is found in many works of Russian researchers. From the point of view of the domestic institutionalist D.S. Lvov, institutions are the rules of the game based on “pre-rational forms of coordination of individual actions” [14]. Another Russian researcher of institutional economics A.E. Shastico believes that an institution is a set of “rules that function as restrictions on the behavior of economic agents and streamline the interaction between them, as well as the corresponding mechanisms for monitoring compliance with these rules” [21]. A.A. Azwan defines an institution as “a set of rules and an external mechanism for coercing individuals to comply with these rules” [1].

Summarizing the above definitions of the concept of “institution”, we can state that its meaning in different sources is interpreted ambiguously. This is due to the split of the institutional school into traditional and neoinstitutional that occurred in the middle of the

twentieth century, as a result of which institutionalism as an economic trend was divided into "traditional" and "new".

«Traditional» institutionalism places the concept of «custom» at the center of its definition and views institutions as consisting mainly of cultural norms, habits and traditions that facilitate human activity [7].

«New» – neoinstitutionalism considers institutions not so much as a socio-psychological phenomenon, but as legal norms and informal rules that restrict human activity. In our opinion, this approach allows us to consider in more detail the interaction of economic agents within the framework of small and medium-sized businesses in the service sector and propose measures to improve the efficiency of the enterprise.

Based on the assertion that institutions reduce the degree of uncertainty in the decision-making process in conditions of a lack of information, D. North, a supporter of neoinstitutionalism, formulated the main features of institutions:

- institutions fulfill the main task of economic theory – they ensure the predictability of the results of a certain set of actions, thus, bringing stability to economic activity;
- institutions have a system of incentives without which they cannot exist;
- institutions ensure the freedom and safety of an individual's actions within a certain framework;
- institutions reduce transaction costs, i.e. costs of information retrieval, processing, evaluation and protection.

Considering that institutions can be expressed both in the form of formal rules, taking the form of normative acts, and informal customs, it is necessary to determine what those and others are [19].

Formal rules are those rules that are created centrally, deliberately and can be easily recorded orally or in writing. These rules are used unambiguously as a restrictive framework for human behavior.

We can conclude that informal rules, like formal ones, are restrictions on behavior, but are not fixed in verbal form. Informal rules, unlike formal ones, are protected not by the state, but by other, deeper social mechanisms. E. Ehrlich determined that «informal rules are the source of the formation and change of formal rules, when their system develops evolutionarily, by small increments, through the selection of elements that make it up. People who create laws do not produce a new norm, but only discover and fix it after it has already taken shape in practice» [15].

Thus, within the framework of our study, an institution should be considered **as an established set of formal and informal rules, the main function of which is to standardize the activities of economic agents**, which allows eliminating uncertainty in socio-economic activities, increasing the predictability of behavior, and thereby helping to reduce transaction costs, and risk of opportunistic behavior.

The term «system» comes from the ancient Greek word σύστημα (sistema – make up, put together) and means «a set of elements in relationships and connections with each other, which forms a certain integrity, unity».

As a result, the definition of the institutional system, which was formulated by the researcher of this problem S.N. Gaponova, suits us. An institutional system is an organic interconnection of its constituent institutions, which represent an integral unity capable of self-development and self-reproduction [8].

It is now logical to define the institutional system of an enterprise in the service sector as *an integral interconnected unity of institutions capable of self-development and self-reproduction, which determines the effective functioning of the organization and the production of quality services.*

Now it is necessary to define the functions of the institutional system of the organization of the service sector:

- providing economic agents with the information necessary for entrepreneurial activities to provide services, helping to reduce transaction costs;
- formation of a system of interaction between employees, which allows avoiding conflicts and ensuring efficient allocation of resources for the production of services;
- defining a mechanism for protecting intra-firm competition from opportunistic behavior;
- creation of openness, transparency and predictability of economic activity for the entrepreneur himself, employees of the organization and economic agents of the external environment (counterparties, competitors, the state);
- regulation of property rights;
- creation of a restrictive framework for the activities of economic agents, ensuring certainty and predictability;
- the formation of the necessary motivation and incentives for labor and entrepreneurial activity;
- ensuring the stability and evolutionary nature of the development of the organization due to gradual changes that do not go beyond the established institutional system, keeping it from destructive impact;
- formation of conditions for parity interaction between the entrepreneur, hired personnel and clients.

Turning to the problem of determining the structure of the institutional system of an enterprise, it is necessary to delimit the institutional system into subsystems and identify their relationship.

The structural model of the institutional system of small and medium-sized enterprises in Russia, shown in Figure 1, can serve as a guideline for the formation of rules for interaction in each subsystem and between them.

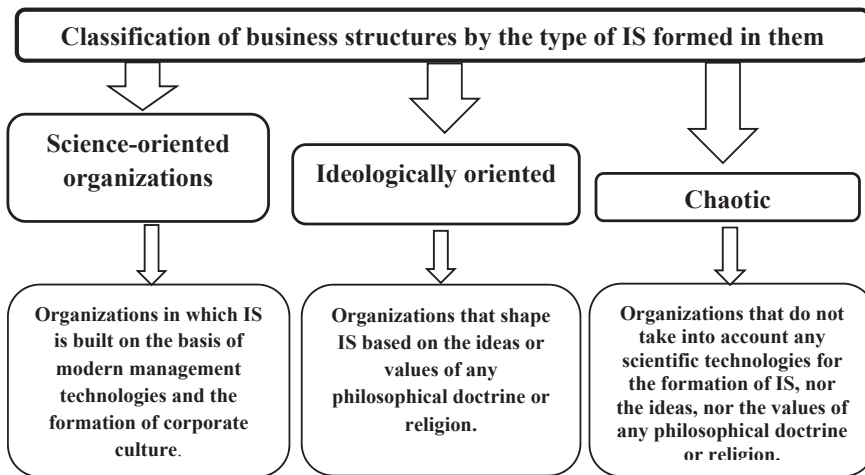


Figure 1. Structural model of the institutional system of small and medium enterprises in the service sector in Russia

The institutional subsystem of the entrepreneur / owner

Researchers of organizational and personal effectiveness such as S. Covey and R. Dalio, who are themselves entrepreneurs in the service sector, argue the importance of «principles», which they call the fundamental norms of individual behavior. These norms can become anchors of the entrepreneur / owner's behavior, which in turn will be reflected in other subsystems. The reliance on the principles allows you to speed up decision-making in a non-standard situation of interaction with the intra-organizational IS and interaction with the external environment. The prominence and reputation of the principles provide additional information for interacting economic agents.

S. Kovi proposes to rely on traditional principles that exist in any formed national culture. R. Dalio, in turn, builds principles based on proven successful patterns of economic behavior [4; 5].

Intra-organizational institutional subsystem

Here, attention must be paid to a clearly formulated framework of interaction between departments and between employees. A transparent and understandable system of motivation and penalties, incentives for rationalization proposals should be formulated.

Institutional subsystem of interaction with the external environment

Interaction with counterparties should be based on clear standards and approved values. The punishment for violation must be predictable and understandable for each employee.

Interaction with competitors must be built within the legal framework, as well as strive to enter the market with a minimum number of competitors, striving for the «blue ocean» strategy.

Interaction with the state also needs to be built in the legal field, additionally building norms for interaction with social projects.

It is important to determine which IP models are most often found in Russia at the moment. As a result of the analysis of operating organizations in the service sector in the period from 2009 to 2021, three main types of organizations are identified, differing in the type of approach to the formation of the model of the institutional system. This, in turn, served as the basis for clarifying the classification of entrepreneurial organizations in modern economic conditions (shown in Figure 2).

Firstly, companies that are already engaged in the implementation of modern management technologies, corporate culture and scientific organization of labor in the process of forming IS (science-oriented).

Secondly, companies whose IS is based on the philosophical and religious norms of any doctrine or religion (ideologically oriented).

Thirdly, companies that do not purposefully build IS, but adapt to the one that is formed based on the cultural level and managerial competence of employees (chaotic organizations) [17].

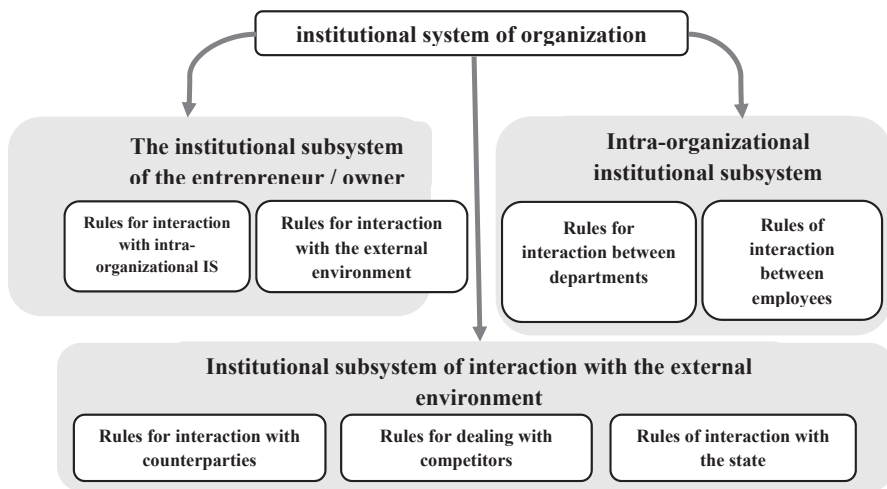


Figure 2. Classification of business structures by the type of IS, formed in them Discussion

Taking into account the existing business structures with their institutional system, it is important to formulate a model of the institutional system that would be optimal as an example for training future entrepreneurs and as a tool to improve the efficiency of existing organizations. As a result, the question arises, is it possible for this to take the best of each type? To answer it, it is necessary to identify the strengths of each business structure.

Research-oriented organizations: the mission, goals of the company and standards of communication with clients are clearly formulated; availability of uniting corporate events; the presence of developed job descriptions, the principles of economic motivation and fines are clearly formulated; clear rules of interaction between departments and between employees.

Ideologically oriented: interaction between employees is governed by well-established and well-known norms in a given society; adherence to high ideals prevents opportunistic behavior; a unified life concept of employees speeds up the decision-making process; high level of loyalty to the organization; the highest possible level of psychological comfort is possible; the coincidence of the goals of the company and the goals of employees helps to reduce staff turnover the ability to create supermotivation, due to the feeling of belonging to the implementation of a high idea.

Chaotic: the simplicity of the institutional system does not require the investment of time and effort to maintain and adapt.

At the same time, the higher the level of development of the organization's IS, the lower the level of transaction costs in the interaction of institutional subsystems and the risk of opportunistic behavior of the organization's employees, which directly affects the viability of the business during the period of global instability.

In our opinion, in Russia as in a secular state, without a clearly formulated national idea at the moment, it is almost impossible to synthesize an organization with a clear, transparent and adaptive institutional system, as in science-oriented organizations, which, at the same time, would offer the same ultra-high mission, goal and values for each employee, as in ideological organizations. At the same time, promising is an ideologically neutral approach based on the rule of law, modern management technologies and secular ethics. However, this approach should be based on uniform norms of the absolute majority of the leadership team. Selection and adaptation of personnel, in turn, should be based on accepted rules, norms and values so that they subsequently serve as a strict guideline for each employee.

The method proposed by the researcher of this issue P. Lencioni will help to form a unified view. He proposes to turn the informal institutional system into a formal and understandable for all using a scenario that can be obtained by answering six questions.

1. Why do we exist? (how an organization makes the world a better place)
2. How do we behave? (norms)
3. What are we doing? (what the organization is actually doing)
4. How will we succeed? (development strategy)
5. What's most important right now?
6. Who is responsible for what? (shown in Table 1)

The author argues that in order to give employees the clarity they need, management needs to «come to an agreement by answering six simple but key questions, and thus bridge even the smallest differences of opinion» [12].

The answers to these questions should underlie the formation of each subsystem of a common organizational IS, which will give chances to manage the organization in a coordinated, consistent and predictable manner, and hence reduce transaction costs arising from the interaction of IS subsystems and reduce the risk of opportunistic behavior.

As an example, you can consider a ready-made scenario of Lighthouse Consulting, which provides consulting services for business [13].

How does an organization make the world a better place? Because we believe that we can give the world the best time management software.

What norms do we adhere to? We are proactive, love what we do, professional, we know how to quickly adapt to new challenges, we are open and honest, with an analytical mindset and have a high level of empathy.

What is the organization really doing? We provide consulting services and software for executives and HR professionals who want to free up the time they spent on scheduling and who want to make scheduling in their organizations more efficient, reducing payroll and increasing conversions.

What is the development strategy for success? We will become the best in providing the highest quality consulting services, providing clients with flawless software, developing and defending our organizational culture and attracting the best specialists in our field.

What's most important right now?

Main goal: development of the "Workforce management" market

Clarifying goals:

- Twice the annual increase in revenue
- Increase advertising volume
- Entering the retail, logistics and industrial markets
- Development of standard solutions for clients
- Entering the CIS markets

Standard operating tasks:

- Raising income levels
- Reducing the level of expenses
- High level of customer satisfaction
- Increasing the level of customer loyalty
- Corporate culture
- Development of a base of potential customers
- Establishing strong relationships with customers and contractors

Table 1

Who is responsible for what?

Name	Title	Main responsibilities
Andrey	General Director	Strategic leadership, defining the company's development path, managing the largest sales
Gennady	Executive Director	Project management, filling projects with content
Anna	Financial Director	Financial Management, Legal Administration
Yuri	Head of Sales	Department Sales, interaction and development of relations with partners
Tamara	Head of Marketing	Department Marketing, training events for clients, holding image and corporate events
Olga	Head of HR Department	Staff training, material and non-material motivation

Conclusion

The formulation and dissemination of a clear goal, norms and values in the organization, as well as a transparent system of incentives and penalties will reduce the degree of uncertainty and the risk of opportunistic behavior of employees. It is interesting, at the same time, that today the idea of «green» and «turquoise» organizations is gaining popularity (in accordance with the typology of spiral dynamics [2], in the arrangement for the organizational development of Frederic Laloux [11]), which include a «culture of harmony», where concepts such as self-government, goals and values come to the fore, and penalties are excluded from management. This approach to building IP is being tried by such companies as «VkusVill», «Fabrika okon», «Ascona» [18]. The principle of management based on the introduction of the driving idea of serving society and creative self-realization through this service is close to the Russian business mentality, although it requires renovation [21]. At the same time, given that today «patriotism» is declared by the head of state V.V. Putin as a national idea [19], it seems expedient in a period

of global instability to build an institutional system of organization, taking into account the answer to the question «how does an organization make Russia better?».

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Methodological Foundations of Mathematical Modeling of the Basic System of Indicators of Information Integrated Logistic Support of Exported Knowledge-Intensive Products

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Annotation: *the article describes a general approach for the formation of a basic system of integrated logistics support indicators based on the example of the export of high-tech products. A review of domestic standards for the calculation of various indicators is carried out. The applied calculation methods are described, the choice of the Markov method of calculation is justified, and the search for independent variables and constants is carried out. In conclusion, the conclusions about the need to develop a set of measures to support exports are presented. It is proved that the use of integrated logistics support provides an increase in the competitiveness of domestic knowledge-intensive products on the international market.*

Key words: *integrated logistics support, export of products, standardization of processes, modeling, basic system of indicators.*

JEL classification: A100, A110, A130.

Introduction

Modeling of the basic system of indicators of the complex of measures for integrated logistics support of high-tech products is the task of generating high-dimensional data. Integrated logistics support technologies are described in the works of the authors of the head of the CALS-Technologies Research Center, Doctor of Technical Sciences, Professor E.V. Sudov and a team of experts [13]. To form an optimal basic system of indicators, it is necessary to find a pattern of interdependent data, consider the possibility of reducing the number of variables by identifying the main variables. When designing high-tech products (aircraft, ships, stations, etc.), operational and technical characteristics are formed at the design stage. The indicators of operational and technical characteristics include the following indicators.

1. Fault tolerance indicators, which include five main factors that determine the reliability of the product during its operation.

2. Reliability indicators, which include six subgroups of indicators, each subgroup of which determines the probability of maintainability and total operability of the product for a given service life of the product.

The organization of work to ensure the indicators of operational and technical characteristics is carried out in accordance with GOST R 56112. When planning the export of domestic high-tech products, the design features and the type of high-tech products are taken into account. GOST R 56111 (Appendix A). Reliability indicators include nine interdependent indicators, namely: I – Probability of uptime during a typical cycle; II – Probability of uptime; III – Average time to failure; IV – Average time to failure during a typical cycle; V is the Average time to failure causing the failure of the task; VI – Parameter flow cracks; VII – failure rate; VIII – the Probability of failure of a certain kind; IX – mean time between unscheduled products for the removal of the sample. To calculate the reliability indicators, you need to define them with constant, unchangeable parameters.

Appendix A, GOST R 56111, provides definitions of the main designations and definitions of indicators. In paragraph 2 (Reliability indicators) Tables A1, Appendix A, GOST R 56111 describe the reliability indicators. When forming the basic system of indicators, we will take reliability indicators as the main indicators. The unbundling of reliability indicators is numbered with Roman numerals to facilitate the graphical display of dependencies and the readability of graphs. The main reliability indicators include (with compliance with the numbering of GOST R 56111): 2.1 Reliability indicators (Table 1); 2.2 Durability indicators (Table 2); 2.3 Durability indicators (Table 3). We will number all the indicators with Roman numerals for the general calculation of their number and further visualization on the diagrams.

Table 1

The reliability indicator

No.	Name of the indicator
I	Probability of failure-free operation during a typical cycle;
II	Probability of failure-free operation
III	Average time to failure
IV	Average operating time to failure during a typical cycle
V	Average time spent on failure leading to non-fulfillment of the task
VI	Bounce Rate Parameter
VII	Failure rate
VIII	The probability of failure of a certain type
IX	The average operating time of the product for an unplanned removal from the sample

Table 2

Durability indicators

No.	Name of the indicator
X	Assigned resource (service life)
XI	Project resource (service life)
XII	Resource (service life) before write-off
XIII	Gamma-percent resource
XIV	Average service life

Table 3

Retention indicators

No.	Name of the indicator
XV	Average retention period
XVI	Assigned storage period

To form a basic system of reliability indicators for high-tech products, it is necessary to determine the constant values that are determined by the tactical and technical characteristics of the product and / or are limited by the requirements of standards. To conduct modeling of the basic system of indicators, reliability indicators are taken as the main indicators. Let's consider the requirements of the standards for reliability.

Methodology

The methodology of integrated logistics support (ILP) consists in the organization of a set of measures for effective maintenance of high-tech products at the operation site. The availability of methodological approaches for the maintenance of high-tech products ensures competitiveness in the international market. Competitiveness is a level of economic, technical and operational parameters of the product, in which the product has a number of advantages compared to analogues. The world market for the export of high-tech products is growing, the leading industries are: aircraft construction, shipbuilding, automotive, special equipment and others. The ILP technology requires a high level of training of technical specialists. Professional skills are: the ability to work with interactive electronic operational documentation, apply and know the classification and coding system, apply digital technologies in the development, design, production, testing and operation of equipment at geographically remote facilities. The price of products on international markets no longer dominates, the export customer needs to have information support for the product, throughout its use. Export implies in international trade, the sale of products to other countries. The countries of export to Russia for high-tech products are: Syria, India, Malaysia, Indonesia, China, France, Kazakhstan, and others. In other words, the export of goods is the export of material goods. I export high-tech products the country of origin must guarantee the operability of the products and the service for restoring operability. Therefore, the technology of integrated logistics support is carried out according to accurate calculations of maintenance, the cost of material and technical equipment of service stations, high remuneration of personnel, the availability or supply of power sources to ensure the operability of the product and its components (SDI). Integrated logistics support with a full range of services is able to ensure the performance of products at a new, higher quality level. It is a new, high-quality level of product performance support that is a priority in relation to analogues of products on the international export trade market. Russia is the main supplier of military equipment and defense products to 48 countries of the world, where 55% of the total export volume is accounted for by India, China, and Algeria.

State, international regulatory and legal regulation in the ILP standard establishes requirements for technical and operational parameters of equipment or products, where the nomenclature of indicators is strictly defined. From general considerations of reliability, the main parameters of high-tech products include the following indicators: reliability, maintainability, recoverability, reliability, and others. The main coefficients are: the coefficient of technical readiness, the coefficient of readiness for use, the coefficient of operational readiness. The main indicators of durability are: average operating time for failure; project resource; assigned storage period. The economic parameters are: the specific total labor intensity of maintenance and repair; the specific duration of repair. Among the probabilities of the characteristics are: the probability of false information; the probability of non-disclosure of information; the average duration of control. When organizing ILP measures, the use of complex indicators for assessing operational and technical characteristics should be taken into account that this group of indicators largely depends not only on the design properties of a sample of high-tech products, but also on the characteristics of other components of the technical operation system (EPVN), including organizational aspects of ILP. The indicators of this group, depending on the evaluation conditions and 0443 calculated when determining the indicators of the components of labor, time and material resources, can characterize both the level of operational and technical characteristics of the sample itself, and the perfection of the technical operation system as a whole.

To calculate all nine indicators of reliability probabilities, you need to determine the constant variables (const). The constant in the case of export of high-tech products is: T_k – a specified period of time. Justification of a given time interval equal to const: Any high-tech product has a certain working life, which is laid down when designing the product. The service life is set in the Technical Specification (TOR) for the development of the product. The design office and manufacturers determine the working life on the basis of R & D, with a large margin, on the basis of scientific research and testing. The requirements for conducting tests are established by the “Instructions for starting, commissioning and running-in of the product”, by industry. This parameter is a health resource that is entered in the product certificate. The certificate is a permissive document that confirms the level of quality and safety of domestic high-tech products, relative to the requirements of national standardization. The permit certificate is issued after providing a sample of domestic high-tech products for testing in an accredited laboratory center or at the state central interspecific testing ground. The certificate has an expiration date. For export products, a Certificate of Origin is developed, which officially confirms the country where the products were manufactured. If, by their composition and quantity, the components of high-tech products have no more than 50% of foreign PRUE, then such high-tech products are considered domestic. When designing high-tech products, development companies have a list of micro-radio-element base approved by the Customer's Representative (PZ), which is recommended for the development of domestic products. The list of approved and approved micro-radio element base is mandatory for use, and the applicability is controlled by the quality management system (QMS) of the developer company. Another health resource is a project resource. The project resource is theoretically calculated for a specific domestic high-tech product. The assigned resource is theoretically calculated for the modification of a specific domestic high-tech product at a certain point in time. Further, according to the test results, according to the results of the analysis of the manifested failures, the operational life can be either reduced or increased. Thus, the limits of the extension of the assigned resource are determined. The assigned resource is increased if a higher-cost planned/unscheduled maintenance and repair is included in the design of the product during the warranty, post-warranty maintenance and repair stages. An important concept is that the product after its long-term operation can not be called “old”. The service life of the product is extended on after-sales service due to increased (more expensive in terms of cost) warranty / post-warranty service and repair. Modern means of objective control and diagnostics allow to detect early “fatigue” of products, to successfully detect and repair them. The practice of exporting civil aviation products (transport, cargo, ambulance aircraft, etc.) has a limit on such an indicator as the product's working life. In a number of foreign countries, the law restricts the transportation of passengers on civil aircraft to 20 years. Therefore, when modeling the basic system of indicators of ILP, it is required to choose a time period of T_k (a specified period of time) equal to 20 years when calculating reliability indicators.

INTERSTATE STANDARD “RELIABILITY IN ENGINEERING. Terms and definitions” // Dependability in techniques. Terms and definitions, updated 2017-03-01. The standard defines: product life-the total operating time of the object from the beginning of its operation or its resumption after repair until the moment of reaching the limit state (p. 3. 3. 4.) For the calculation of reliability indicators, the standard suggests using the calculated reliability method – a method that is based on the calculation of reliability indicators based on reference data on the reliability of components and components of the product, based on calculations on the reliability of analog objects, data on the properties of materials and other information relevant to the reliability calculations. Manufacturers use methods that are labor-intensive to model reliability indicators, namely:

1) calculation and experimental method for determining reliability – a method for evaluating the reliability of a product by calculations in which the reliability indicators of all or some of the components of the object are determined experimentally (p. 3. 7. 10);

2) experimental method for determining reliability – a method for evaluating reliability indicators by statistical processing of data obtained during testing or operation of the object as a whole (p. 3. 7. 11).

Results

The methodological foundations for the behavior of mathematical modeling of the basic system of indicators are domestic and foreign regulatory and legislative regulation, compliance with the requirements of domestic standards for the organization of integrated logistics support for high-tech products, mathematical modeling of the established dependencies of the input a priori parameters of tactical and technical characteristics and output functional parameters of a high-tech product at the object of operation of the export country.

For modeling the basic system of indicators of the complex of measures for integrated logistics support of exported high-tech products, it is not possible to practically apply the calculation and experimental method and the experimental method for calculating reliability. The data required for processing is protected by law and is marked "For official use (DSP)". Therefore, the only method of calculation is the calculated reliability method – a method that is based on the calculation of reliability indicators based on reference data. The calculation of reliability indicators based on reference data includes data on the reliability of analog products; data on the properties of materials and other useful information. To the calculation method of reliability are:

1) structural method for calculating reliability (the product can be broken down into elements);

2) logical-probabilistic method (LVM) – the construction of a functioning model is described by means of mathematical logic, and the calculations of reliability properties are described by means of probability theory);

3) general logical-probabilistic method – construction of event-logic model;

4) the method of failure trees-failure graphs are developed, representing a Boolean logic scheme (working and / or failed states) are displayed by logical characters (- And -, - OR -, "ban", "priority AND", "exclusive OR" and "m of n");

5) Markov modeling method-a simulation model is modeled to obtain the values of the required accuracy, the simulation is carried out using the software MathCAD, Matlab, etc., then analytical and simulation modeling is carried out, the error of the results is estimated.

Discussion

For high-tech products, where failures of the components of the product can occur both in a system with a sequential failure structure and with a parallel system failure structure, this is where the system failure occurs as a whole only when all elements fail. For the case of a high-tech product, a system of the type "K of N" makes sense, the probability that in a system where N is equally (equally reliable) elements, exactly K elements work flawlessly.

Having analyzed the above, it is possible to determine that at the initial stage of the formation of the basic system of indicators of the complex of measures for integrated logistics support of high-tech products, it is necessary to use:

1) when modeling reliability indicators, the time period of the Tor (a given period of time) is 20 years, which is const.;

2) to calculate reliability indicators, it is required to use the computational reliability method (based on reference data), and to simulate a simulation model to obtain the values of the required accuracy, use the Markov method and the MathCAD or Matlab software.

Conclusion

In conclusion, it should be noted that for the export of domestic high-tech products, the use of integrated logistics support (ILP) technology is considered as one of the most important ways to reduce unnecessary costs for after-sales service of domestic products. Thus, domestic technologies of integrated logistics support allow, in addition to the tactical and technical

characteristics of the product, to ensure the competitiveness of high-tech products on the international market. The digital data ecosystem and technological approaches to its formation are described in the research of the author's team of the Russian State Social University [16; 20].

It is necessary to note the importance of research on modeling the system of indicators aimed at extending the life cycle of high-tech products by achieving a high, qualitatively new level of integrated logistics support. For example, using the example of radar stations, the life cycle of such high-tech products can be extended to 70-100 years. And if you take 30 years ahead, then in the year 2050 (according to Kleiner G.B.) "...the full realization of the capabilities of modern electronic computer devices and the completion of the Moore's Law are expected" [10; 11].

The implementation of integrated logistics support technology in the distant future will require the organization of a socio-economic ecosystem, i.e. a system that represents "...a localized set of activities, business processes, innovative projects and infrastructure entities capable of long-term independent functioning due to the turnover of resources, products and systems" [12]. Kleiner G.B. is the Deputy Scientific Director of the Central Economic and Mathematical Institute of the Russian Academy of Sciences, Head of the Department of System Analysis in Economics of the Financial University under the Government of the Russian Federation, Doctor of Economics, Professor. In the works of Kleiner G.B. and Ioffe L.S. "Application of mathematical models in the management of material and technical supply", the dependence of the indicators of procurement, transportation, storage and use of material and technical resources is described [9; 12].

Studies of integrated logistics support technology are devoted to the work of domestic scientists in the following areas: aircraft [17], high-tech products [3], offshore gas and oil production facilities [18], after-sales service of aircraft [1], complex innovative products [4], railway transport [14], transport and logistics security system [13], shipbuilding products [5], IT infrastructure [19], the genesis of cataloging for integrated logistics support [6] and other studies.

The presence of a set of measures for integrated logistics support and a methodology for multi-level system modeling of a set of measures for ILP, in total, increase the competitiveness of high-tech products on the international market. The main purpose of applying the multi-level modeling methodology is to develop such information and computer support for technical operation, which would ensure the effective use of high-tech products at a given cost of the after-sales service life cycle.

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Stereotypes of Musicians-Performers Using National Instruments: Psychological and Culturological Aspects

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Annotation: *the purpose of work is to prove psychological prerequisites of playing music for national instruments in condition of traditional Russian performing school which are that the specifics of a playing the national instruments are caused both by tradition canons, and individual socio- and ethnopsychological manifestations of the musician identity. Characteristic qualities of the performer predetermine any given stereotypes which are considered in article. The system method of art studies (musicology), cognitive approach to a research of the identity of the musician and also the principle of the theory of psychological types of creative persons served as methods of a research. Research conclusions are that: stereotypes of performing musicians define style of interpretation and explain any given effect on listeners. Cultural and educational work of the performing musician begins to be filled with special sense as the musician is a performer and creator of composition and the concept of her artistic realization, and features of stereotypes of performing musicians affect efficiency and success of their creative activity – concert work and enlightenment.*

Key words: *performing musician, national instruments, folklore, culture, performing art, playing music.*

JEL classification: *I200, I290.*

Introduction

Traditional music exists only performed by, each her concrete text is result of the performing realization of an ethnomusical canon therefore its artistic works are also mobile and unique, as

well as each performance, a concrete moment or a present situation. By the beginning of the 21st century many local and regional traditions of national instrumental performance begin to disappear. However they are “picked up” by professional performing musicians. Owing to sociohistorical factors the professional musicians cannot be carriers of traditions of culture, and they should master these traditions to develop them in the concert and performing and cultural and educational activity. In this regard their art and esthetic representations, musical taste, style qualities of a playing art change – performing culture undergoes transformation. The professional musician involves in an arsenal of the means of expression receptions, ways and the art and esthetic principles of the national musician’s playing the folk instruments [18; 20].

Traditional culture was embodied and remained especially gifted persons at all times – singers, instrumentalists, dancers, handicraftsmen. The national artist expresses himself, the inner world, talent and skill contents, sense, and standards of culture. The person – the creator of art, but not the abstract carrier someone the set initially collective will. The identity of the artist is that phenomenon creating culture in which all life of folklore tradition which is in the incessant movement is concentrated and embodied.

Ethnomusicologist I.V. Matsiyevsky pays attention, that “carriers of tradition are subdivided into two, organizing and expressing it, groups: 1) leaders, especially skillful, gifted national artists; 2) the performers forming the so-called folklore environment, focused on creativity of outstanding masters. It is necessary to consider, however, an extraordinary role of identity in unwritten culture. Each musician has unique personal properties. Identification of original creative shape is a steady task of the performer. But over specific features the local style will surely appear, the consciousness type inherent in representatives of a certain tradition will be found. Outstanding masters grow up on own soil, in concrete sociocultural community” [7, p. 145].

The scientist sees the national musician as the unlimited master, being a part of the creative act which is in reality, in constantly changing intoning. And, to comprehend integrity of tradition, I.V. Matsiyevsky emphasizes that it isn’t enough to study only methods of performance because the tradition has “no accurate designation or naming, completeness and at the same time is in freedom and inconstancy. This dialectic contrast is created, first of all, by the person having flexible and various communications with surrounding life. The musician with individual features of character, temperament, expresses through art and expresses himself, and tradition and seeks in the creativity for complete judgment of the world. In an originality of the identity of the artist typical properties of the certain culture comprising actually folklore and the traditional nature of public life are displayed” [8, p. 209]. V. Matsiyevskaya offers the typology to the identity of musicians-instrumentalists, allocating three views: objective, subjective and mixed (intermediate) [5; 6]. When determining concrete type of the personality, properties of musicians are considered subjective (creative and human). “Character, lines of temperament and also musical forms created by them (art result is a manner of singing, feature of sound extraction, a timbre, the intonational movement)” [5, p. 17] become the uniting signs for this typological row.

The certain notion of the identity of the performer is given by genre structure of the repertoire of each of them which differs mainly available works earlier or late by origin: from lullabies, spiritual verses, plots to chastushkas and modern cruel romances [14; 18]. The general characteristic of the carrier of tradition as certain type of the personality is also made by a timbre, temperament, range, performing receptions, etc. The identity of type of the soloist can be considered through manifestation of the personality in concert and performing practice which analysis gives the chance to reveal the main stereotypes of musicians-performers the national folk instruments.

Methods and methodology

The problem will be solved by the established in psychology [15; 16] and art history of systemic-ethnophonic (analysis of the expressive characteristics of the musician’s playing

and the principles of his sound production on instruments) [7], complex (analysis of cultural, historical, sociological and artistic-aesthetic factors affecting the style of interpretation of the musician) [3; 13; 17] methods of studying the performing creativity of musicians, as well as a cognitive approach, which includes the principles of hermeneutics and semantics, which help to identify certain features of performing art in the musical material itself in its semantic, aesthetic and compositional and technical aspects [1]. Also during the study, the method of psychological and pedagogical observation, ethnomusicological and art-historical analysis of interpretations of works by musicians-performers the folk instruments was used [2].

Results

As the most fundamental in creating-implementing a holistic composition and regulating the mobility of the form, 6 musical and psychological factors are identified, the systemic interaction of which determines the final sounding result of each particular performing act, i.e., the real musical text. These include: 1) motivation; 2) communication action; 3) dynamic stereotype; 4) individuality, temperament, creative imagination of the performer; 5) spontaneous or conservative implementation; 6) individual and collective artistic concept. Consider them sequentially.

Dynamic stereotype. This type of musicians-performers the folk instruments is associated with the concept of the dynamic development of music. Dynamic stereotypes have an important impact on the compositional structure of traditional musical works. Dynamic characteristics largely determine their genre specifics. This is clearly seen on the example of large forms of Russian instrumental music, especially unprogram suite poems (poems without title and concrete images). When they are performed as a normative – it is traditionally accepted to gradually increase the tempo of the playing throughout the duration of the sound of a musical work.

The increase in tempo is associated with the growth and intensification of the energy head, the general, including the loud increase in sound: from *allegretto* and *p* to *prestissimo* and *fff*. Such a dynamic stereotype actually determines the melodic-rhythmic, ornamental and dashed simplification towards the end of the composition. Not only motor skills, but also the thinking itself has a tempo limitations. With complex structures, musicians are not able to think and manage at an overly fast pace, performance automatism inevitably comes into play here.

Temperamental stereotype. Individual mental characteristics of performers play a huge role in the process of creating and performing traditional music. After all, it is the character features and personal qualities, temperament, energy, and the originality of the reaction that largely determines the inclinations and direction of artistic interests, choice of genres and forms, as well as their subsequent development throughout his creative life. This is especially noticeable if we compare how differently the creative manners of representatives of the same performing school were realized, comparing the playing of students of the same master.

In the scientific literature, the theory of different artistic styles has developed precisely due to the difference in the individuality of their leaders, the complex of their mental data. Some focus more on the emotional-expressive side of the work, the beauty of the sound and the content of the music [12]. In this regard, great attention is also paid to the search for new musical material through the inclusion of both new-found material (whole plays and individual fragments), as well as the introduction of instrumental inversions from other genres, sound imaginability. Courage, fantasy, innovation in the development and variation of both existing musical forms and in the formation of completely new genres are the features that determined the formation of this artistic line.

A characteristic of this style direction is the construction of musical forms on the principle of contrast [10]. This applies to all genres of music for hearing, i.e. not only program works, but also unprogram poems and suites. Representatives of this area left the greatest composer heritage. From a psychological point of view, such a direction of the sphere of creative interests is due to the specifics of the concentration of the performer attention. A subject of this psychological

type is not able to maintain concentration on one object for a long time, but can very quickly switch from one object to another.

The power and advantages are in quick switching, fantasy, enthusiasm, a huge of emerging new ideas and solutions. Weak side is in the impossibility of prolonged concentration on one object and, accordingly, deep penetration into its essence. The consequence is a special commitment to the contrast of comparisons of episodes in the form characteristic of music of the twentieth century [9].

Representatives of this psychological type are characterized by good short-term memory and the development of associative memory in interaction, to a greater extent with sound and auditory channel of perception than with visual and motor-moving. Stored generically, not detailed. It is easier for musicians to compose a new instrumental version than to literally reproduce the "original". We find many parallels in the history of academic classical and even vanguard music. Attention to the composition itself, contrasts, a continuous search for new material and means of expressiveness is characteristic for this type. Not deep, but wide. Not gradual, but contrast. Since the musician's attention is not directed to articulation and performance, but to a greater extent to constructive and general musical moments, then accordingly the technical side of the game loses quality. Technical perfectionism to musicians of this type is not characteristic, since it requires a deepening into the interpretation of the known, detailing, a long concentration of attention on one material both during learning and during its subsequent reproduction.

Musicians of this type and in everyday life are restrained and calculated. They show rigor and conservativeness, the gradual construction of the material in the deployment of the composition both in terms of dynamics and architectonics themselves. The same is in the external behavior of the artist. All movements are accurate and rational; the effects are thought out and calculated in advance. Spontaneous improvisation is not characteristic of this type of musician.

Spontaneous stereotype. How the musical text is formed in one stage or another of the performing structuring of the composition – spontaneously or conservatively – directly depends on the personality properties of the player (as well as external factors acting during the performance, which have already been mentioned above). Spontaneity and conservatism ultimately represent a greater or lesser degree of adherence to the canonical. This also includes how much the musician in a particular playing situation allows him to fantasize, improvise, i.e. perform something that was not foreseen and was not prepared in advance [19].

The feeling of spontaneity, the surprise of the playing is very important, since it is that produces the strongest effect on the listener. For the performer, in most cases, not spontaneity itself is important, but its illusion among the listener. It is more important that the listener perceives the performance as momentary, unprepared, at that moment created, even if in reality it is not. At the same time, the musician can perfectly control the situation using a previously invented tactic, deliberately preparing all the likely deviations from the canon and "unexpected" effects. Real, true improvisation certainly also takes place. It all depends on how quickly the musician can think at the time of the performance, what is his brain concentration. At a slow tempo, the musician can afford great freedom and spontaneity, because he has more time to think about. Even more spontaneity and improvisability in certain details can afford a traditional performer implementing a form in the genres of music, where, in addition to canonically slow tempo, there is also a fairly free, rubato like rhythmic performance. At the same time, the rhythmic model cannot be violated as unshakable, sacrally conditioned by the canons of the genre.

Collective stereotype. The traditional musician-performer, leader of the instrumental ensemble or soloist is the creator of the composition and the concept of its artistic realization. There are two types of instrumental ensembles: ensembles with one only or ensembles with a few soloists. The artistic concept in the ensemble of the first type belongs entirely and completely to the first soloist (for example, accordion player, balalaika or domra player) [4]. The second type of ensemble is a chapel, or choir with several soloists. In terms of artistic concept, the composition

here is realized by several performers-leaders at once. In parts of solo instruments there are elements of concertation, competition [11]. The melody can take turns: either one or the other solo instrument. The presence of several soloists at once suggests a more complex – score thinking, which provides for the leader to take into account the entire complex of register and timber and dynamic patterns of ensemble instruments.

Discussion

What, in fact, is the reason for the formation of 4 stereotypes of musicians-performers presented above, except for the individual-personal properties and qualities of the musician? Each performer not only conducts creative activities, including a cultural and educational component, but also a professional one, which provides him in life and generates income. Motivation and communication are also such factors predetermining gravitation to one type or another.

Motivation. Motivation is the most important factor that serves as a kind of indicator of the genre “for hearing”, and also stimulates the appearance in the initially dance structure of greater freedom in improvisation (and, accordingly, variation) and enrichment of performing equipment with virtuoso techniques. Researchers of traditional instrumental music V.N. Gunin and I.A. Gunina attach great importance to performing motivation [3]. In their opinion, many problems of notation of large compositional forms arise precisely from the transcriber’s lack of understanding of the performing motivation of a text played by a traditional master. After all, often recordings of folk music are made outside the usual working environment for the performer, i.e., accompanying a dance, ritual, concert situation or without ensemble accompaniment. The informant during recording, communication with the researcher is currently oriented.

Remaining without the usual incentives, the traditional musician often implements large forms not on a full scale, preferring the “narrowed” option (a kind of “autopaper” or “thesis”), and, of course, can miss many spectacular performing techniques, weaken the pace and, in general, the emotional intensity of the performance. At the climax of the holiday, the playing of the leader – accordionist or domrist is as motivated as possible by the emotional maximum. By this point, the musician is concentrating all his performing resources on making the best impression. And this should be taken into account, more precisely, this should be taught to folk musicians [19].

In the playing of the domrist soloist, first of all, the art of ornamentation is appreciated: trills, mordents, groupettos, double notes, all kinds of passenger beats of the main tones of the melody. Indicators of virtuosity are also beaded motor technique at a fast tempo, playing in high positions, using lower strings in the playing of melody. Such use of marginal, that is, going beyond the usual practice of playing in the understanding of musicians, the possibilities of the genre. Various coloristic effects are used: playing at the edge of the strings, hitting the instrument body, pizzicato, glissando, high long notes with a high amplitude of vibration (in a characteristic metric organization). The temporary inclusion of the accompanying line in the soloist’s playing with the complete disappearance of the melody at this moment is used.

Communicative action. The process of creating and performing a composition is always an act of non-verbal communication. Competition, opposition, harmonious and contrasting interaction of the performer with other musicians and recipients are characteristic features of concert and represent the essence of this non-verbal communication. In the material under consideration, the following communicative pairs are significant: 1) musician and dancing, 2) musician and listeners, 3) musician and musician (between soloist and accompanying group, between soloists within the framework of one ensemble of musicians and between ensembles with parallel play).

As part of the first communicative pair, the domrist or accordionist is subordinate to the task of creating ideal, comfortable conditions for dancers. It should be convenient to dance to his performance. The first condition here is a strict “iron” rhythm (as the musicians themselves say, “so that the legs do not knock down”). The second is not to focus the attention of listeners on the actual instrumental performance (otherwise they will only listen and stop dancing). In addition to directing dances (musicians often solemnly notify of a change in a particular dance

figure), choosing the type of dance (here the musician focuses on the age category of the participants, their physical condition and, of course, desire). In the sound stream itself, in the process of structuring the text, the musician varies the scale of the composition (expanding or compressing the form), the pace and energy filling of the performing.

In the second of these pairs, listeners are in the role of wingmen. The task of the instrumentalist is to hit, surprise, amaze, produce an wonderful effect or immerse in memories, cause certain life associations. When choosing the theme material of the music for the hearing, the performer takes into account the personal characteristics of the public, its social composition, the ability to concentrate at the moment, the mood. In the show of music for the hearing, in addition to works with a dance genre basis, solo program compositions with sound imagery, plot, and associative symbolism, epic poems with iconic or emblematic signs can be heard [20]. It achieves contrast effects using register shifts and tonal comparisons of certain thematic or textural formations, sometimes moving the same melodic block or its fragment, rhythmic formula or its part to another register and tonality, etc.

Conclusion

From what is said it is clear that in the modern revival in the new conditions of traditional music it is important to take into account not only the productive side of it, i.e. the works recorded once (in addition, in the only version), but also the whole complex of creative and psychological prerequisites that give rise to them. Stereotyping of performers determines the interpretation style and explains one or another effect on listeners. The cultural and educational work of the musician-performer begins to be filled with a special meaning, since the musician is the creator of the composition and the concept of its artistic realization, and it is the characteristics of the stereotypes of the musicians-performers that affect the effectiveness and success of their creative activities.

In one way or another, the musician-performer the folk instruments should focus the attention of listeners as much as possible on the instrumental playing itself, which is implemented precisely for listeners, therefore, it is the effect exerted on the listener that predetermines certain qualities of the performance, expressiveness, nature of interpretation and form of composition. How this affects the purely performing moments of the composition is discussed above. In relation to the strategy of choosing the means of musical and performing expressiveness of formation, the musician acts in accordance with his own aesthetic ideas, individual psychophysical condition and mood, as well as the canons of form variation adopted in local or regional traditions.

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Pedagogical Conditions, Methodology and Organization of Training of Performers on Copper Wide-Ranging Instruments

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Annotation: *the methodological principles of teaching a musician-performer to play wide-ranging wind instruments at the Military Institute (military conductors) of the Military University have features that depend on the conditions of training. The contingent of students is characterized by certain age characteristics, features of the level of basic music education, ethnic and cultural differences in the trained military personnel of foreign countries. The article describes some laws and mechanisms that ensure the possibility of achieving high levels of individual professional development during training in the game on wind instruments of trainees of a special group of military institute (military conductors) of the Military University, based on the academic method of training in the game on wind instruments, but actively adapted to a specific psychological and pedagogical situation.*

Key words: *music pedagogy, teaching methods, professional training, wind instruments, wide-ranging wind instruments, saxhorns.*

JEL classification: *I200, I290.*

Introduction

Domestic musical culture has the richest performing traditions on wind and percussion instruments. The formation of the domestic performing school takes place in the «golden age» of the development of Russian culture, in the era of classicism. Since the middle of the XVIII century, thanks to the active performing activities of foreign musicians (primarily Italian), a whole galaxy of outstanding domestic performers has grown. In the late XVIII – early XIX centuries, performing culture in Russia was actively developing not only in metropolitan St. Petersburg, but also in provincial cities. Initially, provincial musical culture developed due to the widespread distribution of serfs and theaters, as well as the organization of private music salons, circles, and evenings of music [9]. With the organization in 1859 of the Imperial Russian Music Society, musical culture in Russia receives the opportunity to develop professional music

education, music classes are opened at the regional departments of IRMO, in which local young people who are talented for music are taught performing skills.

The leading teacher of the Moscow Conservatory was trumpeter Vasily Georgievich Brandt (1869–1923), who worked there since 1900, is a German by birth, born in Bavaria, a graduate of the Court Music School in Coburg (Germany), who served as the first trumpeter of the Philharmonic Orchestra and professor of Music Courses in Helsinki. He wrote a number of outstanding works for trumpet solo, including a collection of sketches included in the educational repertoire of trumpeters around the world. Contemporaries noted Brandt's high performing skills: «As a soloist in the Bolshoi Theater Orchestra, he stood out for his play due to his strength, beauty and lyric-dramatic cantilena. The surprisingly wide sound range distinguished Brandt from all other musicians: the famous luminous upper notes, the velvety and juicy sounds of the middle register, and deep buck tones – everything was subject to him» [14, p. 93]. At the same time, the emotional and singing manner of the game, the expressive phrasing, the sensitivity of Brandt's intonation testified to how deeply and sincerely the German penetrated Russian national culture and mastered the traditions of performing arts prevailing in our country. From this moment begins the glorious history of the development of the art of playing copper wind instruments, and with it the development of teaching techniques [5].

A talented student of Brandt at the Moscow Conservatory was Peter Yakovlevich Lyamin. He also combined the talents of the performer and teacher, like his predecessor, he performed in the Bolshoi Theater orchestra for many years and served as the head of the stage composition. In addition, he performed with the troupe of S. Diaghilev during the "Russian Seasons" in Paris. Lyamin's name is on a par with the outstanding names of such outstanding musicians as M. Tabakov, M. Adamov, I. Vasilevsky, L. Yuriev, N. Polonsky, T. Dokshitser. His skill was distinguished not only by virtuoso technique, freedom of sound production, impeccable reading of the musical text, but also by a bright temperament, spiritualization, and a sense of the internal dynamics of the work being performed. Lyamin secured what Brandt had begun – an impeccable mastery of a copper wind instrument both technically and in terms of performing a beautiful cantilena.

Already in the spring of 1915, the first graduates of talented teachers demonstrated the results of their training at a concert in the famous Great Hall of the Conservatory. The exam was passed by 15 spirituals, including a clarinetist and a trumpeter from the Brandt class. Chairman of the commission Boleslav Yavorsky flattered about the professional level of performers on copper brass. The performing skills of the student symphony orchestra of the conservatory were invariably increased. Its composition increased and became more diverse, including a group of copper brass. Thanks to this, the orchestra could master the program of any complexity [11]. Under the direction of V. Brandt, the student orchestra presented to the public such compositions as Beethoven's Fifth Symphony, Bizet's Rome Symphony, Tchaikovsky's Italian Capriccio, and Kalinnikov's First Symphony. The fact that such musicians as A. Glazunov, A. Arensky, M. Hippolitov-Ivanov, A. Grechaninov, N. Cherepnin, V. Safonov, N. Malko, N. Golovanov, K. Sarajev also spoke about the level of performance of the conservatory orchestra.

In the 1920s, this good tradition was further developed. The intensity of concert activities of teachers and students has increased. Noteworthy statistics: if in 1912–1917 the Conservatory gave 18 symphonic evenings, then in 1924–1930 – about 100 symphonic concerts. Assessing such facts even in purely quantitative terms, it is not difficult to conclude that during this period a high level of training of professional musicians was maintained. For all the achievements of the previous stages, from the mid-1930s, the conservatory in some way had to start with a «clean slate» and it was then that the configuration of the educational «tree» that was still preserved took place. The fundamental pedagogical and methodical principles of learning to play copper brass formed the basis of professional training and spirituals at the military institute (military conductors), which continued the glorious traditions of the copper brass class of the

Moscow Conservatory. We will pay special attention to pedagogical conditions, methods and organization of training of performers on copper wide-ranging instruments.

Methods and methodology

Scientific concepts and developments of philosophers and aesthetics, culturologists and musicologists, psychologists and teachers, as well as research in the field of theory, history, psychology and the methods of performing arts, physiology, acoustics, mechanics, etc. play a major role in the study of pedagogical and methodological conditions for the training of copper-brass performers. This study is based on the results of historical documents, theoretical and analytical materials, reference information, as well as methodological literature of Russian and foreign authors and manuals for playing copper wind instruments. In order to comprehensively consider the subject of the study, a wide practical experience was also summarized and the pedagogical approaches of famous Russian performers on copper brass were analyzed (R. Abramov [1], A. Barantsev [4], I. Batishchev [5], R. Laptev [10], A. Pautov [14], G. Saldaeva [17]).

Results

Professional musical education, the purpose of which is the comprehensive creative development of cadets of the military institute serving in the armed forces of the Russian Federation, includes various forms of classes, concert performances, participation in competitions and festivals and solves the tasks of artistic education and education of musicians of different ages, social and ethnic groups, carriers of various national mentality and has a clear acmeological problem [8]. Acmeology as a science of human vertex achievements, which is part of the psychology of development, exploring mechanisms that ensure the possibility of achieving the highest stage (acme) of individual development. The practical significance of the analysis of acmeological aspects is that it gives an understanding of what educational conditions can lead the trainee to the tops of professional activity [7].

The art of playing brass and percussion instruments is a musical and creative process that not only leads to the formation of performing skills and the mastery of professional skills and skills, but also determines the general artistic and aesthetic education of musicians and the development of collective music skills (chamber or orchestral), while contributing to self-improvement, broadening the outlook, professional and personal formation [12]. The most important component of the educational process at the military institute is the education of tolerance in the perception of ethnic, social, cultural and psychological differences is relevant. The education of a military conductor is a complex special phenomenon aimed at transferring professional performing and social experience from generation to generation of representatives of this rather narrow professional group [6]. The content of the education of the conductor of the military orchestra consists of: professional, moral, aesthetic education, etc.

In our case, given the contingent of students, the forms of interaction between the teacher and the student are specific. Despite the great difference in the basic training of military musicians of foreign countries, the teacher relies primarily on methods of musical generalization, intonation-style comprehension of music, the laws of interpret reading of a musical text, and dramatic analysis of musical forms. Teachers of the military institute (military conductors) today also in classes in various educational disciplines are engaged in students of a special group to educate general culture, expand the musical outlook, develop hearing and a sense of rhythm, theoretical issues, finding the necessary words, turning to their own life and professional experience as a military conductor. Active methods of learning the curriculum, such as sharing with the most trained participants in the educational process, provide serious assistance in training students of the special group. It should be noted that the concern for the creative component is almost the main feature of leading teacher-musicians, regardless of the class in which their pedagogical activity takes place in the orchestral class, brass instrument classes, solfeggio, piano or other subjects.

At the present stage of the development of higher education, the importance of methodological science as an engine of the pedagogical process has increased immeasurably. In these conditions, it becomes especially important to study the issues of training methodology, including playing copper wind instruments [4; 19]. Taking into account these requirements, future specialists are being trained at the Military Institute (military conductors) of the Military University. An integral part of the contingent of students at the institute are cadets and students from African states, where special education is little available, where there is no musical graphics, and oral musical art replaces it, where forms of polyrhythm and polymetre are extremely complex, where the training of national personnel of performers on wind instruments is still very weak. In the professional selection of candidates for training in the playing of instruments of military orchestras, the training of a significant part of the cadets of a special group of popular brass musical instruments (Saxhorns) is presented.

The first didactic recommendations for training in playing wind instruments began to be actively developed by domestic scientific and methodological literature from the 30s of the twentieth century. The methodological foundations of brass performance were reflected in the works of such outstanding musicians as S. Rozanov, B. Dikov, V. Blazhevich, M. Tabakov. In subsequent years many works of research character of teachers-performers Y. Usov, T. Dokshitser, A. Sedrakyan, B. Grigoriev, V. Apatsky and others appeared [11].

However, unfortunately, few authors turned to the development of questions about the method of teaching the game on instruments of the Saxhorn group (althorn, tenorhorn, baritonhorn). Only at the end of the twentieth century, the topic was touched upon by teachers of the Department of Instruments of the Military Orchestras of the Military Conducting Faculty at the Moscow State Conservatory named after P. Tchaikovsky – A. Sedrakyan and V. Yakovlev. In the future, we find a lot of methodological developments among the teachers of the same department – Yu. Beloglazov, R. Laptev, I. Yakushev.

The main task of the teacher of the military institute of military conductors is to help him master a variety of performing means during the training period. They can be divided into three groups. The first group is technical means: ambushur, performing breath, language technique, finger technique. The second group is means related to sound quality: intonation, timbre, vibration. The third group is general musical means of expressiveness: strokes, dynamics, musical phrasing, agogics. Naturally, this division is conditional. There is a very close, organic relationship between performing means in music [2]. A feature of their relationship is subordination to artistic goals. But the most important performing means of playing a wind instrument is considered to be sound. The expressiveness of the sound as a means of performing the melody, most fully determines the strength of the emotional influence of the music. «Singing» on a wind instrument is one of the most important tasks of musical performance. The player should strive to make the sound of the instrument clean, juicy and dynamically diverse. But these are «programs-maximum» tasks.

In the training of foreign military personnel in the game on wide-ranging instruments of the Saxhorn group, the method of teaching the game in the initial period is very important. One of the most important aspects of this period is rational staging. In special methodological works, we do not find, as a rule, a deep theoretical justification for the concept of rational staging when playing broad-minded wind instruments, it's clear and accurate wording. Analyzing the conclusions and conclusions of our leading teachers Yu. Usov, B. Dikov, V. Venglovsky, A. Fedotov, M. Tabakov, N. Platonov, etc., it can be said that rational staging involves the creation of comfortable conditions for the work of organs and muscles among performers playing wide-ranging copper wind instruments, as well as the interaction of the components of the performance.

The first question of this section is the production of ambushur. Setting an ambushur requires a purely individual approach to each trainee. There can be no single standard for all in

this area. Before going to the production itself, you should correctly select the mouthpiece. To do this, you need to be able to understand some features of the structure of the mouthpiece. First of all, it should be borne in mind that mouthpieces are separated by their dimensions of the inner diameter of the cup and the outer size of the rim of the fields. These dimensions vary depending on the tool. The internal size of the calyx, rather than the external size of the fields, should mainly be taken into account. In the initial period, the mouthpiece is selected only by the external physiological qualities of the trainee, and in the future, for several lessons, making sure that the choice does not correspond to the data of the cadet, you can change the mouthpiece if necessary, relying on the already known qualities of the cadet's ambouchure. Changing the mouthpiece during this period will not cause negative consequences. As already mentioned, there is no single standard when putting a mouthpiece on the lips. There are certain recommendations, but the staging should be based on a careful study of the structure of the lips of the trainees. However, it is impossible to determine all the features of the structure of the labial and facial muscles with great accuracy, so the correctness of the staging should be clarified during the extraction of sounds. Sponges: full (procheilia); medium (orthocheilia) itonic (opistocheilia). Put the mouthpiece on the lips correctly folded for the game, you should begin to extract the sound. Before doing this, it is recommended to first engage in «mouthpiece basing» (from English buzzing – whistling, humming), i.e. play on one mouthpiece without an instrument. And then go on to the first sound, which quite easily manages to extract on the instrument a novice tenorist-baritonist. Most often this sound is the «salt» of the first octave. After that, as the extraction of the sound «salt» is confidently achieved, it is advisable to proceed to the exercise of extracting natural sounds «before» the first and second octaves. Having fixed the skills of extracting the sounds «salt» and «before», you should go on to master the sounds of the tone Do-major in descending motion. After a confident extraction of the sounds of the first octave, you can begin to perform the gamut as a whole, its tripod-arpeggio, as well as exercises and plays in this tonality.

Discussion

Let's go to the next section of the methodology. It's performing breath. Special works of D.A. Balagur [3], D.M. Muyedinov [13], B.A. Pronin [15], O.V. Rykov [16], V. Sumerkin [18] and others are devoted to this problem. Performing breath should occupy an important place in teaching the game on wind instruments, including wide-minded brass. The practice of playing copper wind instruments shows that mastering breathing skills is inconceivable without a long systematic training of the respiratory apparatus, which should begin from the first moments of training.

V. Sumerkin in his work «The Method of Teaching Trombone Playing» [18] clarified in detail the anatomical and physiological foundations of human respiration and defined the principles of the musician's performing breath. The teacher must be very accessible to bring to novice performers the basic laws of the physiological foundations of human respiration, to clarify the differences in breathing of ordinary and performing. It is necessary to trust the cadets that when playing wide-minded copper wind instruments, the respiratory organs, in addition to fulfilling their main role in the body, perform as if the function of furs pumping air into the instrument. Naturally, the specifics of playing wind instruments often require adjustments to ordinary physiological breathing standards: fast breathing, prolonged breathing, more inhaled air, etc. Such a deviation from normal breathing, which causes a significant load on the lungs of the heart, can adversely affect his health if the correct breathing technique is not developed. The teacher must take care of this constantly, following the staging of the body, hands, legs and head. The hands pressed to the chest make it difficult for the breathing muscles to move freely, the slight round-shouldered position will lead to the chest not being able to rise freely, the tilt of the head adversely affects the breath, straining the excessive neck muscles, which leads to partial breathing clampdown.

The development and training of the breathing apparatus of the spiritual musician, who is special, should be carried out in two ways: without playing the instrument and during the game. The first method is based on the systematic development of the respiratory apparatus through general physical exercises. The value of such exercises is that they contribute to the strengthening of the respiratory muscles, develop the thorax, enhance blood circulation and contribute to the raising of the general vital activity of the whole body. The second method of training is involved in playing special exercises on an instrument. This is the main type of training of the respiratory apparatus, since during the game the strength, flexibility and coordination of the respiratory muscles most naturally develop. It shows that in the system of daily classes on a wind instrument, these special exercises should occupy the most important place [20].

You cannot forget about such an element in the game on copper wind instruments, w.h. and on tenor-baritone, as a language technique. It is inextricably connected with the breathing technique, since the tongue plays the role of a valve that opens access to the jet of air in the mouthpiece. The tongue and breath combined perform a function similar to the bow movement when playing string bow instruments. Various shades of sound production on wind instruments are closely related to the so-called «sound attack». The attack of sound when playing wind instruments is the initial moment of sound extraction. The initial moment of sound extraction requires strict coordination in time between the push of the tongue and the beginning of the movement of the exhaled air jet. A properly executed sound attack has a positive effect on the timbre, intonation and culture of sound. Here it is appropriate for the teacher to clarify the concepts and meanings of articulation, the role of the oral cavity in sound education, types of attack.

As for the coordination of the action of ambushur and tongue with fingers, this is the most obvious connection, at least outwardly; it is easier to trace it than the connection of ambushur with tongue or tongue with breath. However, although it is relatively easy to follow this coordination outwardly, it is difficult to achieve it. To achieve coordination, in addition to the development of language technology, ambushur, breathing, the development of finger technology is also required. Without finger technique, there can be no high perfection of playing any copper wind instrument. In the initial period of study, it is impossible to strive for the development of rapid mobility of fingers. This leads to tension in the muscles of the hands, hand and fingers, sequentially, in the future will deprive the opportunity to develop finger technique. It is necessary to focus the attention of the students that the movement of the fingers should be extremely conscious, that it is necessary to monitor the correct position of the hand and fingers during the game, full of freedom of movement of the fingers, the absence of any tension and stiffness in the fingers and hand. When the movements are prepared in consciousness, and in the fingers and in the hand there will be no harmful, buckling tension – these movements will be even, rhythmic, clear and confident. Only on this basis can a good development of finger technology be achieved in the future.

Conclusion

Summing up a brief review of the acmeological aspects of the method of teaching the game on wide-minded instruments of a group of Saxgorians cadets of a special group, it should be emphasized that all performing aids are in close relationship, their development should take place simultaneously, without excessive fascination with one type of technique to the detriment of another.

The following factors affecting the educational process should be taken into account when organizing the training of foreign military personnel: the level of knowledge of the Russian language; quality of special (music) education; experience of military service of foreign military personnel; the use of self-training for up to date classes and consultations.

The promotion of military conducting education at the international level and the training of highly qualified specialists require constant organization, amendments and additions to the

training of military musicians and conductors who arrived from foreign countries. The training of foreign military personnel has resulted in maximum professional preparedness for successful activities in the military orchestras of the national armed forces.

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Distinctive Features of a Threatening Demand and Entreaty at the Fundamental Frequency Level

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Annotation: *the article gives the results of an experimental and phonetic study on the prosodic differentiation at the level of the fundamental frequency of two illocutionary acts – a threatening demand and entreaty (on the material of German). It is known that prosody affects a communicative process, and depending on the nature of a prosodic structure, the meaning of a statement changes. The same lexical and grammatical corpus can act as a threat, demand, entreaty, sarcastic statement, etc. The distinctive features of these speech acts are directly influenced by the perceived prosodic features of fundamental frequency, intensity and duration. On the basis of auditory, acoustic, and mathematical and statistical analyzes, the distinctive features of the two illocutionary acts were identified at the level of the fundamental frequency. The study shows that the two illocutionary acts differ at the level of the fundamental frequency, despite the fact that they belong to the same speech act – directive. The results obtained can be used in research in the field of phonology, experimental and applied phonetics. In addition, the obtained material may be of interest to forensic experts when conducting a phonoscopic examination.*

Key words: *illocutionary act, directive, speech act, prosody, fundamental frequency, experimental and phonetic research.*

JEL classification: *I200, I290.*

Introduction

A review of domestic and foreign literature shows that the role of prosody in the communication process is extremely significant. "Prosodic parameters of speech refer to those basic elements of speech production and speech perception, which are actualized in discursive activity and in many cases determine its nature and direction" [6, p. 41]. E.I. Grigorev, based on numerous experiments, believes that only with the help of prosody it is possible to differentiate unidirectional speech acts: entreaty, threat, demand, etc. [12]. J. Raith argues that "correct possession of prosodic means is in some cases more important than correct pronunciation of segment units" [18]. The results of L.Kh. Nakatani and J.A. Schaffer also say that it is the prosodic-rhythmic segmentation criteria that are fundamental in the process of decoding coherent speech [17, p. 234–244]. According to T.M. Nadeina, "the ability to express any meanings is possessed not by sets ("bundles") of primary prosodic features, but by larger prosodic features which we call prosodic means" [16, p. 84].

Thus, it can be argued that prosody affects how the communicative process proceeds, and also, depending on how the prosodic structure is built, the meaning of the statement will change. L. Wittgenstein argued that one and the same statement, when viewed from the perspective of vocabulary and grammar, differs only in that how they are pronounced [20, p. 87], i.e. differentiation of the same lexical-grammatical corpus occurs at the level of prosody.

The distinctive features of these speech acts are directly influenced by the perceived prosodic features of fundamental frequency, intensity and duration. Experimental and phonetic research in this area is carried out by many linguists [3; 5; 6; 8; 12; 15]. Despite its relevance, the issue of identifying the distinctive features of unidirectional speech acts through the prism of prosody remains insufficiently studied. The purpose of this study is to identify distinctive features of entreaty and a threatening demand at the level of fundamental frequency, despite their belonging to the same speech act – directive.

The previous work which looked at an entreaty and a threatening demand at the intensity level identified their distinguishing features. The first illocutionary act has a smoother volume movement, while the second has louder values [14]. It is assumed that these illocutionary acts also differentiate at the level of the fundamental frequency.

Raising and falling of the tone of a voice in a phrase is called melody. It is essential in the segmentation of the speech stream, as it carries versatile information: about the communicative type of utterance, about its completeness or incompleteness, about the feelings expressed in speech, about the modality of the utterance [10, p. 65]. Depending on the nature of the melodic changes, the interval of speed, the steepness of rises and falls of the tone, opposite types of tonal manifestation are distinguished. There are four such types in total: directive-dominant, friendly-collegiate, unmarked, and insincere tone. The directive-dominant tonotype marks speech acts of an authoritarian nature that impose certain duties [13, p. 59]. These include entreaty and a threatening demand.

The directive-dominant type of tonal expression is marked such features as “a lower value of the fundamental frequency of illocutionary acts relative to the average indicator; quite frequent discreteness of tone in highlighted syllables, and hence clear and frequent rhythm; relatively large steepness of the rise and fall of the tone in the areas of its change; more constant correlation of change tone and intensity; the proximity of the tonal contours of the manifestation of speech acts to the normatively fixed communicative samples” [13, p. 60].

During the phonetic-experimental study at the stage of auditory analysis, auditors are asked to note the hierarchy of stress, the movement of tone and pauses in the phrases. Noting these three components in phrases allows, firstly, to carry out an acoustic analysis in the future, and secondly, to identify the first signs of differentiation of the two illocutionary acts.

Due to the fact that any utterance is considered as a speech act which differs from the pronunciation of sounds in that when it is made something is meant [19, p. 157], the theory of speech (illocutionary) acts is extremely important for studying the problems of differentiation of oral speech.

J. Austin was the first to suggest the classification of speech acts, which, however, he did not recognize as final. He singles out such actions that are carried out by the speaker during a speech act, such as: a locutionary act (uttering an utterance) and an illocutionary act (implementation of a communicative intention) [1, p. 24].

Following him, J. Searle, calling various types of speech acts as illocutionary acts, said: “The production of a specific sentence under certain conditions is an illocutionary act, and an illocutionary act is the minimum unit of linguistic communication” [19, p. 152].

Since the appearance of speech act theory in linguistic literature, a wide range of taxonomies of speech acts has been formed over many years: J. Austin, J. Searle, L. Wunderlich, A. Wierzbicka, Th. Ballmer, W. Brennenstuhl, E.I. Grigorev and others.

The most prominent among other taxonomies is the classification proposed by E.I. Grigorev [12], since, firstly, it is built according to the phonetic principle; secondly, it is more detailed, since it consists of 16 types of speech acts.

Within the framework of this taxonomy, such a speech act as a directive is distinguished which is a statement aimed at getting the listener to perform any actions initiated by the speaker. The author of this classification, E.I. Grigorev believes that the fundamental factor of

statements of this type is “the indisputability of the execution of the will protected by legally enshrined norms or the social status of the speaker” [11, p. 73]. Proceeding from this thought, one can definitely say with certainty that a threatening demand belongs to this type of speech act, and it can be assumed that an entreaty, on the contrary, does not fall under this type.

However, it should be noted that directives can have both authoritarian and non-authoritarian overtones. So, V.V. Bogdanov, considering different classifications of illocutionary acts, identifies a list of those that are most often found in them, but do not intersect with each other. Among this list are directives which, in turn, fall into two subtypes: injunctives (orders) and requisites (requests) [4, p. 159]. In this regard, it is considered justified to refer the speech act of entreaty to directives.

Taking as a basis the taxonomy proposed by E.I. Grigoriev, it should be noted that, by the nature of their manifestation, both illocutions – entreaty and a threatening demand – belong to the same group of speech acts – to directives. However, despite the fact that the two illocutionary acts belong to the same type, it is assumed that at the fundamental frequency level they exhibit both differentiating and similar features, which was proved during this study.

Methods

The material was processed according to the method adopted in the experimental-phonetic research of the Moscow State Institute of International Relations. The method is a complex analysis: auditory, acoustic and mathematical-statistical. The German speakers were offered situations in which entreaty and a threatening demand are realized. The situations were implemented in two versions. Subsequently, samples of two speech acts were obtained by two groups of auditors: native German speakers who were not involved in the experiment, and Russian teachers of German who had listening skills. The task of the first group of auditors was to establish: the authenticity of the communication situation and confirmation of the correctness of the pronunciation norms of the subjects. Russian teachers of German with listening experience were tasked with placing emphasis, pauses and tone movements. Then, using a special program for processing the speech signal Praat, phonemic-syllabic decoding of phrases was carried out, which made it possible to measure and then analyze the acoustic parameters of the fundamental frequency. The mathematical and statistical analysis of the research results using the SPSS computer program made it possible to obtain an objective assessment of the data obtained, which included the detection of the degree of randomness and regularity of the facts observed in speech. It was on the basis of objective mathematical and statistical calculations that the further interpretation of the experimental material was built.

In order to neutralize the individual characteristics of the subjects' pronunciation, the obtained data were normalized in absolute values according to the method proposed by B.M. Bashkina and L.D. Bukhtilov. On the basis of the normalized relative values of fundamental frequency, averaged data were established [2].

Results

The study analyzed 60 phrases reproduced by 5 native German speakers, three of them are men and two women, all between the ages of 23 and 26, permanently residing in Germany on the territory of Bavaria. The total number of syllables was 1074.

At the research stage, with the involvement of Russian teachers whose task was to fix pauses, stressed syllables and tone movement in the studied phrases, the following results were obtained which are summarized in Table 1. According to this table, one can assert about the distinctive features of the two illocutionary acts at the auditory level.

Before starting to interpret the results of indicators of tone movement before pauses, it is necessary to take into account that the number of tone movements before pauses directly depends on the number of pauses in the phrase itself. This explains the small amount of tone movements before pauses in the entreaty. In total, there are 13 of them if we take into account both a rising and an average even tone.

Table 1

Percentage of indicators of a threatening demand and entreaty

	A threatening demand, number of indicators	Entreaty, number of indicators
Tone movement before pauses (rising tone)	18 (67%)	9 (33%)
Tone movement before pauses (average even tone)	13 (76%)	4 (24%)
Tone movement at the end of a phrase (rising tone)	0 (0%)	17 (100%)
Tone movement at the end of a phrase (falling tone)	30 (70%)	13 (30%)

It is worth noting that in both illocutionary acts the amount of rising tone before pauses prevails over the amount of an average even tone. This phenomenon is typical for a rising melody before pauses, however, which does not explain the large number of phrases with an average even tone. On closer examination of the results of the study, one can notice that wherever an average even tone is encountered, the pause is very short and insignificant. It can be concluded that the movement of the tone before a pause depends on its duration.

The end of the phonation in the threatening demand is characterized by an exclusively falling tone. As a result of the study, not a single case of a rising tone was recorded.

On the contrary, in the illocutionary acts of entreaty, in most cases, an upward movement of tone is noted. However, it would be wrong not to note that the falling tone is not much inferior to the upward movement of the tone at the end of the phonation.

Thus, comparing the entreaty and the threatening demand the following conclusions can be drawn: 1) in a threatening demand a rising tone prevails before pauses; the end of the phonation indicates exclusively a falling tone which indicates the completeness of these phrases; 2) in entreaty a rising tone prevails before pauses; at the end of the phrases, the rising melody prevails.

As a result of acoustic and mathematical-statistical analysis using Praat and SPSS programs, two models were obtained: M-1 is a threatening demand, M-2 is an entreaty (Figure 1).

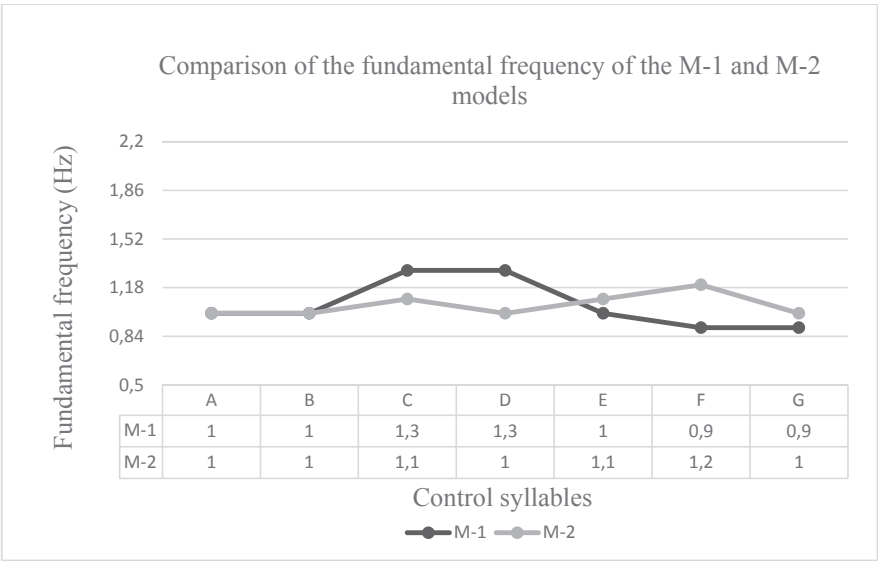


Figure 1. Comparison of the fundamental frequency of the M-1 and M-2 models

The range of fundamental frequency was divided into five levels. Each differed from the preceding and following by a statistically relevant indicator. The phrase was divided into three zones: pre-beat, rhythmic corpus and post-beat, with seven control syllables, according to the method adopted by O. Essen [9]. The averaged values of the fundamental frequency of the phrases M-1 and M-2 differentiate them as illocutionary ones belonging to different samples (the level of discrepancy is 70%).

The tone range of phrase M-1 is twice higher than the parameter of this attribute of phrase M-2 (0.4 / 0.2). The M-1 range develops within the second and third levels, the M-2 tone range has its own peculiarity: the tone development mainly occurs at the second level, only the first post-beat point slightly rises one level higher. Regarding the maximum indices, both illocutionary acts did not find a consensus: the peak M-2 value was recorded in the post-beat, and in magnitude it is lower than phrase M-1, and the maximum M-1 values are located at two points at once and are concentrated in the rhythmic corpus. As for the minimum indicators, there is no match here either. The minimum value of phrase M-1 is exclusively limited by the post-beat. It is noteworthy that the M-2 illocutionary reveals its minimum indicator at once at four points: the entire pre-beat, the prenuclear syllable, and the end of the phonation.

The melodic contours of the indicators of the two illocutionary acts are generally not similar. An exception is the beginning of phonation where the numerical values of phrases M-1 and M-2 completely match, forming a smooth curve which begins to rise after the pre-beat. Both illocutions have a common path of movement – rising-falling. However, there are two differences. First, the M-1 curve, having reached its peak, gradually declines until the end of phonation, the M-2 curve, in turn, shows an upward-downward trend twice. Secondly, a threatening demand is characterized by sharp drops, and for an entreaty drops are smoother which predominantly proceed at the same level.

Discussion

As it has been found out earlier, both illocutions (entreaty and a threatening demand) belong to the same speech act – a directive and have the same target orientation. Their task is to try to get the addressee to perform an action. However, illocutionary attempts are made in different ways. Differentiation of the two illocutionaries occurs through the prism of prosody, which is clearly seen from Figure 1.

The location of the M-1 curve at two levels suggests that the possibilities of lowering and raising the tone are less limited due to their directionality. Here one can talk about a certain freedom of movement of the curve. This is because a threatening demand is authoritarian. In turn, entreaty, being predominantly at the same level, is much more limited. In order to achieve a perlocutionary effect, this speech act cannot use sharp changes in tone and cannot be far away from the average value.

Finding the maximum indicators of M-1 in the rhythmic corpus can be explained by the fact that the points in this area are, in fact, key. In this regard, it becomes obvious that focusing on these points allows you to convey the essence to the addressee and make the statement unambiguous. In addition, the fixation of the peak M-1 values in the rhythmic corpus may indicate the exceptional authoritarianism of the call. In this regard, it is assumed that an increase in the tone of a given illocution can lead to the desired result for the speaker – the fulfillment of his / her intention.

The fact that the maximum rate of entreaty is in the post-beat can be explained by the fact that in most cases this illocutionary act is characterized by an upward movement of tone at the end of phonation (Table 1). But it is noteworthy that the rising tone was present precisely in those phrases that contained a question, for example, “kannst du vielleicht meinen Computer anschauen und mir helfen?” This can be explained by the fact that “the rising melody serves to express the incompleteness of the message and accompanies non-finite syntagmas of all types of sentences and interrogative sentences without an interrogative word” [7, p. 11]. However,

one has to disagree that the rising melody can say about the incompleteness of the speech act. Based on the results of the study, it can be assumed that this rule does not apply to entreaty, since it is a logically complete statement. In declarative sentences of the subjunctive type, which are also entreaty, for example, in the phrase "es w re klasse, wenn du mir dieses Buch heute Abend geben könntest", a downward movement of tone is recorded. "The descending melody expresses the completeness of the message and is used in the final syntagms of narrative, exclamation and interrogative sentences with an interrogative word" [7, p. 11].

The minimum metrics of the threatening demand, found exclusively in the post-beat, indicate the completeness of the phrase. The increase in tone at the end of the phonation within the framework of this illocutionary act could be regarded as an unfinished act, as a statement that would have some understatement.

The entreaty that finds the minimum indicators at four points at once characterizes itself as a calm statement. It is assumed that the same indicators, a slight difference with the rest of the points and the absence of a large distance of indicators from the average value (equal to 1) allow this speech act to create a trusting, favorable and comfortable environment in which the addressee is.

The reason why the numerical values of the phrases M-1 and M-2 completely match in the pre-beat may lie in the absence of semantic or significant information at the beginning of the phonation. It is either in the rhythmic corpus (at the threatening demand) or in the post-beat (at the entreaty). As mentioned earlier, in addition to the rising-falling trajectory in the first half of the phrase, the two speech acts do not find similarities. The upward-downward movement of the M-1 curve emphasizes that the main idea was conveyed at the points with the maximum indicators, after which there is a gradual decline until the very end of phonation. A more cascading movement of tone, which is characteristic of a threatening demand, speaks of its authoritarianism, indisputability and creates a certain confidence in what is said. The absence of sharp drops and relatively the same indicators throughout the M-2 model may indicate the softness of this illocutionary act and its monotony. Presumably, the lack of authoritarianism leads to a positive outcome for entreaty. The analysis showed that each type of a speech utterance, expressing one of the directive forms, has a set of typical melodic features, which makes it possible to consider them as different variants.

Conclusion

In the course of the experimental and phonetic study using auditory, acoustic and mathematical-statistical analysis, it has been found that two illocutionary acts – entreaty and a threatening demand – despite their belonging to the same type of a speech act – directive – are differentiated at the level of the fundamental frequency. A threatening demand has the following features: sharp changes in tone, the location of the minimum indicators in the post-beat, finding the peak values in the rhythmic corpus, a wider range of melody. Entreaty is characterized by a smooth but zigzag tone movement, finding the minimum indicators almost throughout the phonation of the entire phrase, the location of the maximum indicators in the post-beat, a narrower range of tone movement. Thus, entreaty can be characterized as a calm, monotonous utterance, while a threatening demand is a harsh, but confident utterance with an authoritarian note. It is highly likely that these illocutionary acts will have distinctive features in terms of duration, which will be revealed in the course of further research. The obtained material may be of interest to forensic experts when conducting a phonoscopic examination. Besides, the results obtained can be used in research in the field of phonology, experimental and applied phonetics.

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Conceptual Foundations of Project Activities for the Formation of the Musical Culture of the Younger Generation

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Annotation: *the article is devoted to the topical problem of increasing the role of concert activity in the formation of the musical culture of the younger generation. The article examines potential for improving concert activity within the framework of the project ideology corresponding to various conceptual foundations. The main conceptual approaches are the activity-based, axiological and interactive, which make it possible to take into account the entire range of possible musical interests and demands in modern society and to outline further strategies for improving project practice in the field of organizing concert activity. The authors analyze practical experience of conducting musical cultural and educational projects aimed at enhancing the musical culture of the younger generation in modern Russian society.*

Key words: *enlightenment, musical culture, opera, concert activity, younger generation, activity, axiology, interaction.*

JEL classification: *I200, I290.*

Introduction

The problem of formation of the musical culture through familiarization with musical heritage has been studied in sufficient detail in terms of history and education in publications of musicologists and educators (B.V. Asafiev, D.B. Kabalevsky, N.I. Anufrieva, L.L. Melnikova, S.A. Morozovf, etc.) [2; 6; 1; 12; 15]. The issue of modern mass musical education needs further development. «Propaganda» of classical art as a goal-oriented activity has neither a social status nor a developed methodology, according to D.K. Kirnarskaya [10]. One of the first attempts to study the organizational basis of music management in the art history was undertaken by O.N. Garmash [5].

Meanwhile, the process of mass education in modern society is one of the most important objects of modern culturological and pedagogical studies. Special attention shall be paid to research of the organizational basis of mass musical education. This research should be aimed at developing the theoretical basis and methodology of mass musical education; generalizing

the experience of various cultural institutions in matters of mass education; determining new ways to implement mass educational events [16].

An important area for research within the framework of the above problem is formation of the musical culture of the younger generation, since this task is not duly addressed by educational and cultural institutions, despite separate achievements in this regard.

Study of the potentialities for introducing children and adolescents to achievements of the musical culture shows that it is necessary to rethink many traditional approaches to the process of musical education, training and involvement, as well as to develop new conceptual foundations for this activity in the context of globalization and general crisis of arts education.

Thus, it is a well-known fact that the younger generation prefers musical works of western mass culture, while the majority of children and adolescents have little interest in classical musical culture and national musical art. In accordance with the widespread theory and practice of social stratification, this fact is assessed by many researchers and educators as natural and not posing a serious threat to spiritual and aesthetic development of the younger generation. Accordingly, it is proposed to take for granted the dominance of mass musical culture as an inevitable component of the lifestyle and values of certain social and age groups and strata.

However, it does not take into account a stable trend of unregulated unlimited commercialization of musical art in Russian society, which has led to degradation of musical demands of large groups of the population and damage to spiritual health of the whole society, especially the younger generation. In this situation, it is introduction to musical classics of children and adolescents that can become the basis which will allow for a full-fledged moral and aesthetic development of the younger generation, formation of its musical tastes, which are necessary for perception of truly artistic pieces of musical creativity, including the best examples of mass musical culture. In addition, unregulated intrusion into the process of familiarization with musical culture of not always best examples of western music promotes cultural codes and meanings alien to the established mentality of the Russian society, which destroy the traditional national-cultural identity of the peoples of Russia.

Methods

In 2015, according to the order of the Government of the Russian Federation, the Concept for development of concert activity in the field of academic music for the period up to 2025 was approved. This concept should be implemented both by individual performers and organizers of concert business, and by philharmonic organizations, educational institutions, educational and cultural authorities [7; 9; 19].

The purpose of this Concept is to create organizational-creative, economic and legal environment for the effective implementation of concert activity in the field of academic music.

In organization of concert activity focused on formation of the musical culture of the younger generation, three main conceptual approaches can be pointed out.

The first of them can be called *activity-based*. Its essence lies in the fact that the younger generation, in one form or another, becomes involved in performing activity mainly through the system of respective musical educational institutions. Currently, this approach prevails in introducing children and adolescents to musical classics and is characterized both by its own achievements and significant pedagogical and social costs. On the one hand, the existing system of musical education is an "alma mater of musical performers" and its importance as such can hardly be overestimated. On the other hand, there is a huge dropout of young performers who cannot cope with the high requirements of specialized music educational institutions, as well as a decline in interest in primary music education and, as a consequence, outflow of children and adolescents from music educational institutions, which demonstrates serious flaws in the existing system of familiarizing the younger generation with the music culture [2; 17].

The second approach can be called *axiological*. In accordance with it, mass familiarization with musical culture of children and adolescents is carried out mainly in the context of one or another

ideology, value and worldview orientation of various programs of music education, considered as part of the general ideological and educational work among the younger generation [11; 18]. This approach was especially widespread in the Soviet period and its culmination became the system of D.B. Kabalevsky, who created a method of educational influence on children and adolescents by means of musical art in the spirit of Soviet ideology.

The positive side of this approach was the possibility of introducing mass audience of listeners to humanistic values using examples of domestic and foreign classics, as well as songwriting of Soviet composers, whose musical compositions were rightfully included in the “best pieces of music” of the world musical art. On the other hand, excessive ideologization of the respective musical and educational activity led to a significant impoverishment of the concert repertoire perceived by audience and to simplified approaches in its interpretation by musical educators.

The third approach can be classified as *interactive*. In accordance with it, children and adolescents interact in one form or another with bearers of musical culture: performers, musicologists, educators, etc. [20–22]. The young audience is invited to become participants of a general creative process through play activity, co-performance at accessible level, expression of musical impressions through art, etc. This approach is presented, first of all, in the musical system of C. Orff, who even created a system of children’s orff-instruments and various methods of involving children and adolescents in mass musical creativity [3]. The positive aspect of this approach is its democratic character and great potential for involving children and adolescents in playing music in various forms, regardless of the level of their performing abilities and inclinations. However, this approach is limited by lack of possibility of versatile perception of a large volume of musical material.

In our research, we have sought to synthesize all three of the above approaches in order to remove the limitations of each of them and to make use of their strengths.

Results

As part of implementation of this systematic approach, which includes the activity-based, axiological and interactive aspects, experimental research consisting of several directions has been carried out.

The first direction is development of the cycle “Golden Pages of Opera Classics” in the genre of musical journey [13]. An experimental study carried out within the framework of the project of Creative Association “League of Music” held in the concert hall “Theatrical House” of the Palace of Tsar Alexey Mikhailovich (Kolomenskoye Historical and Architectural Museum and Reserve) made it possible to identify one of the possibilities of preserving and mastering the national musical heritage through concert activity. No less important was the analysis of practical experience in preparation and implementation of a musical cultural and educational project in the museum space.

Creative Association “League of Music” is a professional community of people of art: musicians, singers, actors, dancers, artists. In our cultural and educational projects, young performers and masters of stage take a step towards the modern listener, performing in concert and museum halls in Russian and foreign cities. The objective of the Creative Association is to restore continuity of cultural traditions, to raise a new generation of listeners. One of the enlightenment tasks at any time is to speak clearly and figuratively about the complex world in universal language of art. Principles and vicissitudes of our spiritual life are reflected in classical music. High culture helps to find a way to the heart and mind of a person.

The “League of Music” programs are created according to the author’s script and reveal talents of performers, immersing a viewer into atmosphere of a creative work and helping to start a dialogue with the cultural heritage.

The idea of “Golden Pages of Opera Classics” project is to promote the musical, literary, artistic and historical heritage of our country, which comes to life in the space of the recreated palace of Tsar Alexey Mikhailovich in Kolomenskoye. Educational programs of the Creative Association not only familiarize listeners with acknowledged examples of the Russian opera music, but also,

through a combination of literary text and well-developed visualization, immerse viewers in the context of historical events presented in the opera, re-opening the treasury of our Fatherland's culture [14].

The format of musical journey is oriented on a wide audience: it can be of interest to both experienced connoisseurs of opera music and listeners who are just beginning their acquaintance with the world of classical art.

Why were the programs of the cycle originally given the format of the concerts-excursions? The fact is that one of the main tasks of the authors is to establish links between the content of musical programs and the venue (museum space). This is how the format of concerts-excursions was born, which is based on, albeit indirectly, the idea of correlation between the forms of concert and excursion activities, their essence, tasks and functions. Thus, for example, in the course of a story, a guide helps listeners to see objects on the basis of which a topic is explored, to hear necessary information about these objects, to realize significance of historical events, and to master independent skills of observation and analysis. In solving the latter task, formation of the ability to see (in case of a musical excursion, to hear) plays an important role [4; 8]. We also talk about expanding the listener's emotional and aesthetic perception of musical and museum spaces.

Within the framework of the programs of the cycle "Golden Pages of Opera Classics", a traditional concert becomes a dynamic musical journey through the pages of the operas of the great Russian composers.

Opera is a genre that requires participation of an orchestra, chorus, soloists, as well as use of scenery and complex stage machinery for its embodiment. In this cycle, the authors have adapted the form of a major musical and dramatic work for the chamber ensemble of performers. For five seasons 2015–2020, on the stage of the concert hall "Theatrical House" seven Russian operas were presented to the audience: "Ruslan and Lyudmila" by M.I. Glinka, "The Snow Maiden" by N.A. Rimsky-Korsakov, "The Tsar's Bride" by N.A. Rimsky-Korsakov, "Prince Igor" by A.P. Borodin, "A Life for the Tsar" by M.I. Glinka, "Boris Godunov" by M.P. Mussorgsky and "Eugene Onegin" by P.I. Tchaikovsky.

The second direction is reconstruction of historical eras in natural landscape. The conducted experimental study of the musical reconstruction of historical landscape made it possible to identify one of the possibilities for preservation and familiarization with the national musical heritage by means of concert activity. Also, this study has helped to identify the possibilities of musical art in reconstruction of the historical landscape in cultural and natural environment that revives the memory and "spirit of the place" associated with events of cultural and historical significance. On the example of the project "Musical journey through the pages of opera "The Tsar's Bride" by N.A. Rimsky-Korsakov» in the State Historical, Architectural and Art Museum-Reserve «Aleksandrovskaya Sloboda», a search for cultural and semantic aspects in a musical theatrical production that actualize the main meaning and historical content of events was carried out. The study reveals influence of historical landscape on director's solutions, nature of musical performance, scenography and other components of theatrical and musical performance, as well as impact of the musical theatrical production on perception of the historical object, formation of historical consciousness of audience, their musical interests.

In this case, the organized concert activity was initially interpreted in the context of important events in the Russian history, which constituted the main content of the concert performance and its direction.

The experience of implementing this project has shown great opportunities for using the natural environment in enhancing interest of the younger generation in the art of opera. In this case, all three of the above-mentioned conceptual approaches to the organization of the concert program were implemented.

The activity-based approach is that the young audience was offered cognitive activities related to acquaintance with the historical events reflected in the opera. The opera

performance was structured in such a way that it assumed necessary explanations about the events shown on the stage in such a way that the musical parts performed became a kind of «texts» that carried not only cognitive information, but also evoked corresponding feelings and emotions in viewers and listeners.

Let's fantasize a little and imagine that an opera clavier with a lot of graphic symbols and author's comments related to indications of tempo, nature of performance, details of geography and decoration of the stage, artistic image of the heroes, is nothing more than an imaginary map of the musical space, according to which the performers and listeners together go through an exciting path to new knowledge, discoveries, emotions and sensations. On this path, you need a guide who helps the listener, directs his/her attention, unites with the performer. The author's approach to the production consists in developing a script in which, alongside careful attitude to the musical text, the most significant arias, ensembles, scenes from the opera are combined into a single inextricable action by narration of a story-teller or chronicler. Each scenario for the authors of the project becomes a real research, uniting both musicians and a creative team of museum staff.

The axiological approach is expressed in drawing the audience's interest during this program to the Russian history, as well as immersing in the world of high feelings of human relationships that have spiritual and moral significance.

In our musical journey (research), which took place in Aleksandrovskaya Sloboda on the site of historical events underlying the opera, we tried to establish a connection of times and fill the museum halls with life of both past and present: space of the Tsar's court, where in the XVIth century Ivan the Terrible, seated on the throne, received foreign ambassadors, where the portal is preserved, which is an entrance to the Trinity Church, a household church of Ivan the Terrible with frescoes by the followers of Dionysius (now the Church of the Protection of the Theotokos). The musical and dramatic performance and the history itself, captured in architecture, seemed to merge into a whole, helping performers and listeners to transfer from the real space to the imaginary space.

The musical drama "The Tsar's Bride" does not claim historical credibility, but portrays vivid characters under unusually poignant circumstances. The heroes of the opera have their own historical prototypes – everyone except Lyubasha, whose story was fictionalized by L.A. Mey. The image of Lyubasha has become a collective symbol of "earthly love", a woman passionately loving and desperately fighting for her love. In her aria "“This is what I have lived... Grigory!” the heroine in her inner monologue, almost a prayer, is making one of the key decisions that influences the entire plot of the opera: she agrees to buy a potion and ruin the beauty of her rival Marfa Sobakina. But how not easy to decide on such a step: "The Lord will condemn you, condemn you for me. <...> Does she love him; does she love him as I do?" – such strong feelings the heroine demonstrates in her aria. In most of opera productions, Lyubasha at this moment is alone on stage (an actress is performing *tête-à-tête* with audience), she is on the street near the house of Bomelius, the Tsar's healer. In our case, Lyubasha finds herself in real historical chambers at the carved portal leading to the tent-shaped temple; she turns around and turns to the icon "Christ in Majesty", which helps to make her character more vivid. The acoustical specifics of the tent-shaped dome also help to make sounding of voice deep and volant.

Discussion

Currently, the third stage of the research is underway, which is designing of musical needs of the younger generation, taking into account specifics of children of different ages. The main task of the project is to form experience of musical perception in children and adolescents and accessible forms of playing music in various ways based on musical classics. To solve this problem, a synthesis of various types of the art is used with application of a variety of directing and pedagogical solutions.

The activity-based approach within the framework of this direction of formation of the musical culture of the younger generation is implemented in the form of organized

opportunity for self-realization in various spheres of artistic creativity with the dominant role of musical art.

The axiological approach is based on a given literary and artistic context that determines the spiritual and moral content of the proposed musical developmental programs, as well as expands possibilities of musical semantics in the process of introducing children and adolescents to classical music.

The interactive approach is mainly expressed in game forms and various methods of theatricalization of musical lessons with children and adolescents.

Thus, this direction of the project activity is focused on forming of target audiences for opera performances we organize, which is a significant resource in expanding number of opera music lovers among the younger generation. At the same time, the emphasis is on musical enlightenment as the main project strategy in relation to children and adolescents as the main condition for introducing these age groups to classical music.

Conclusion

The study of the experience of formation and development of musical enlightenment provides a basis for improving the forms and methods of organizing this type of activity. B.V. Asafiev considered introducing broad masses to musical culture, making the best of modern and past musical culture true assets of the people to be the most important task of musical enlightenment. It is not passive involvement that is fundamental, but active participation of people themselves (listeners and spectators) in the creative process. The task of professional musicians is to enable broad masses to experience first-hand the immense power of music that can shape a person. The patterns of interaction between music and audience, close creative relationship between art and public consciousness deserve special research. We can talk about mutual interaction of artistic taste of audience and quality of concerts, level of performance. Project activities in the field of art today allow to find creative and organizational solutions under the existing conditions to form an audience of listeners and viewers, to attract attention of sponsors, mass media, performers, composers and general public.

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Social, Psychological, Educational and Technical Conditions of a Vocalist's Skill Acquisition Within the Open Digital Environment of a University

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Annotation: *the article is dedicated to one of the current problems to be considered while training future professional vocalists within the digital educational environment. We will analyze the influence of the social, cultural environment as well as psychological and educational aspects that stimulate vocalist for active creative growth and self-education under conditions of the modern information society.*

Social and psychological aspects are considered as individual aspects of personality. This article will consider the positive and negative influence of the social conditions that influence the development of the creative personality to be taken into consideration during the educational process of a modern vocalist.

We will discuss influence of aggressive competitive environment and creation of the positive social climate that will unite creative youth and form cooperative atmosphere with colleagues around the world.

We will also discuss internal (psychological) and external (social) conditions that play a significant role in the current digital educational environment of the modern society.

The Author's aim is to disclose the axiology and use of the modern informational systems dedicated to diverse aims of an educational process.

Key words: *personality, conditions, environment, psyche, society, competitive environment, open education, digital education.*

JEL classification: *I200, I290.*

Introduction

Under conditions of digital environment modern musical education envisages understanding of the baseline principles of the university IT involvement aimed at decreasing bureaucratic workload. In its turn this will allow teachers to concentrate on the specific educational tasks. But significant technological difficulties create obstacles for the formation of a single standard for the evaluation of student's skills. We will consider technical aspects of the modern vocalists' educational process, define current tasks and will try to find answers to them.

We need to determine the chain of cause and effect that influences the creation of favorable social and cultural environment for active and creative development of a modern professional singer.

The baseline quality that determines the formation of a personality under the conditions of information society and open digital education is the ability to learn and motivation that is conditioned by the drive to develop and accumulate theoretical and practical knowledge.

Modern education requires a qualitatively different approach to the future of the acquisition of new knowledge, skills and their organization.

We have to recognize that the system of educational influence on the student has changed significantly. Digital educational environment allows us to consider training in many ways as self-education of a personality and formation of the internal creative activity on the way to self-actualization within the informational society.

Modern information and communication technologies such as internet and cellular phones provide every user with global awareness i.e. access to any information generated by mankind at any time and in the required format (text, audio, video) [20].

A variety of electronic resources that have significant cultural importance (full text libraries, virtual museums, online foreign language, singing and music lessons) are open and available.

Traditionally we refer to the Net Generation (Generation Millennium, Millennials or Digital Natives [5] those born from 1980 to 2000 and who grew up actively using Internet and diverse electronic gadgets that significantly change the information mentality.

Even with Russia lagging behind in this respect we witness an influx of this generation into schools and universities, some young teachers belonging to the same generation also showed up [16].

Research conducted in the USA shows that about 75% of the respondents (students and graduates of universities) periodically use open electronic courses due to their easy accessibility.

45% are interested in courses that are not taught at their universities, but considered important for future career.

Finally, only 6% responded that an electronic course is integrated with one currently studied at the university and recommended by the teacher [13]. We think that this study to a large extent can be applied to musical colleges. We cannot deny that artistic professionals need experience on stage. This practical side of education excludes isolation from colleagues, teachers and audience, but studies and acquisition of skills can be enclosed and limited to the remote lessons in electronic format. The experience we gained recently during several months of remote educational process in the university's digital environment confirms the statement above.

We think that individual features of the student's social-cultural climate are an important psychological factor as well as creation of the favorable conditions to overcome psychological, language and financial barriers during the education.

The complexity of the study, when considering the issue, comes from the need to take into account all the above-mentioned components such as personal, social-cultural and psychological. What's equally important is the impact on the modern performer of the social and cultural environment, behavioral patterns and psychological stereotypes of the training itself.

We think that the atomization of society and active growth of individualism that gain strength in the modern world against the background of growing influence of patterns in the mass culture provide for unfavorable environment for the formation of creative personality and bright individuality.

If we do not consider social and cultural requirements when teaching a student for performing on stage then there can possibly be a shift towards shock and bad taste that can play a negative part in professional on-the-stage and artistic skills. In connection with this the independent work of young vocalists online should have logical continuation and face to face off-line work with the teacher. This is possible for the on-site full time and remote forms of education.

Methods

We all live in a new educational environment as the open education has firmly become a part of our lives. Modern society has gone one step up in its IT support of the education. Problems of data and communicative exchange have become topical. Emergence of digital information

environment in many educational institutions has become a sort of response to the social demand. Despite the fact that many of the universities go back to the full-time education many students reserve the right for remote on-line educational environment. The task of the university is to provide digital educational services at the highest possible level.

Digital and traditional systems of education organize data for further perception differently. Due to huge volume of available data perception of the world itself has undergone significant changes. This implies the demand for ability to operate data in a dynamic environment that includes events in society, science, profession etc. All this creates environment of constantly changing cultural strata with modern personality being an integral of society.

We believe that the fundamental factor of the open digital educational environment in vocal performance is the free development of creative personality, his creative potential and individuality.

Such educational system allows everyone to control flexible process of education and determine its intensity, schedule time and place of studies.

At the same time due to the development of the net, multimedia technologies and software functionality there is a constant contact with the teacher and an ability to obtain statistics on student's progress. It is also important that open education makes it possible to carry out education not only by the traditional but also alternative commercial institutions operating in the cultural and social spheres.

Digital educational environment is shaped as a result of evolutionary processes in society that take place at the current stage of the information development of mankind. State educational policies influence these processes to a lesser degree as they are a logical response for the existing demand of a modern and active personality.

Open international system of education promotes integration of national systems of education into one common interstate environment. Such processes lead to favorable cooperation and, despite language barriers, to the development of common professional terminology and mutual benefits for education itself.

Basic social and psychological characteristics of a human being are innate. This determines the need to take into account the temperament of the student who can also be an introvert or an extravert. Individual peculiarities of the personality will invariably influence behavior and personal traits of a creative personality, at the same time the role of these peculiarities is often underestimated leading to the negative emotional state of the singer [3; 15].

It is obvious that there is a demand for trained professionals who can support process of open and digital education and make the earliest introduction of new and efficient technologies possible. The number of these professionals is constantly growing. Right now, these technologies are widely used in modern education. This is confirmed by a huge interest to the educational internet channels, lectures and topical sites. What's not learned in the classroom can be learned during on-line lesson or a webinar. This confirms reality of the above-mentioned processes that take place in modern society and shows social demand and motivated action of a modern man on the way to learn the new data.

We understand that the open digital educational environment makes higher requirements to the student as the work in this environment needs new personal qualities such as motivation, diligence, self-control and discipline. All at a very high level. We should objectively evaluate the initial level of student's education, the set of earlier acquired skills and the available equipment of the workplace.

Due to the unequal starting conditions, there can appear a factor of social inequality, but, unfortunately, this is inevitable in the modern world. This is to blame for the existing huge gap between elite and mass education. We believe that the task of the open digital education is to minimize the class differences and help students raise the level of the information and professional culture without imposing additional expenses on them.

System of the data delivery within the digital education provides feedback and support of the teacher that, as a rule, is complicated within the traditional educational system. Personal contact has great significance, but the dialog between a teacher and a student is not always productive. The main component is the student's motivation for acquisition of new knowledge and self-organization since absence of constant control is a motivational impulse for many.

Modern internet platforms and environment of many educational institutions contain educational software with materials readily and accurately presented. We should emphasize that this is a fact of life for modern students and in its turn it leads to the creation of educational modules and systems controlling the command of the presented materials.

Researchers in methodology based on modular educational programs have accumulated vast amount of data that has great significance for the development of modern studio and concert practice of a modern singer.

Pedagogical and educational functions for motivating the student are now in the background as the main factor of influence and future professional success is the students own internal or external motivation.

The productive interaction of a student with a teacher is promoted by interactive communication including communication between the students themselves. At the same time the authority of the teacher is not diminished, but just the opposite it moves to a different level. This is mentorship as a sort of individual and personal support of a student. Student becomes an independent in solving individual professional tasks working with support of a teacher [14].

Technical features of digital music education

Today in the process of digital remote musical education there is a number of unsolved technical issues that to this or that degree face musicians all over the world. Even if a student and a teacher have high speed broadband internet connection it will be difficult to synchronize through Skype, Zoom or any other software for video communication. The problem is that audio signal even when compressed presents a huge amount of data. It is impossible to controls the route the data travels. Signal between neighboring blocks can travel through half of the world. It depends on too many factors such as traffic, condition of the channels etc. other variables that are unstable in their turn and change constantly. Thus, there is a delay in transfer of audio signal that as a rule exceeds acceptable 20 to 30 milliseconds. Under the conditions it is impossible to get synchronization and as a result it is impossible to perceive two-way audio and video data traveling between the teacher and the student.

We have evaluated a number of software tools that will solve the problem of the signal delay. The platforms will allow students, teachers and musicians play music together independently of actual physical location.

The solution of the problem is different in each case and may significantly limit functionality, but it is still better than nothing.

NINJAM – developed by Cockos, designed for a band to play music online.

Client software (software preinstalled on the user's computer, provides for interactive functionality of the system) both teacher and student can connect to the NINJAM servers (list of servers is output the Client's menu). It is possible to use any source of sound be that a virtual synthesizer, physical instrument, microphone etc. The program will stretch delay for all participants aligning them along the metronome grid. NINJAM client software records and streams synchronized intervals of music among participants.

Jammmr offers a solution identical to NINJAM: participants hear each other with a delay aligned by metronome. The service will work with any internet connection and does not require any special equipment. All you need is a computer connected to internet and an audio interface (a device that allows to connect microphones and other devices to your computer). Audio interface will transform analogue signals into digital audio data that can be processed by

your computer. You can broadcast sound from physical instruments, microphones or software synthesizers (VST).

Endless platform also uses common delay for all participants, but at the moment the solution is offered only for the iOS that means a requirement for additional equipment to connect analogue sound sources.

JamKazam – is one more internet solution that allows to pay music in real time and without any significant time delay. There is also a possibility of online broadcast free for a small audience, and paid for if we talk about a potentially big audience. High speed connection is a prerequisite. But in most cases, all you need is a computer, audio interface and music instrument.

A brief analysis of the existing platforms shows that to play music online will require that every participant has additional software, audio card and high- speed internet connection.

Since not all of the students and their teachers can afford this equipment and since in most cases smartphones are used as a means of communication, the quality of such a session is not acceptable for a meaningful process of education.

Under the conditions the delay of the signal creates significant obstacles because there is a span of time between the chord played or an extract sung by the teacher and the moment the student gets it.

Thus singing together becomes impossible. It also significantly limits vocal functions in the process of teaching not just a solo vocal performer, but also a wider profile performer.

All participants of the musical educational process should take these technical shortcomings into consideration. It is also necessary to obtain new skills operating new equipment with pre-installed new software and using educational modules.

Results

In accordance with requirements and tasks that face modern vocalists and considering the desire of the young professionals to integrate into the world community and pursue successful professional career we should pay special attention to the formation of the favorable climate that will allow close cooperation with colleagues and acquisition of professional skills.

Tutor's task as we see it is to provide the students with the widest spectrum of knowledge possible and it means that the incremental atomization of society and technological shortcomings should not hinder the process.

More and more highly rated foreign music schools open online courses for everyone interested including students from abroad. For instance, Berklee online <https://online.berklee.edu/courses>.

We continue research in the field of educational online modules for singers of different skill levels, ready for independent creative work, educational and rehearsal activities for further evaluation of studied and mastered content.

Off-line activity is also needed as, in its turn, personal contact with the tutor can become a decisive stimulus.

All this will allow to set up an efficient system of professional vocal training for everyone interested independently of the student's physical condition or geographic location.

Remote digital and modular online education gain special importance when medical condition, remote location or other specific factors do not allow the student to attend the educational facility.

The educational experience we gained shows that the approach will allow introvert students concentrate on the individual vocal, associative and physiological processes and disclose internal potential bypassing the fear of the external negative factors.

Feedback from the tutor will be a favorable factor for the extravert students as regular comparison of the student's performance with the expert opinion and approval received is beneficial when working with such students.

Cooperation of tutor and student is an important factor for acquisition of professional vocal skills, but this is not always possible due to concert tours, remote location or education by correspondence.

In connection with the above we believe that modular online system will allow to organize educational process in the best possible way. In its turn this will create complimentary social and educational conditions for acquisition of professional vocal skills.

Discussion

For us, it is obvious that the stage is the most powerful stimulus for a musician. Approval gained from colleagues and audience boosts for professional and personal growth.

Self-perception formed out of person's relation towards society and the activity also has a significant meaning for personality [4].

We understand that participation in contests, concerts and other events is an integral part of a musician's life and vocalist in particular. In connection with the above all performances are an excellent opportunity to polish acquired professional performance skills.

We cannot deny that these days an emphasis is made on the musical videos. Thanks to modern technologies a singer can record both audio and video right in his own rehearsal and acoustic space.

Online concerts are gaining popularity. Musicians gather in a studio equipped with sound, light and video equipment and audience enjoy concert in any corner of the world. We believe that it cannot replace a fully blown live concert but the concept exists and gains popularity.

Certainly, stage fright, fear of the camera and the ability to work in any acoustic space as well as free expression of music material in accordance with the creative task at hand and many other factors are mastered in rehearsal and only later on stage and in front of a camera.

Spirit of competition, participation in contests among equals will form the basis for the self-evaluation of a student. Analysis of the performance, feedback from jury and audience not just across the footlights but from the other side of the computer screen are capable of determining the direction of future professional development and allows singer to adapt to the environment of colleagues and tutors.

Many professionals agree with the above and underline that friendship ties and relationship are formed at this stage to help future signers form an optimistic mind set and belief in oneself [21].

Mass culture is created by professionals in evaluating customers demand, education, politics, mass art and advertising [18].

By now psychologists studying personality have gain extensive knowledge of great importance for the concert performance practice. We can single out Young's [22] theory of personality typology. It is of interest because it combines research in the unconscious and conscious in their natural unity and overcomes psychoanalysis with its exaggerated importance of the unconscious in the creative life of a human being [9; 7; 10].

Our analysis of the social and psychological environment allows to highlight a number of possible scenarios of interaction of a creative person with the outside world.

One – «scenario of consolidation». This scenario is based on the formation of the social micro environment and informal personal interaction (situation of love and friendship). It is important to note that there can possibly immerse fear of existential solitude when the notion of "ours" and "own" i.e., familiar audience is absent. In the case the situation can be considered as hostile and even critical.

Two – «scenario of confrontation». For many performers it can have a stimulating effect namely desire to "shock the audience and tear them all up" etc.

Here we have in mind an atmosphere of competitive hype, supported by the social environment. But in this case the fear of defeat is inevitable, defeat that can be viewed by young performer a catastrophe of lifetime.

Three – the third scenario can be described as “scenario of creative dialog”. It is formed during the process of educational and rehearsal activities and is filled with director’s and actor’s technologies. The performer tries to “agree with the audience” or “lure it to performer’s side”, set up a trust. But there can appear a fear that this contact will never appear.

Four – this scenario can be described as “scenario of public solitude” performers with developed internal creative potential and prone to egocentricity can fear to lose any contact with the audience because they are self sufficient. This situation can result from extreme personification of the performer during his education, feeling of one’s uniqueness, imbued by surrounding people. Sometimes it can do but quite often it leads to nervous breakdowns, connected to the feeling of internal solitude and arising fears, anxiety, depression, fear of being not understood [1; 2; 8; 13].

All the above-mentioned scenarios are not to do just with the concert performance but with the education itself. These scenarios are clearly seen in the creative groups and universities, though environment of the digital education can hide most of them.

So, what are the true motives of the younger generation on their way to self-actualization? Obviously, the thirst for success, recognition by the audience and colleagues are the other side of vanity. The Author has conducted a survey and asked a number of reputable colleagues the same question: “what was your stimulus to seriously study music”. Almost all of them responded “Success”. Thus, we can assume that we deal with strong individuals with qualities inherent in the leader.

Within the environment of the open society and digital education modern vocalist gets a universal tool for acquisition and mastery of professional skills. It works successfully regardless of the type of personality, its inherent fears and complexes.

Conclusion

Social, psychological, educational factors of professional training by modern vocalists as well as technical factors in the digital environment of the university can be both internal and external.

It is obvious that individual psychological peculiarities of a personal development are conditioned by internal factors based on individual genetic predisposition.

Basic structure of inborn personality has vulnerabilities that can become a positive stimulus on the way to professional training and self-actualization. That is why extrovert wins against introvert when it comes to communicative skills and losses in the subtlety of perception and emotions.

Positions of the most social and psychological groups are equalized by the flexibility and depersonalization of the digital education. Further exams, contest and concert practice teamwork, work with colleagues and tutors allow to enrich routine vocal and rehearsal process. Going through online modules will allow a step by step social and psychological adaptation of the performers.

Despite difference in speed in assimilation of the material all modules are necessary and on condition that elaborate sequence is preserved every student will be sufficiently trained for the next level.

The miracle of art as a reflection of highest esthetic summits sets nowadays non-standard tasks for the creative individual, tasks that to be solved will require tutors to offer his students all available tools on the student’s way to professional growth and self-actualization.

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Modern Approaches to the Study of Music of the Twentieth Century

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Annotation: *the subject of research – modern academic music of the 20th century is a special kind of art, the effective development of which by students of art departments and universities requires appropriate methods. The purpose of the work is to consider problematic teaching methods that ensure the effective mastery of complex artistic material by university students who do not have sympathy for 20th century music. To verify the effectiveness of the application of problem learning techniques when students mastered avant-garde music, a pedagogical experiment was conducted to introduce problem problems, the case method and the design method into the process of mastering musical and historical disciplines. The study carried out a theoretical justification and introduced into creative practice the methods considered, which made it possible to involve the student in the development of discipline in the process of creative activity, which significantly increases the level of cognitive activity and contributes to the formation of students; to solve the problem of modern musical skill, students of the musical and pedagogical profile of education were presented with problem problems, and the task requiring brainstorming – to practically “guess” the alleged image of the author – had the necessary didactic effect. Methodological recommendations related to the use of problematic methods in music education are formulated.*

Key words: *problem-based methods, modern music, mastering, problem tasks, students of musical universities.*

JEL classification: *I200, I290.*

Introduction

Music develops personal and socially significant moral and moral qualities in a person and a productive and creative attitude to life, contributes to the assimilation of spiritual values and the cultural heritage of civilization. Academic music, including avant-garde music, contributes to “the comprehensive development of the person, the expansion of aesthetic needs, the humanization of the moral aspirations of the person, and the increase in the level of spiritual culture as a whole” [1, p. 44]. The music of domestic and foreign modernists and avant-garde artists of the 20th century serves as a source from which cultural and educational figures draw valuable artistic and aesthetic ideas implemented in musical, creative and socio-cultural activities. On the one hand, complex feelings and experiences, symbolic images, thoughts that have incorporated the wisdom of the ages, corresponding means of expressiveness, unusual touches and techniques of the game, on the other hand, the needs of young people for light, entertaining music that leads away from everyday problems: all this takes the mass listener away from avant-garde music, puts obstacles to its understanding and mastery in the process of training and education of cultural, art and educational figures.

The effectiveness of problematic teaching methods is due to “the complexity of tasks that initiate an increase in motivation and cognitive interest, an active analytical process, personal involvement in the search for solutions, the development of heuristic and creative abilities” [2, p. 847]. This is due to the preference of problematic methods of teaching modern music to students of universities of culture and art, who often experience difficulties in mastering avant-garde styles, genres and forms [11, p. 17]. Active and interactive forms of work, the method of problem situations and tasks, as well as other innovative educational technologies, including digital ones, form students’ skills of self-searching and processing information, involve participants in the process of creative application of the acquired knowledge in practice, ensuring the formation of professional and personal qualities of a specialist [7, p. 14]. Semantically ambiguous and «speaking» works in an unusual musical language require concentration of attention, internal experience and understanding, which provide precisely problematic methods of cognition [9, p. 240].

The effectiveness of the process of professional music education depends both on the relevant goals and objectives of the teaching methodology, as well as on the level of musical education, the breadth of aesthetic experience and the activity of the student as a whole. The modern spatial image of the world has gone far beyond the limits of Earth reality surrounding man, beyond the empirically comprehensible scientific patterns – into the space of imagination, therefore avant-garde music, reflecting the modern spatial image of the world, and causes problems among representatives of informational creativity [16, p. 240]. The attention of art began to be occupied by the expression of deep and moving perceptions of human consciousness, reflection about the world, the awareness of outer space, its instability and the ambiguity of the image of the Universe, which opened in our era [18, p. 12]. Hence the misunderstanding of 20th century music, reflecting the universal system as dynamically changing and complex one. Such non-classical aesthetics require non-classical but effective teaching methods [20, p. 4]. Modern art of the twentieth century meets the basic principles and methods of thinking of the era: the scientific multiplicity of reference systems with the multiplicity of “points of view” of artistic images and concepts. Therefore, only self-developed projects, methods of enhancing perception, cases (problem situations), problem or project methods, an integrative and multi-artistic approach, other innovative pedagogical principles contribute to the understanding of modern music as a complex multifaceted layer of artistic culture.

Methodology

To test the effectiveness of application of techniques of problem training at development by pupils of vanguard music the pedagogical experiment on introduction of problem tasks, a case method and a design method in studying history of music was made. At the diagnostic stage including poll and testing of students the low level of knowledge and motivation of students to studying vanguard compositions and also the low level of the academic achievements of second-year students of department of musical pedagogical education of RSSU is revealed. For this reason the decision to change methodological approach to development of discipline “Music history” was made. It then will begin to justify the name when in her all history from antiquity is developed up to now, and her consecutive expansion will provide evolution of consciousness of consumers of works of art.

Within a year, seminars instead of lectures were held generally and problem tasks were given to students independently to work on development of projects and the decision a tasks case. At the end of an experiment the control selection by means of inspection and testing which confirmed efficiency of these methods of training with use was made. The efficiency of process of professional music education depends as on the corresponding purposes and problems of a technique of teaching, and on the level of the organization of musical and educational activity in general. Even before study at the university the performing musician visits masterpieces of world musical culture as any member of society, attending concerts, the museums, exhibitions,

themed nights, lectures and seminars, festivals and competitions and also listening to house music in a leisure-time, etc. [16, p. 240]. The music of the 20th century sounding not only at concerts and themed nights, at cinema, on radio and television, thanks to an unsurpassed variety of styles and genres, gradually gets into hearts of listeners.

Many factors lead to unwillingness and inability of modern youth to listen and understand vanguard music. Sociologists, psychologists, musicologists, teachers dealt with this issue. In the 20th century, musical material, genres and forms of the academic music cardinally changed, and her complication was followed by development of easy mass culture to which those to whom the serial twelve-tone technique or a sonorous music didn't become close gave preference. In the 21st century the art and esthetic needs of modern youth and value which were broadcast by musical vanguard of the last century ceased to coincide. The new generation is keen on the pop music and a rap sounding everywhere and the musical vanguard just lacks the place and time, even in educational institutions art of the 20th century "is studied at the end of a basic course and often occupies only one general section" [10, p. 100]. However, as practice shows, at due methodical and pedagogical approach at pupils interest in musical vanguard and the modern art in general is formed: "students are carried away by the music forcing to think, have complex feelings, to draw in imagination original images" [1, p. 43].

However, positive trends happen only in the professional universities (conservatories), but not in the universities of culture and art of vanguard music where there is not enough attention both with scientific, methodical, and practical points of view continue to be paid. At the same time music takes the important place in life of the modern person: it sounds at cinema and on television, in malls and dancing clubs, on sporting events and in the subway, but all this entertaining contents which is easily perceived by contemporaries therefore serious art begins to bore and move away from us [6, p. 57]. Music turns from art into a life background. Original interest and love for music as to art form arise in the course of intelligent listening of highly artistic samples, experience of musical emotions, receiving bright impressions – all this is comprised by vanguard music of the 20th century.

Modern music thanks to serious conceptual bases is capable to form and adjust value orientations of students: new timbre shades, difficult methods of composition, accurately built forms based on scientific approaches, but traditional esthetic categories fine "are penetrated by historicism of thinking, opened to dialogue with other eras, styles and types of arts. Music of the 20th century expressed urgent need of modern composers in individual transfer of universal meanings of culture in this plan. It changed feeling of historical prospect, esthetic categories and the fundamental bases of music as art form" [6, p. 58]. In works by composers of the 20th century the modern musical language speaks about universal values, danger of loss of humanity and kindness, new bases of world order. All this promotes formation of comprehensively developed person with the high level of moral development and capable to productive life and improvement of the world. High moral and ethical ideals get into consciousness of the personality in the course of communication with works of high art and esthetic level to which, undoubtedly, also music of the 20th century belongs. We will review several examples.

Results

Symphony of Sofia Gubaidulina "I hear... Silent..." in twelve movements (1986) is devoted to philosophical topics in the spirit of Shostakovich and Mahler. Symphony's author reflects on the global, landmark problems of being. The composition can be proposed as the basis of a cultural and educational evening, concert, seminar, discussion-conversation, extracurricular event, which can be opened with such a question: "What global problems are facing humanity in the 21st century?" About the era of the twentieth century, Gubaidulina expressed the following point of view: "The greatest feature is life in the age of the real apocalypse. None of the other periods of history gives us such a reality of the end of the world. It imprints all areas of our lives, all our actions. Consciousness of the end of the world already existed at some points in history.

However, our consciousness has no hope that the righteous will be saved..." [15, p. 80]. Is it true that during a pandemic, the same motives sound in the hearts of people? The concept of the Gubaidulina's symphony is in the circle of these reflections on the apocalypse, on the fate of mankind and on the eternal light of hope. While familiarizing students with this work, you can offer to find in the symphony the very sounds that glow with hope.

The imagery of the symphony is not only earthly, human, but also cosmic, universal. The dramaturgy of the work is based on the antitheses of the dark – bright, brainy – eternal, evil – good. A cultural and educational event, at which Gubaidulina's essay can become the center of the event, students can listen to the Symphony in order to determine the range of topics symbolizing these antitheses. The author does not seek to bring the conflict to a final resolution, but resorts to the method of parallel drama. The name "I hear... Silent..." indicates the most important compositional principle of the work – the hanging question of the future, the "static major" as a symbol of shimmering hope.

The Symphony contrasts sound and silence. Pauses dissect the sounding tissue into blocks, "spaces", which correlate with each other in certain proportions and form the artistic rhythm of the form. The elevation of silence is comparable to the tradition of religious-philosophical, but world, both eastern (ZenBuddhist meditation) and western (Greek hesychasm). It is advisable to discuss all these categories together with students, at the same time giving them a problematic task, for example, to comprehend the concept of silence and prayer in Christianity, Buddhism and Islam; find several futurological predictions describing the future and evaluate them from their own perspective. So the most expressive work becomes a source of serious reflection on the future of mankind.

Another example is Concerto grosso No. 1 A. Schnittke (1977) for string orchestra and two violins, harpsichord and prepared piano. The composition is unique in that it combines the revived genre of ancient (baroque) music, relatively close and familiar to young listeners, with the avant-garde technique of polystylistics, in which the combination of ancient and modern styles in the composition has a certain conceptual basis. A philosophically generalized and symbolic expression receives the composer's thought of the modern world and society. The sound of the string orchestra is so penetrating and squeaky that it does not leave even the most ardent enemy of the musical avant-garde indifferent.

Two orchestral groups Concerto grosso No. 1 enter into a dispute and participate in the creation of an acute dramatic collision of the work. Since in Schnittke's polystylistics "collide" with Bach prelude-toccata angel-like music and tough-dry and broken music in a dodecaphonic and aleatoric spirit, it will not be difficult for students of universities and culture and art to determine the "arrangement of forces" and the "strategy of struggle" of the two principles. Also, thanks to the most expressive music, Schnittke does not find it difficult to determine the "winner" and draw deep conclusions.

The dialogue involves three representative topics: author's music, the field of deep reflection and meditation; the second is quotes, quasi-quotes and allusions to the music of the past (baroque, romanticism) as a symbol of perfection and beauty, an unattainable ideal; the third, special layer is banal music of everyday life, low-lying musical everyday life, painted in old-fashioned nostalgic tones, symbolizing "false ideals". The collage whole building on this basis is charged with acute stress, the atmosphere of the essay is determined by "tragic carnival".

The multidimensional image of the world today "carries the features of dual complexity in various complementary aspects of objective and subjective being and perceptual perception of man of order and chaos" [6, p. 58]. In other words, the depth and truth of perception depend on the personal picture of the world. The listener can understand the meaning of the essay to the extent of the fitness of his mind. So, polystylistics in the second half of the 20th century saturates composer opuses with many cultural aspects of creativity. The author is aimed not so much at the invention as at rethinking (including theoretical) existing compositional models – a rethink

that required deep reflection and dialogue with the styles of bygone eras [14, p. 128]. Therefore, teachers-musicians evaluate polystylistics as a «breeding ground,» an incentive to the self-development of the listener. The polystyle semantic concepts of music of modern composers are most clearly identified at the level of the semantic-ontological foundations of creativity. Among them, the primacy belongs to the psychological paradigm of creativity: on the one hand bringing together avant-garde composers, on the other hand, conveying the individuality of author's thinking and style in each work of art. The most consistent psychological knowledge of historical, genetic and style «secrets» of his own work is demonstrated by the works of Volkonsky, Denisov, Schnittke, Gubaidulina, Martynov, Sidelnikov and others.

Discussion

Modern music requires active methods of knowledge, which are especially effective in the case of mastering truly problematic creative tasks that improvisation and aleatorics pose to the performer as a principle of composition, implying "the composition of the play by the performer based on the material and form set by the author" [13, p. 346]. For example, composer Sergei Polozov boldly brings Russian thematism and European composition techniques closer together in his compositions. The new discovery of the game concept of music is another, general-semantic, sign of polystylistics in the music of avant-garde composers. The meaning of many game concepts (humor, irony, seriously laughing carnival masks, game symbols, grotesque, parody, and absurdity) is subordinate to two principles (techniques) of their organization. This is contrast and ambivalence as the main "characters" of game systems. In the intonational aspect, the contrast conjugation of Ernst-music and Unterhaltung-music makes up the game index of Vladimir Michelet's compositions [19, p. 113]. The aleatorics of the material and form of prelude allows the student to "improve the process of cognition, and the choice of projection in achieving the maximum possible self-realization of the individual; in the context of game logic, theatricality is revealed as the most characteristic semantic sign of aleatoric music. The theatrical "code" of improvisation finds the original semantic refraction in the instrumental compositions of different authors" [13, p. 394].

An even greater brainstorm is "dialogue and personification of some timbers (guitar in the compositions of E. Gohman, flute in the compositions of S. Gubaidulina and K. Stockhausen), which perform the function of "additional meaning"; elements of the "performance theater" (voice replicas of orchestra performers, author's remarks in the text); instrumental submission of borrowed vocal text (a characteristic feature of L. Berio's music) or vocalization of instrumental music in the aspect of creating a single emotional line from instrument to voice (vocal parts in the compositions of E. Denisov); the presence of an unusual timbre composition or genre component ("Quintet Buff" by E. Gohman); rapprochement with the music of the "third direction", in particular with jazz and the hat (mainly in the compositions of A. Schnittke)" [11, p. 15]. Such signs reinforce the poetics of contrasts as the basis of theatrical entertainment, contribute to the comprehension of instrumental opuses of Saratov composers in the context of the genre of instrumental theater [14, p. 123].

Mobile, or aleatoric forms and improvisational character of performance is one of the most complex tasks in the creative process [5, p. 19]. Even professional musicians refuse to perform pieces by such authors as Karlheinz Stockhausen, John Cage, Pierre Boulez, Witold Lutoslawski, Earle Brown, Gyrgy Ligeti, and many others, precisely because of their unspecified form. For example, because of the form's aleatory, dozens of variants of piano pieces by David Foster "October'64" (1964) are possible, including "14 variants for the first 13 sections and 8 for the last 11" [14, p. 123]. The choice of the form becomes a problem task for a professional musician, so why not give it to the student musician in the course of mastering the piano? Intellectual-creative and musical-artistic work in the universities consist not only in introducing students to the collection, storage and promotion of artistic and aesthetic values of modern music, but also in developing their responsibility for maintaining artistic values, fostering a sense of their

own ability to create an artistic environment that will be interesting and useful for others. Such activity is associated with the formation in students a focus on self-education and self-upbringing and is aimed at developing needs for improving knowledge, skills and independent work, an individual meaningful choice of creative activity [8, p. 100].

Conclusion

As the pedagogical experience shows, the deep and felt perception of avant-garde music is facilitated by the aggravation of auditory attention due to its activation (the contrast of the material, the dynamics of its development, the frequent change of moods), but this can also tire of hearing. But another factor affects much more effectively and reliably – the creation of an atmosphere of immersion in the world of modern art, the creation of associative ties between its various types and the search for analogies with the phenomena and events of the environment. The result is accompanied by avant-garde music concerts with analytical comments, presentations, installations, reproductions of paintings, bright stage design of events and applying digital technologies intensify the emotional impact of the art event on the viewer, contributing to a deeper, more personal and valuable perception of contemporary art.

Many researchers note a lack of interest among young people in the academic music of the 20th century, but they do not test any teaching methods that would help to increase students' interest in avant-garde music. A theoretical study and a generalization of practical pedagogical experience make it possible to conclude that thanks to active intellectual work and a deep emotional experience of music of the twentieth century, in the process of solving problem problems, the student receives completely new emotions that the musical classics do not give him. A person is changing; new aesthetic needs appear that new music can satisfy. The problematic method of training with its search and creative approach, project activities, practical orientation of classes contribute to solving several educational problems at the same time – motivation, acquisition of new knowledge, development, conducting cultural and educational work. And mastering the theory and practice of performing music throughout the history of its development contributes to the formation of universal professional competence in the field of musical art.

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Digital Technologies of Public Participation in Urban Governance Practices

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Annotation: *the relevance of the topic is determined by the need to create a comfortable urban environment that meets modern requirements. Involving the public in urban governance practices is one of the state's priorities. The development of digital technologies creates new opportunities for taking into account the opinions of residents, including the population in solving issues of improving the urban environment, and the practice of public control. The article examines the positive and negative aspects of the implementation of public control using digital technologies. The issue of the security of personal data of all portal users is also important. The pandemic of the coronavirus infection COVID-19 has updated the study of the use of digital technologies in the practice of urban management.*

Key words: *metropolis, improvement, comfortable environment, public control, digitalization, information technology.*

JEL classification: A140.

Introduction

The city is a social space. On the one hand, the population adjusts the urban space to suit their needs, changing it, and on the other, the urban space affects the ability to live in comfortable conditions. From the point of view of sociology, a comfortable urban environment is the conditions under which the needs of city residents are satisfied.

Currently, most of the population of the Russian Federation lives in cities and that is why the urban environment is the main indicator of the quality of life. The effective development of cities has not only economic but also social significance. Society has a great influence on the development of cities. For the formation of a comfortable urban environment, first of all, a social request is needed.

The participation of the population in urban governance allows for better development of it. Thus, the city acts not only as a social space, but also as the basis of sociality. Urban space is not only engineering systems, but also social ones.

Public control is the most important component of any modern state, whose activities are focused on the prosperity of its inhabitants. Population control is a guarantee of the implementation of a democratic regime in the country. Control is expressed in public hearings, public discussions, voting, etc.

In this regard, the state will develop programs for the improvement of urban areas, taking into account the needs of the population. These programs are aimed at increasing the level of living comfort in a particular area. Involving residents in the development and implementation of measures for the improvement of the territory is one of the priority areas. This approach allows you to meet the needs of residents in the area of improvement [10].

Moscow is a dynamically developing metropolis following world trends. Digitalization is an integral part of megacities. The prosperity of a city depends on how widely information technologies are used and how quickly they develop.

Digital technologies are being introduced into all spheres of life. Today Moscow occupies a leading position in the ranking of cities with developed electronic services. According to the Tholons agency, the capital was ranked 18th in the assessment of cities for digital transformation [7]. It should be noted that the spread of coronavirus infection COVID-19 contributed to the spread of digital technologies in people's lives. Government-imposed pandemic restrictions require the use and improvement of digital technology in all areas.

Methods

As part of the study, the scientific works of domestic and foreign scientists in the field of urban improvement of the metropolis and the use of information technologies in this area were studied. Also, a content analysis of the media was carried out.

The empirical basis of the study is the quantitative and qualitative data on the activities of Moscow city portals: «Our City», «An Active Citizen», «Electronic House», «Public Discussions», «City of Ideas».

In addition, the author used general scientific research methods: induction, comparison and systematization.

The purpose of the article is to identify the positive and negative aspects of the introduction of information technology in the process of public control in the field of urban improvement.

Results

Improvement of the urban area includes a set of measures for the construction, reconstruction, maintenance and repair of courtyards, sidewalks, driveways, parks and squares, landscaping, etc. [19]. These measures are necessary to create comfortable conditions for the life of the population. To achieve this goal, cooperation between the authorities of Moscow and its residents is necessary. Participation of the townspeople in the issues of improvement is necessary, as they know what problems need to be solved first of all. In addition, such interaction will help raise the level of public confidence in officials.

Currently, public control in the field of creating a comfortable urban environment is carried out in such ways as: public discussions, public hearings, monitoring, expertise, verification. The most common are public discussions and hearings, because they provide for the direct participation of residents in pressing issues. Such methods of participation imply a gathering of caring residents to discuss issues of concern together with the authorities and specialists on a given topic. As a result of such meetings, public attitudes towards the topics discussed are formed and the authorities make management decisions taking into account the opinions of residents.

These forms of participation are similar. The principles of holding such events are identical: openness, publicity and the opportunity to speak out on exciting topics. The difference

between these two forms of participation is that public discussions, unlike public hearings, can be conducted online.

Moscow is a dynamically developing metropolis that strives to meet all modern requirements. Digital technologies penetrate all spheres of life and urban improvement is no exception. Along with the generally accepted forms of public participation, the Moscow Government is developing new ways to take into account the opinion of Muscovites.

The «Smart City» project developed by the Government has shown its relevance and effectiveness during the spread of the coronavirus. Aimed at the most effective urban management and at creating a comfortable urban environment, «Smart City» involves the use of digital tools in city management.

The development of the project was dictated by requests from Muscovites to simplify the receipt of public services, increase their transparency and efficiency. The modernization process was divided into three stages:

- 1) 2010–2012 – transition to electronic document management;
- 2) 2012–2016 – automation of the process of providing public services;
- 3) Since 2017, work has been carried out with big data [21].

In 2020, Moscow was ranked 44th in the Z / Yen Smart Centers Index. This rating is based on 126 indicators and experts' assessments, grouped into three categories: support for innovation, intensity of development and dissemination of innovations [8].

The capital, being a smart city, strives to optimize the work of state bodies in all areas, including the improvement of the urban environment. The most important principle of a smart city is the possibility of participation of the population in the development of the capital.

Currently, such electronic services as «Our City», «An Active Citizen», «Electronic House», «Public Discussions», «City of Ideas» are gaining the greatest popularity in Moscow.

Thanks to the developed portals, Muscovites can participate in voting, propose their ideas, report inappropriate maintenance of improvement facilities, make decisions in the field of improvement, etc.

To take into account the opinion of Muscovites, «An Active Citizen» project was created. This service makes it possible to participate in polls related to improvement works. For example, Muscovites can decide which courtyard or park area needs to be improved first. Thanks to this project, 4.8 thousand votes were held and 153 million opinions were taken into account.

«Our City» portal, created in 2011, enables Moscow residents to effectively interact with government authorities. This resource makes it possible to control the quality of the work carried out on the improvement of urban facilities. Everyone can report the improper condition of the improvement elements and the violation will be eliminated within the scheduled time frame [15]. Thus, 4.5 million problems have already been resolved.

The «Public Discussions» project is aimed at a constructive dialogue between the authorities of Moscow and its residents. With the help of digital technologies, issues can be resolved online. Issues related to the definition of the boundaries of the courtyard territory or the search for construction sites, etc. are brought up for discussion. During the existence of this service, 780 urban planning projects have already been discussed.

The «City of Ideas» platform allows Muscovites to propose their ideas for the development of the urban environment. Residents offer ideas, experts choose the best ones and further implement them. For 7 years of work, «City of Ideas» accepted 100 thousand proposals and implemented 30 projects. So, for example, the «Our City» portal was created.

The next important mechanism for the participation of the population in the field of improvement is the «Electronic House». Now you can hold general meetings and solve the problems of an apartment building online. Using this project makes it possible to send an application about problems in the apartment or entrance, transfer meter readings, communicate

with neighbors, find out news at home, etc. More than 50% of houses in Moscow have joined the «Electronic House».

Moscow is subject to all global trends: urbanization, socialization, mobility, etc. The digitalization of Moscow within the framework of the Smart City project implies the development of artificial intelligence, work with big data, the use of blockchain, etc.

To resolve issues of urban improvement, it is enough to have a smartphone at hand. For all of these services, special applications have been developed. Every caring resident should have an account. All portals require entry through a single mos.ru system. Mos.ru is a Moscow-based government services portal that has collected a catalog of various options, from making an appointment with a doctor to registering a car.

In 2019 alone, 30 million services were provided in this way [12]. To ensure openness and accessibility, the Moscow Mayor's portal is the only official website authorized to provide information on the activities of the authorities in Moscow. The site contains regulatory legal acts, programs implemented in the city and their results.

On the one hand, this is a plus, because you don't need to remember multiple passwords for all digital platforms. On the other hand, leaking user data has serious consequences. The development of information technology provides attackers with new opportunities. In the field of information technology, there are such types of crimes as: unauthorized access to information, the spread of computer viruses, spam and illegal information.

During the COVID-19 pandemic, scammers find new ways to carry out illegal actions. During the crisis, cybercrime is gaining momentum, because a large number of Muscovites, being in self-isolation, use online portals to receive government services and solve problems. Cybercrime is currently the most widespread type of crime in Moscow. Every year the growth of such offenses is only growing [9].

In 2020, the personal data of residents infected with a coronavirus infection became publicly available. Information about 300 thousand patients with COVID-19 was posted on the Internet for everyone to see. The data contained surnames, first names, passport details and health information. The leakage of such data gives fraudsters new opportunities.

The Department of Information Technology said that there was no hacker attack and the reason for the data leakage was the employee's dishonest attitude towards the database. It should be noted that the organization is obliged to protect the personal data that it requests. Unfortunately, the fine for such a case is 10 thousand rubles for individuals and 50 thousand rubles for legal entities [18].

Such a case may lead to distrust of city portals on the part of users. Fearing data leakage, people will stop using digital means of public participation in the life of the city. Involving citizens in improvement issues remains a key task for the authorities in creating a comfortable urban environment. For example, on the portal «Our City» 1 685 845 members are registered. This figure is not large compared to the population of Moscow. Involving the population in the city management process is necessary to achieve the most effective results.

Discussion

The most important task of a metropolis is to use modern methods of creating comfortable conditions for all its inhabitants. This is possible with the participation of qualified personnel and the residents themselves [16]. The most common forms of direct participation of the population in issues of urban improvement are public discussions and hearings. However, there are a number of disadvantages to holding such meetings. For example, such events are not representative. Those residents who have time for this take part in public discussions. Not all interested townspeople can take part in the discussion due to the fact that they are uncomfortable with the appointed time for this event.

In contrast to the usual forms of participation, the use of digital technologies in urban improvement:

- 1) promotes the prompt solution of urban problems;
- 2) automates the process of urban management;
- 3) organizes operational feedback between citizens and authorities.

Thanks to the Smart City program, Moscow is becoming a metropolis where management decisions will be made using automatic data processing [5]. This makes it possible to even more quickly identify problems and select ways to solve them [4]. In the area of improvement, the transparency of spending budget funds is increasing.

Moscow is dispelling digital technologies by creating resources for open access to government services and public oversight.

The government is constantly improving the city, creating an ever more comfortable and safer environment [5]. Modernization of the sphere of urban improvement implies the creation of new digital databases of housing and communal services systems. This is necessary not only to create favorable conditions for life, but also to optimize the work of state authorities. Also, the developed city portals are the effectiveness of the authorities in the field of improvement [14].

It should be noted that with the emergence of urban portals, the subjects are separated from each other and the level of personal contacts decreases. Thus, all citizens are equal before receiving public services and the possibility of exercising public control [11]. This is a big plus, because the human factor is minimized.

So, due to the impersonality of civil servants, corruption factors are reduced, which in turn increases the efficiency of work [2]. Using digital technologies, it becomes possible to involve all residents of Moscow in making management decisions. This fact contributes to the decentralization of management.

The provision of public services using digital technologies has led to a decrease in visits to various departments [20]. Now about 80% of public services can be obtained online, which is very important during a pandemic.

Muscovites can report a problem in the area of improvement and wait for its solution within the scheduled time frame, moreover, they can control the quality of the work done. Also, the citizen can send his proposals and the authorities will take them into account when developing improvement plans. This approach reduces the level of bureaucracy.

City portals, as effective tools for creating favorable conditions for life, have enormous potential in optimizing the interaction between the authorities and citizens, but they carry risks.

With the introduction of digital technologies in almost all spheres of life, it is worth considering that new types of crimes are also emerging. Law enforcement agencies must be prepared for possible cybercrimes and take measures to prevent them. Otherwise, crime in the digital space will only grow every day.

There are several types of information crimes:

- 1) illegal access, copying, distortion of information;
- 2) violation of the order of access to information;
- 3) impact on information processing facilities [1].

Ensuring information security is a critical issue that requires determining the factors and scales of possible damage from illegal actions in the digital environment.

Information security is the most important factor in the successful implementation of the Smart City project. To reduce the level of cybercrime, the authorities need to increase the digital literacy of the population. Portal users should be aware of the potential risks and take measures to help protect their accounts.

To prevent cybercrimes and ensure a safe working environment for Moscow city portals, it is necessary to improve legal regulation.

Conclusion

Currently, the state of cities is the determining factor in the state of the country. Cities show the standard of living of the population. Creating comfortable conditions for life is the most important task for the state. To solve it, the participation of the townspeople is also necessary. When interacting with residents and authorities, all needs will be taken into account [3].

In the modern world, the use of information technology is an integral part of the development of megacities. Moscow is developing dynamically and follows all modern trends. Digital technologies are being introduced into all spheres of life and improvement is no exception.

Landscaping creates convenience and safety in the city. To optimize the work of government agencies, the Smart City project is being implemented. The essence of the project is to use modern technologies in various fields.

Coronavirus infection has contributed to the development of digital technology. Now, sitting at home, Muscovites are able to influence the life of the city and solve the problems that have arisen, as well as receive the necessary information. The development and implementation of Moscow portals certainly makes life more convenient and saves time.

So, public control in the improvement is carried out with the help of such portals as: «Our City», «An Active Citizen», «Electronic House», «Public Discussions», «City of Ideas».

Thanks to these developments, the process of interaction between the authorities and citizens is simplified, as well as the transparency of the activities of the city authorities increases. Every Muscovite can participate in the management of the city [13].

Residents can complain about any problem in the area of improvement in the city and be sure that it will be solved in a timely manner. In addition, they can express their opinion or offer their idea.

Moscow is becoming a city where the process of making managerial decisions in creating comfortable living conditions for citizens is implemented through a dialogue between the population and the authorities [6]. The authorities should take into account the needs of Muscovites and their desire to participate in the development of the urban environment.

To a large extent, the success of the Smart City project depends on how much the citizens are familiar with the purpose and objectives of the program and how Muscovites are involved in this issue. Thanks to this, the project will really be implemented.

It is important to note that to enter your personal account, you must enter your login and password from the mos.ru portal for providing government services. This has its pluses and one significant minus. With one account, a citizen has access to all city portals. On the one hand, you don't need to remember a lot of passwords. On the other hand, it carries certain risks.

The topic of cybersecurity during the pandemic has become the most relevant. Muscovites strive to solve their problems and receive the necessary information online, and this creates new opportunities for cybercriminals. The number of such offenses is constantly growing. To ensure information security, state authorities need to take advisory measures, namely: optimize mechanisms for protecting personal data, inform city residents about cybercrime prevention measures and possible risks, and improve the regulatory framework.

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The Activities of Rospotrebnadzor to Ensure the Sanitary and Epidemiological Wellbeing of the Population in a Rapidly Changing External Environment

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Annotation: *the health of the citizens lies at the heart of any state and presents an immeasurable value. Decent living standards and protection of the population's health are contingent upon ensuring sanitary and epidemiological wellbeing.*

The activities of the Russian Federal Service for Surveillance on Consumer Rights Protection and Human Wellbeing (Rospotrebnadzor) aim at achieving a consistent improvement of the sanitary and epidemiological wellbeing of the Russian population and are based on the findings of scientific research, legal framework development, and direct cooperation with sole entrepreneurs, individuals, and legal entities.

The accumulated scientific knowledge and the multi-year experience in fighting against infectious diseases enable the Service to react swiftly to new challenges, such as the new Coronavirus disease (COVID-19).

Key words: *Sanitary and epidemiological wellbeing, Rospotrebnadzor, COVID-19 pandemic, coronavirus, administrative measures.*

JEL classification: A140.

Introduction

Each person has the right to demand that his or her vital needs are satisfied, including food, clothes, home, medical care, and adequate social services that are necessary for ensuring the health and wellbeing of the person and his or her family [18].

The Constitution of the Russian Federation regulates the inalienable right of all Russian citizens for a favourable environment, reliable information on its state, and compensation for the damage caused to the citizens' health or property by environmental offences. The lives, livelihoods, and health of the population are recognized as the supreme values that are to be taken into consideration while defining all other values and benefits in the society. State administration of the sanitary and epidemiological wellbeing of Russian citizens is based exactly on the afore-mentioned values and benefits.

Health is one of the crucial elements that form the system of sustainable development of any contemporary state. The right to the health protection is an intrinsic and globally recognized human right: it is enshrined in many international and regional agreements and is backed by numerous declarations and resolutions signed by inter-state organisations at corresponding international conferences. The constitutional right of Russian citizens for medical care implies the opportunity to obtain high-quality, affordable, and qualified medical

services. A fully-fledged system of health-care facilities, accessibility of medical care, and the prescription of pharmaceutical products in accordance with the latest scientific data ensure the realisation of the right in question. Medical assistance in state and regional health-care institutions is provided to Russian citizens free of charge [3]. Compulsory medical insurance programs ensure the guaranteed scope of free medical care. Among various types of medical assistance included in such programs is free medical care for individuals who suffer infectious diseases that present danger to the community.

The Russian Federal Service for Surveillance on Consumer Rights Protection and Human Wellbeing (Rospotrebnadzor) is a federal executive body that is responsible for ensuring the sanitary and epidemiological wellbeing of the citizens of the Russian Federation.

Due to a massive spread of the new Coronavirus disease (COVID-19), the issue of the population's sanitary and epidemiological wellbeing has become the first and foremost priority. The study of practical and theoretical scientific findings and analysis of measures undertaken by the Government of the Russian Federation allow assessing the scope and timeliness of actions aimed at preventing the spread of COVID-19, as well as identify problems and elaborate recommendations for the improvement of activities related to ensuring sanitary and epidemiological wellbeing.

The analysis of the particular features of Rospotrebnadzor's activities for ensuring sanitary and epidemiological wellbeing is contained in scientific papers written by Onischenko G.G. [12], Zaytsev N.V., May I.V., Kiryanov D.A., Sboev A.S., Andreeva E.E. [19], Sakhno A.I., Sivolapov M.P. [17], Porokhnyavaya E.L. [15].

Pressing issues and challenges that arise in the course of ensuring sanitary and epidemiological wellbeing, in particular during the pandemic caused by the spread of the new Coronavirus disease (COVID-19) have been studied and reported at scientific conferences by Baranov A.V., Zaytseva T.A. [2], Kravets A.A., Sivolapov M.P. [9].

In 2020, a well-known Russian scientific magazine called "Sociological studies" published a scientific study aimed at identifying particular features of Moscow residents' perception of COVID-19 spread [16]. This sociological poll was conducted in Moscow on March 20-25, 2020 among 478 respondents represented by Moscow residents aged 18 or older. At the time of the poll, the main concerns of the respondents were the quick spread of the disease, lack of efficient treatment and vaccine, anxiety about their parents' health, and possible economic destabilisation in the country. According to the data obtained, the respondents' degree of awareness about infection prevention and adherence to the rules and restrictions was rather high. For example, the overwhelming majority of the respondents proved to be aware that COVID-19 is associated with airborne (95.4%) and contact (84.7%) transmission.

Methods

The study relies upon the statistical data provided by the Russian Federal Service for Surveillance on Consumer Rights Protection and Human Wellbeing, federal and regional statutory regulations of the Russian Federation, articles published by the leading periodicals, materials used at scientific conferences and seminars, general and specialized books on hygiene and epidemiology written by Russian authors, as well as issue-specific websites.

In the course of writing the article, several research methods were employed, including the structural and functional method, comparative legal method, consistency principle, modelling, analysis and synthesis, as well as factor and statistical analysis.

Results

According to p. 2 art. 41 of the Russian Constitution, the Government finances federal health care and health improvement programs, undertakes measures for the development of state, regional, and private health systems, and conducts activities that promote health improvement, development of fitness and sports, ecological, sanitary and epidemiological wellbeing.

According to the state report "Status of sanitary and epidemiological wellbeing in Moscow in 2019", in the reporting year Division of Rospotrebnadzor in Moscow participated in the implementation of 15 regional programs aimed at ensuring the population's sanitary and epidemiological wellbeing. These include one sanitary and epidemiological wellbeing program, four sanitary protection programs, seven programs for vaccination and prevention of rabies, typhus, pediculosis, and zoonotic diseases, fight against rats and rodents, antimalarial treatment, and aquatic pest control.

Sanitary and epidemiological wellbeing of the population can be defined as the state of the people's health and their living environment characterised by total or almost total absence of the environment's harmful impact and by the existence of favourable conditions for the community's livelihood. Safe and favourable living conditions are an essential aspect of sanitary and epidemiological wellbeing and can be achieved only through ensuring strict enforcement of Russian sanitary legislation.

Sanitary and epidemiological wellbeing of the population is ensured through carrying out the following activities:

- prevention of diseases in accordance with local sanitary and epidemiological situation and its possible future alteration;
- implementation of sanitary and epidemic-prevention initiatives;
- state sanitary and epidemiological standard setting;
- federal sanitary and epidemiological surveillance;
- conduct of social and hygiene monitoring;
- carrying out of scientific research related to ensuring sanitary and epidemiological wellbeing of the population;
- elaboration and operation of open and generally accessible federal information resources that serve for timely notification of public and local authorities, legal entities, sole entrepreneurs, and individuals on the surge of infectious diseases, mass non-infectious diseases (intoxications), environment's state, and sanitary and epidemic-prevention measures that are being undertaken;
- implementation of initiatives aimed at improving personal hygiene awareness and promoting a healthy lifestyle;
- undertaking of measures for prosecuting legal entities and individuals for violating Russian laws related to ensuring sanitary and epidemiological wellbeing of the population [5].

State sanitary and epidemiological policy is implemented in three major forms: legislative (adoption of laws by supreme state authorities); executive (state bodies' activities based on the adopted laws); judicial (settlement of legally valid disputes).

The main tasks that are being fulfilled by the Russian Federal Service for Surveillance on Consumer Rights Protection and Human Wellbeing include: prevention of the spread of infectious and mass non-infectious diseases, undertaking of measures for eliminating environment's harmful impact on the population, and timely notification of the population on possible infectious and mass non-infectious diseases.

The coordination of the activities of the Russian Federal Service for Surveillance on Consumer Rights Protection and Human Wellbeing is performed by the Government of the Russian Federation [4].

The Service carries out its duties on its own and through its regional divisions (84 regional offices and 84 centres for hygiene and epidemiology in the constituent entities of the Russian Federation), in cooperation with other federal public authorities, executive bodies of Russian constituent entities, and other organisations. The Service comprises 29 research institutes [10].

The afore-mentioned cooperation is achieved by means of elaborating and implementing various regional programs related to Russian citizens' sanitary and epidemiological wellbeing and health protection, as well as carrying out comprehensive inter-agency initiatives aimed at preventing infectious diseases, joint drafting of orders and other necessary papers, and

discussing the most pressing issues in the course of joint seminars, boards, meetings, and conferences.

One of the crucial objectives of the Russian Federal Service for Surveillance on Consumer Rights Protection and Human Wellbeing is the improvement of sanitary and epidemiological wellbeing of the population whilst eliminating excessive administrative barriers that hinder the activities of legal entities and sole entrepreneurs. This task can be fulfilled through the introduction of a risk-oriented model of the organisation of state control and supervision activities [1].

Since 2018 the risk-oriented approach can be employed for ensuring optimal use of labour, material and financial resources involved in the state control (surveillance) execution, reducing expenses borne by legal entities and sole entrepreneurs, and improving the efficiency of state control (surveillance) bodies' activities in the course of arranging particular types of control measures [6].

The risk-oriented approach towards the planning of control and supervision activities is a sequence of several stages, each of them being associated with particular tasks to be fulfilled. Such an approach employed by Rospotrebnadzor comprises a system for assessing the potential degree of danger of facilities that are subject to control and surveillance, taking into account the criteria of the risk of harming public health. The highest priority is given to facilities that are classified as carrying potentially high or extremely high risk of harming the health of the population. Laboratory studies (tests) that are conducted during inspections aim at measuring factors that present the highest risks for the health of employees, consumers, and the population on the whole.

Due to a massive spread of the new Coronavirus disease (COVID-19), the year 2020 has become very peculiar both for the Russian Federal Service for Surveillance on Consumer Rights Protection and Human Wellbeing and for the whole world.

On January 30, 2020, the World Health Organization declared this outbreak a global health emergency while on March 11 of the same year it started using the term "pandemic" [8; 13].

As of March 11, 2020 (8:00 a.m., Moscow time) there were 118,921 confirmed cases of COVID-19 reported by available sources (daily growth was 4,836 new cases; 4.2%). In 107 countries outside China, there were 37,966 registered cases (daily growth was 4,805; 14.5%) [11].

Being a predominantly medical issue, the spread of COVID-19 in Russia initially required coherent actions of Rospotrebnadzor and the Russian Ministry of Health.

However, the new epidemiological, social, and economic circumstances made the country face new tasks aimed not only at ensuring sanitary and epidemiological safety and wellbeing, but also at supporting businesses and making a switch towards the expansion of import substitution, and improving competitiveness [14].

On March 14, 2020, well-coordinated activities of all governmental bodies involved in fighting against the spread of the new Coronavirus infection became indispensable. According to the Decree of the Government of the Russian Federation dated 14.03.2020 n.285, a Coordination council under the Russian Government was established for fighting against the spread of the new Coronavirus disease in the territory of the Russian Federation. The Council comprised task force, economic commission, and heads of Russian regions.

The Coronavirus pandemic set a number of serious tasks to be fulfilled by Rospotrebnadzor. On one hand, it was the necessity to unfold an urgent and efficient fight against the new threat to sanitary and epidemiological safety. On the other hand, it was essential to provide a high level of new legal and regulatory acts to be adopted.

During the whole period of the pandemic, Rospotrebnadzor was engaged in carrying out massive sanitary and awareness-raising activities. In particular, it systematised and published on its official website the following information:

- latest update on the epidemiological situation in Russia and in the world (over 400 documents containing analytical data, including global public health situation; information on

countries with the biggest number of COVID-19 laboratory tests; news on the latest restrictive measures adopted in the countries with the biggest daily growth rate);

- recommendations for the population (expert interviews, tips, clarifications);
- decisions made by the Government of the Russian Federation, decrees issued by the Chief State Sanitary Doctor of the Russian Federation, recommendations of Rospotrebnadzor;
- materials published by international and other organisations;
- list of laboratories authorised for carrying out studies related to the new Coronavirus disease;
- COVID-19 laboratory tests;
- over 38 recommendations for businesses based on their type of activity.

Contemporary technologies and social networks have become an inalienable part of the population's life. Communication technologies play a crucial role in the interaction between the state and the society, and convenient obtaining of the necessary information is one of the most top-priority issues. Such a tendency can be found in the activities undertaken by the Russian Federal Service for Surveillance on Consumer Rights Protection and Human Wellbeing. On January 29, 2014, the official page of Rospotrebnadzor on Facebook was created, and as of February 23, 2021, the community's audience featured over 20,800 users. On March 26, 2020 Rospotrebnadzor published its first Coronavirus-related post. Throughout the year, the Service used to post the latest data, recommendations, expert comments. As of February 23, 2021, the page of Rospotrebnadzor was followed by over 1,000,000 users. The use of such social network as Instagram was of huge importance for Rospotrebnadzor during the pandemic when it was crucial to adhere to the precautionary measures, minimize contacts with the citizens, and find an alternative way of informing the public about preventive measures aimed at containing the spread of the Coronavirus infection.

The elaboration and implementation of control and supervision initiatives towards legal entities and sole entrepreneurs is performed by Rospotrebnadzor in accordance with the Federal Law dated 26.12.2008 n. 294-FL "Protection of legal entities and sole entrepreneurs' rights in the course of exercising state control (surveillance) and regional control".

The afore-mentioned Federal Law regulates the following aspects: procedure for cooperation between state officials in the course of exercising control and surveillance initiatives; rights and obligations of state officials in the course of carrying out inspections; rights and obligations of sole entrepreneurs and legal entities in the course of undergoing state control (surveillance) inspections.

According to the Decree of the Government of the Russian Federation dated 03.04.2020 n.438, in 2020 the conduct of scheduled inspections was allowed with respect to legal entities and sole entrepreneurs whose activities are classified as carrying high or extremely high risk. Scheduled inspections of legal entities and sole entrepreneurs that represent small- and medium-scale businesses are prohibited, with the only exception being made in the case when such inspections have been initiated due to facts of causing harm to the lives and health of the citizens or risking to harm their lives and health, as well as natural and technological hazards. The conduct of non-scheduled inspections must be coordinated with prosecution authorities.

The Code of Administrative Offences of the Russian Federation dated 30.12.2001 n. 195-FL and The Criminal Code of the Russian Federation dated 13.06.1996 n. 63-FL provide legal responsibility for the violation of sanitary and epidemiological requirements.

In particular, the breach of Coronavirus-related regulatory provisions and instructions committed by individuals and entrepreneurs can entail criminal or administrative liability.

In order to prevent sanitary legislation violations (including those that exacerbate the spread of the Coronavirus infection), art.6.3 of the Russian Code of Administrative Offences has been supplemented and subdivided into three parts [7]. This article establishes administrative responsibility in the form of a fine for individuals, state officials, entrepreneurs, and legal

entities for the breach of sanitary rules and hygiene standards, and failure to carry out epidemic-prevention initiatives required during the emergency or in case of a threat related to the spread of a disease that presents a danger to the community.

Art. 236 of the Russian Criminal Code has been subdivided into three parts that establish responsibility for the violation of sanitary and epidemiological requirements in the form of a fine, deprivation of the right to occupy particular offices, compulsory labour, and imprisonment.

Discussion

The sanitary and epidemiological wellbeing of the population is a comprehensive and multi-level system that is controlled by the state. The Russian Federal Service for Surveillance on Consumer Rights Protection and Human Wellbeing performs duties related to the elaboration and implementation of the state policy and statutory regulation of the protection of consumer rights, elaboration and enforcement of state sanitary and epidemiological requirements and hygiene standards, as well as organisation and execution of state sanitary and epidemiological supervision and federal supervision over the protection of consumer rights.

The fulfilment of the Service's mission that implied reducing administrative burden experienced by legal entities and sole entrepreneurs and achieving consistent improvement of the sanitary and epidemiological wellbeing was prompted by the introduction of the risk-oriented model of the organisation of control and surveillance duties of Rospotrebnadzor.

The accumulated experience in fighting against other epidemics enabled the Russian Government to take comprehensive and timely measures for the containment of the Coronavirus disease. These include, first of all, sanitary and epidemiological measures, as well as medical, financial, economic, social, and other initiatives.

An efficient fight against the pandemic is impossible without introducing new statutory regulations and enhancing responsibility for offences that threaten to deteriorate the epidemiological situation.

Sanitary and awareness-raising initiatives that are being carried out by the Service on a daily basis have gained particular importance during the Coronavirus pandemic. The abundance of remote communication technologies and general digitalisation of the society allow Rospotrebnadzor to promptly inform the citizens on the latest Coronavirus-related news, thus reducing the speed of the infection's spread.

Conclusion

Despite being criticised by several society members, the Service's consistent activities help to improve considerably the sanitary and epidemiological wellbeing of the Russian population. The practical experience gained in 2020 has shown ability of Rospotrebnadzor to react in a timely and efficient way to previously unknown challenges. The initiatives conducted by the Government of the Russian Federation and aimed at fighting against the new Coronavirus disease (COVID-19) have proved to be highly efficient.

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“Digital Society”, “Super Smart Society”: Some Impacts on Management and Society in Vietnam

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Annotation: *the society has been complexly transforming from traditional to the new status society – “digital society”, “super smart society” based on the foundation is technology and digital that has helped to connect things and transform social life as never before. Through researching and analyzing documents in domestic and foreign, comparing to the specific context of Vietnam, the article discusses the central theoretical issues of a “digital society” perspective, “super smart society” (as the type of “digital society”) as history, concept, essence, model, especially discussing new and urgent problems of theory and practice for leaders and managers, and also studying Vietnamese society this stage.*

Key words: Fourth Industrial Revolution, Digital Society, Super Smart Society, Vietnam.

JEL classification: A140.

Introduction

“Digital society”, “super smart society” is a reality of social life and new scientific concept on the international and Vietnamese level. There are only 16,900 results for “digital society” and 661 results for “super smart city” on Google Scholar from 2015 to now. However, they are almost the newspaper articles, few monographs and scientific articles. This is similar to the search results for the phrase “digital society” and “super smart society” in Vietnam.

In Vietnam, there are not many large-scale research projects using “digital society”, “super smart society” as the object, the central theme and there are different perceptions, not approaching international research. Besides, recent survey by the Vietnam Chamber of Commerce and Industry has up to 50% of enterprises saying that the fourth industrial revolution cannot affect enterprises, 31.1% of enterprises have yet to do so what to keep up with this Revolution [16]. From the management aspect, Vietnam’s national digital transformation program to 2025, orientation to 2030 show that Vietnam seems to be some confusion, reduction, and difficulties, about the “lag” in the concept, updating the model, and solutions to building a “digital society”, “super smart society” [11, p. 2–7].

All of this makes the topic research so important and necessary.

Methodology

This article researches and analyzes mainly based on secondary information collected from over 15 articles and research papers from foreign countries, about 10 recent studies of Vietnam on “digital society”, “super smart society” and many documents, laws and policies related to this topic.

Results

1. "Digital societies", "super smart societies": History, definition and the essence

First is the history of the "digital society".

The early stage: When computers in the world are widely used (late twentieth century), social researchers mark this as the first stage, the foundation of the digital and social era. This is the stage of "information and communication technologies" (ICTs) or "cyber technologies", or "information society" [20, p. 323]. This period is also of the development of the World Wide Web at an early level – "Web 1.0"¹.

The formal stage: The term "digital society" is officially used widely in the development of the Internet at Web 2.0 level (equivalent to the second wave of world science and technology)², is about the early years of the twenty-first century. This period, digitalization was used in both media and academic documents, and forming and expanding the expression of "digital society" with many other related terms such as "digital people", "digital culture", "digital anthropology", "digital geography" [10, p. 11]. In this period, the World Summit on the Information Society was held in Geneva (12/2003), attracting many senior world leaders to attend, discussing the future of the digital society. From these events affirm that in the early years of the twenty-first century, digital society officially appeared in practice and research [21].

Second is the history of "super smart society" (society 5.0).

From needs to address national challenges such as reduced fertility, population aging, natural disasters, terrorism, and lack of resources; in order to balance economic development and solving social problems through a highly integrated system between virtual space and real space, on January 22, 2016, the Japanese Cabinet issued the Basic Plan on Science and Technology for the period 2016–2021 in which the first time mentioned the building "super smart society" [7, p. 21]. From that, Japan become the first country in the world to introduce this new term.

Third is the definition and essence of "digital society", "super smart society"

As for the digital society, many international views on this topic are not consistent. From a technology perspective, in the Special Report "Digital Society in Asia", Global System for Mobile Communications (GSMA) – Organization representing the interests of mobile operators worldwide has launched an important definition that Vietnamese media often refer to. This refers to a society where citizens interact seamlessly with different aspects of life, including work, entertainment and communication, through digital channels through networks of smartly connected devices and compatible services. In fact, everyone in the digital society can access and interact with a wide range of public and private services, including financial services, utilities, education, healthcare and transportation. using digital technology" [12, p. 6].

According to Simon Lindgren, "digital society" is the connection of things (everything) in society through the way of digitizing them [9, p. 10]. Also in this paper, he further discusses, approaching "digital society" as an equation where "digital society" = digital media + social (societies). In particular, the society is influenced by a system of communication tools and basic infrastructure such as the Internet and social media which are digitized and interconnected [9, p. 4]. Neil Selwyn said that, it is the stage of social development, based on the development of technology, digital systems (artificial intelligence (AI) and big data, utility services and systems

¹ "Web 1.0" based on website, equipment platforms as electronic computer and laptop, which was born in the late 20th century; "Web 2.0" – early years of 21st century was characterized by technologies as wireless and broadband Internet, smart watches (smartwatches), Google Glass, transmitting Social media such as Facebook, Twitter, Google+, Instagram, Youtube,... and "Web 3.0" today, are featured with Internet of Things (IoT) [10, p. 9–10].

² According to the recent report by Fujitsu – the No. 1 of Information and Communication technology (ICT) provider in Japan, 7th in the world, there've been 4 waves of digital technology in transformation so far number of the twenty-first century. *The first wave* is digital technologies on the Internet (appearing from the Internet until 2000); *the second wave* with digital technologies on mobile Internet platforms (after 2000 to 2010) with 2 characteristics: real-time technology and everywhere, everywhere; *the third wave* starts about 5–7 years ago (forecast to be ripe in 2020) with technologies based on the Internet of Things and the convergence of the real world and the digital world, *the fourth wave* beginning after 2020 characteristic of AI technology and robot. According to this research group, the wave of technology 3 and 4 will strongly affect industry and society [19, p. 153–154].

(smartphones, computers, laptop, tablets, other electronic devices...) in many different fields such as education, healthcare, law, social security system [17, p. 11–12].

In Vietnam, there are not many large-scale and in-depth studies on “digital society”. The Department of Computerization, Ministry of Information and Communications shows that in a broad sense, it covers all human activities, based on the rapid growth of information and data, changing every aspect of social organization, from government, economy to the people; and in a narrow sense, it includes population and digital culture. In this sense, “digital society”, together with digital government and the digital economy, form the three pillars of a digital nation [5].

Ho Tu Bao, Nguyen Nhat Quang and the Department of Informatics (Ministry of Information and Communications), Nguyen Huy Dung said that “it is a human society in a digital environment, where many digital services and platforms make human life easier, easier, more jobs, more productive, a safe and humane society more, help to balance the economy with life...” [1, p. 296].

In this article, we generally introduce the concept of “digital society” as follows: Digital society is a new state, phase of change and qualitative development of society, where, based on a basic foundation (platform) and most importantly, technology – digital, digital media like the Internet, AI, Bigdata, Mobile Technology... help connect all members of society to interact, with everything in the fields of social life such as economics, politics, culture... in the world. From there, the world creates a positive quality change in life, promotes a sustainable, humane and modern social development.

Fouth is the essence of “digital society” and “super smart society” (society 5.0).

“Digital society” is the qualitative change of social interaction and connection way in which all people, everything in the fields of social life such as economics, politics, culture... together in the digital world thanks to the development of digital technology in order to create the positive changes in social living – more humane and modern society and sustainable development.

For the “super smart society” (society 5.0) according to the 5th Basic Plan of Science and Technology, the period 2016–2021 approved by the Cabinet of Japan, the awareness and essence about it is:

Firstly, the super smart society is the social model, period and era in history. It’s the next society of the four previous social types, including the hunter-gatherer society (society 1.0), the agricultural society (society 2.0), the industrial society with machines, mechanics, automation (society 3.0) and information society with computers, the Internet, electronic equipment... (society 4.0) [7, p. 21; 8, p. 8].

Secondly, a hyper-connected society based on modern technology and digital platforms, in digital environment, digital society and digital life; is the solution that promotes solving the great challenges of the times, towards a comfortable, complete, high quality of life and humanity, taking people as the center, and accomplishing the goals of Sustainable Development United Nations (SDGs).

In society 5.0, everything (including people) in the real (physical) world is connected and digitized through sensors; thereby forming a big data warehouse. This will be analyzed, processed and responded by AI and modern digital technologies (robots, computers, smartphones, autonomous vehicles, autonomous traffic lights,...) for people in physical space in many different ways, with immeasurable needs, bringing new values to the industry and society that cannot be realized by society 4.0 [7, p. 21].

Thus, super smart society is proposed and pioneered in Japan or recently the terms and models “smart urban”, “smart city”... are essentially digital society, is a concrete, visual and vivid version of the digital society model.

Discuss some urgent issues to current leadership, management and social research in Vietnam in background of “digital society”, “super smart society”

1. The core of digital and super smart society development management is human resources

Among the 08 guidelines and policies to actively participate in the Fourth Industrial Revolution in the Politburo's Resolution No. 52-NQ/TW dated September 27, 2019, led by "renewing thinking, unifying awareness" [3]; or Decision No. 749/QĐ-TTg dated 30/6/2020 by the Prime Minister on national digital transformation [4] emphasizes "awareness plays a decisive role... Digital transformation is the first of all to transform awareness". Preparing human resources in the digital society (classified into the following 4 groups) is an important, decisive task of social development management:

First, as a digital citizen, building a citizen must have certain knowledge, understanding and understanding of digital transformation and digital society; have blatant ideology, consensus to build a digital society and highly adaptive to a super-smart society; practice new standards, culture and principles of conduct in the digital environment, real space – digital (physical cyber connection). To do this, the integration of education, methodical propaganda about digital society, super smart society... in training institutions, researchers, social class should also be done regularly. and more substantially. Therefore, using digital space and digital technology to propagate about the digital transformation process in addition to traditional educational and propaganda methods.

Second, digital human resources. Digital society and 5.0 society bring new jobs with optimization of labor, increased productivity and convenience. But that also means a large workforce will be traditionally replaced by technology and AI.

Vietnam has advantages for AI development such as large population size, young structure, golden population, mathematical potential, rapid development of information industry [19, p. 155–156] ...But the AI development strategy in Vietnam in the overall digital transformation of the country in general and building a digital society in particular should care of some social issues, avoid conflicts between "people", and "robots"; solve the problem harmoniously between the economy also attaching importance to labor intensity and the pressure of national digital transformation with the problem of social security policies.

Third, entrepreneurs, owners and administrators in digital businesses need to be aware of and take appropriate action to adapt to the digital society and model doing business with high digitalization requirements, avoiding mistakes in digital transformation strategies in businesses (especially mistakes in thinking and hasty thinking).

Fourth, the contingent of cadres leading, managing and executing digital services, and digital government. One of the three pillars of the country's digital transformation to 2025 and vision to 2030 is digital economy, digital government and digital society. Therefore, improving the thinking and capacity of leaders, managers, civil servants and public employees – who need to be knowledgeable, understand thoroughly and motivate and lead for business and society is important.

2. Building "sandbox" for digital society and super smart society

According to author Chu Thi Hoa [6], from a legal perspective, sandbox is a form to create a favorable space with its own legal and policy framework (outside or beyond the current legal framework) to proceed. We already have many sandboxes, but we need to note the following.

First, building "sandbox" to lead, nurture and promote digital transformation and form a digital society as well as overcome defects of this process in Vietnam, in which, pay attention to data sandbox (law data, big data), AI sandbox (AI production, operation and ethical issues...), security and safety sandbox for users in digital space, especially digitizing sensitive fields finance – banking, justice, insurance, health.

Second, building a "sandbox" to ensure the participation of state and non-state sectors in digital management, digital government operation, digital government in accordance with the nature and operating principles of the development management model. Therefore, building

an open data warehouse, ensure the citizen's right to access information, implementing public duties can be deployed in real – digital space... also need to be taken seriously.

Third, building a sandbox about the overall model of building digital society, super smart society in our country in Vietnam. This is a rather lacking and embarrassing content in the national digital transformation program, and in the pillar of “digital society”.

Through researching international works and the practical basis of Vietnam, we propose an overall model “digital society in Vietnam with a vision to 2030”. This based and approached by some factors.

The first is politically and legally: (i). Resolution No. 52-NQ/TW dated on September 27th, 2019 of the Politburo on a number of guidelines and policies to actively participate in the 4 Industrial Revolution; (ii). Decision No. 749 /QD-TTg dated on June 3rd, 2020 of the Prime Minister approving the “National Digital Transformation Program to 2025, with an orientation to 2030” [15].

The second is the approach and the differentiation of the scope of “society” in “digital society”. The term “society” has many approaches with different broad, medium and narrow scales. However, in this article and for drafting the overall model “Digital society” of Vietnam, we approach the term “society” in the broadest and most general sense, the whole field, activities in social life, especially in the economic, political, cultural and social fields. Thus, the general model of “digital society” in Vietnam will have access to the corresponding overall pillars, including “digital economy”, “digital politics”, “digital culture” and “society number”.

The third is basing on the generalized world platform model, especially the “Digital society in Asia” model with 3 pillars in the Special Report of GSMA Intelligence in 2016 and 2020) [8, p. 9], the general model “digital society” in Vietnam will also inherit and apply creatively and appropriately in practice (see table 1).

3. Identifying the essence and urgent problems of the society related to digital society and super smart society to lead, manage and promote timely and appropriate research

First, “digital society”, “super intelligent society” brings a comfortable, new and modern life that has never been seen before, but also threatens the most basic rights and safety of their own children. people in the real world and the digital world have their personal information stolen, being “monitored” in real time, infected with computer viruses, spyware, spreading depraved products, violence on the Internet or leading to fraud, kidnapping and extortion, attacked by fake news, bad – malicious information.

Second, “digital society” and “super intelligent society” create the new changes very quickly and deeply in the social value system, social culture and ethics, many new trends, new consciousness that is both mixed and contradictory between traditional and modern society.

It is “digital culture” that creates conditions for us to enjoy the new, advanced and unprecedented cultural values through modern technology, but also from here on, deviations in the social value system, the value system. standards in the digital environment, due to digital technology with bad habits, corruption, moral corruption, the way of life of people, leaders and managers; a new social phenomenon appears “although less sedentary, people today always feel busy, lack of time, ... urban lifestyle makes people always rush, eat fast, drink fast, speak fast, go fast, communicate fast, everything is fast” [19, p. 252], or worry that robots can replace humans or have negative effects in the areas of sex, love, marriage, family ... has become a major barrier in building successful “digital society” with the four pillars analyzed above.

Third, “digital society”, “super smart society” changes social communication, social interaction and the living environment, the social environment in the way of interaction between virtual – real with the support of modern devices and technologies such as Internet, Skype, Zalo, Messenger, Instagram, Viber, Blog, ... and smartphones with increasing connection speed from 3G, 4G, 5G... However, they feel more “lonely”, stuck, tired and more stressed, although the digital living space and communication, convenient connection, openness than ever. Besides, it

Table 1

Description of the model “Digital society in Vietnam” with a vision to 2030

Pillar 1: “Digital economy”	Pillar 2: “Digital politics”	Pillar 3: “Digital cul- ture”	Pillar 4: “Digital society”
Level 1: The core content of each “digital society” layer in Vietnam			
Digital commerce	Digital transformation in the public service of the political system and building a digital government	Digital life-style	Building a modern, inclusive and multilayer digital welfare and welfare system
Level 2: Specific content of each “digital society” layer in Vietnam			
<ul style="list-style-type: none"> - Digital technology enterprise. - Innovative product “Made in Vietnam”. - Product development with digital content, digital media, digital advertising. - Ecommerce 	<ul style="list-style-type: none"> - Interactions between government, people and businesses through public services are done through digital channels. - National data portal (data.gov.vn) - Information system, digital report. - Deploy the latest technology of social media, information, public administration services on mobile devices, Big Data Analytics, AI, VR / AR. - National public service portal. - Public administrative personnel in the digital environment... 	<ul style="list-style-type: none"> - Using smart devices to access related information, work, play, study, consume... - Code of conduct on the digital environment. - Social media for a more convenient experience (VR – virtual reality experiences, online music...) 	<ul style="list-style-type: none"> - Training of digital human resources. - Communication about digital transformation and technology. - Education according to the numerical model. - Researching social problems from digitalization (Center for answering questions and supporting people affected by the digital transformation process). - Integrating security system, social welfare system on digital platform (security code, security data...)
FOUNDATION AND OPERATING CONDITIONS OF THIS 04 PILLARS: “Connectivity (IoT hyperlinks): Fast, reliable, and uninterrupted personal access to the Internet “is based on: <ul style="list-style-type: none"> - 5G service - Broadband internet with fiber optic cable - Safety and security of the network (GCI). 			

Source: Author research, synthesis and recommendation.

is the comfort and ease in setting up and interacting socially via cyberspace and in the virtual world that a part of people, especially young people, tend to “delusional” about many things in virtual space; tend to leave, forget or “trivialize” the noble values of tradition, morality in friendship, real life, family, parents, children, husband and wife, friends, fatherland... [13, p. 355; 18, p. 276–280].

Fourth, “digital society”, “super-smart society” makes us have to identify and even re-realize the central elements constituting the concept of “social development management”, which is inherited by the Party. We officially admit for the first time in the Document of the 12th, 13rd National Party Congress in 2016 and 2021 [14, p. 155–156] in a new perspective, such as: Development management space (hyperlinked space); tools, management methods for social development (modern technology and digital, of social media and social networks, of non-face (anonymity), online (livestream)); object management – people – machine involved in the management of social development and changes in the quality of public relations for a long time [2, p. 147–148].

Fifth, the development of “digital society”, “super smart society” with many cases of AI workforce, robot human resources, machine learning, many artificial intelligence in the granted countries nationality, participating in politics, running for positions in the public apparatus, participating in and contributing in many professional fields such as medicine, media – television, traffic, ... then the concept (classical sciences) in Sociology (in particular) – the concept of “society” brings together human individuals, or society is human society, the group of “flesh and bones” people as long as the research world and in documents, works, scientific dictionaries specialized in society, is it still appropriate, there is a risk of “breaking”? Whether the future has an “AI society”, “robot society”... besides “human society” is also a matter that needs to be thought about? From here, poses a big problem about re-thinking “management object” in social development management and sociology science today.

Conclusions

“Digital society”, “super intelligent society” is the topic that has great attraction in research both in the perception and practice of scientists and leaders, and management of the world and Vietnam. From the research, analysis of the secondary document system, by the method of synthesis, history – logic, comparison... the article generalized the most basic and fundamental issues about “digital society”, “super smart society” such as history, concept, essence, theoretical and practical models to the scientific contribution to building bases and proposing, outlining the overall model “Digital society in Vietnam to 2030” coming up. Besides, we also pointed out 03 groups of big problems and many other important issues to set out, interested in awareness, research and practice of leadership and management in Vietnam associated with the construction orientation “digital society”, “super smart society” with the vision to 2030.

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Implementation of Social Technologies for the Development of the Civil Service Staffing System in Modern Russian Conditions

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Annotation: *the subject of our work is modern social technologies for the development of the personnel support system of the state civil service. The purpose of the research is to study the socio-managerial aspect of the introduction of social technologies for the development of the personnel support system of the state civil service in modern Russian conditions. The research methods used were institutional and system methods, methods of political and legal analysis, analysis of statistical materials, and study of documents. The result of the work is an analysis of the features of the introduction of social technologies for the development of the personnel support system of the state civil service in Russia (on the example of the United Russia party).*

Key words: *personnel reserve, state civil service, social technologies, United Russia, personnel support.*

JEL classification: A140.

Introduction

At the heart of the existence and functioning of any state is the system of public administration. The operation of such a system is impossible without qualified civil servants. The state administration apparatus is, first of all, professional managers, on whose activities the existence of any political system depends. It is civil servants who solve practical problems of a social, political, economic and other nature.

Today in Russia there is a need to reform and modernize modern social technologies that allow providing the state civil service with highly qualified personnel. Instead of strictly centralized and authoritarian technologies of appointment to public positions, democratic technologies should come to make work in state bodies transparent, open access to it to all categories of citizens, and form a personnel reserve that can ensure a high level of work of state bodies at the federal and regional levels, which underlines the relevance of this study.

In the scientific literature to date, various aspects of public administration have been considered: the formation of personnel policy (T. Batueva [1]; E.N. Bogdanova [2] etc.); the formation of a personnel reserve (N.L. Ivanova [10]; R.Yu. Nalimov [14] etc.); problems of the institute of public service (B.N. Ondar [16]; T.N. Troshkina [25], etc.); technologies of personnel support (E.A. Panova, E.A. Vasilyeva; M.V. Sorokina, E.A. Kudrina [17], etc.). At the same time, the issues of participation of Russian political parties in the staffing of the state civil service were practically not the subject of special research, which determines the scientific relevance of our work.

Methods

The study used the institutional method, the system method, the method of political and legal analysis, the analysis of statistical materials, the study of documents.

Results

The state civil service is a type of public service in which citizens of the Russian Federation, holding positions in state authorities, carry out their professional activities aimed at solving political, social, economic, legal, and organizational tasks of the work of state bodies.

Regulation of relations and staffing of the state civil service in Russia is carried out by normative legal acts and documents (federal laws [7; 8]; decrees of the President of the Russian Federation [4–6] and other documents [9; 12; 13]).

The distribution of the number of employees of state bodies and local self-government bodies by branches of government at the end of 2018 shows that 87% of employees are in the executive branch; 10.6% – in the judiciary and prosecutor's office; 1.4% – in the legislative branch and 1% – in other state bodies [15].

The analysis of the problems of the state civil service in modern Russia is largely based on the study of the issues of its staffing. In modern literature, a number of authors understand staffing as a certain type of comprehensive management activity, which represents a certain set of legal, organizational, educational and other measures aimed at organizing and providing executive authorities of federal and regional significance with highly qualified personnel that meet the requirements defined by law.

Staffing is analyzed through a set of priority departments in the field of personnel management:

- formation and development of a culture of management processes and a high level of professionalism;
- creating conditions for the realization of intellectual abilities;
- scientifically based identification of criteria for evaluating the performance of state bodies' personnel;
- implementation of the system of personnel support for public authorities;
- determination of the list of competencies of state executive authorities;
- determination of the norm of the number of civil servants in public authorities;
- creating an environment for the professional development of staff, building their professional careers, strengthening service discipline and effectively performing their official duties;
- creation of a scientifically based system of incentives and forms of responsibility of civil servants;
- creation of a system of hiring, selection, certification, and evaluation of employees in state authorities;
- organization of the personnel reserve training system.

Thus, staffing is a set of principles, methods, methods, forms of selection, training, hiring, advanced training, monitoring and evaluating the activities of employees of public authorities, creating a personnel reserve, aimed at providing highly qualified personnel and improving the efficiency of the state civil service.

The analysis of the literature [3; 16; 18 etc.] shows that today the problems of staffing state civil authorities should include:

- lack of an official concept and programs for the implementation of personnel policy;
- high staff turnover, including due to the lack of a system of guarantees and benefits for civil servants;
- the low level of competence of the heads of state authorities and personnel services, who should be responsible for staffing;
- insufficient level of training of specialists of personnel services, which affects their inability to apply modern technologies of personnel support of state civil services;

- frequent creation of new state authorities and changes in the list of competencies for employees of state bodies;
- the absence of an official federal body that would give not only recommendations, but also administrative decisions on the management of personnel support for state civil authorities;
- insufficient development of mechanisms for the transition of specialists from one type of civil service to another;
- the lack of fixed responsibility for the heads of state bodies and the heads of personnel services for making personnel decisions and staffing authorities.

Thus, the system of personnel support of the civil service involves the solution of several main tasks:

- ensuring the personnel rotation of the staff of employees;
- development of professional and ethical qualities of civil servants;
- development of personnel reserve training programs;
- development of a unified system of criteria for evaluating the performance of a civil servant.

Today, our country uses a number of technologies and tools for staffing the state civil service:

- conducting qualification selections of candidates for the formation of a personnel reserve, including in a remote format;

- development and establishment of qualification requirements for different groups of professional positions;

- implementation of the system of comprehensive diagnostics of the work of civil servants in practice;

- development of the mentoring institute;

- organization of training programs and projects for staffing the civil service with highly qualified employees. Currently, the implementation of this direction includes the implementation of advanced training courses, obtaining new professional skills, additional professional education, allowing to increase the level of staffing of state bodies. According to statistics, in 2018, 97.7% (125 739 people) of employees of federal state bodies improved their qualifications [24];

- conducting all-Russian and regional competitions for the implementation of the best personnel practices and strategies in the state civil service;

- the formation of a personnel reserve, including through the holding of the competition «Leaders of Russia», the implementation of special projects in this area.

As statistics show, as of February 10, 2020, in the Russian Federation, the personnel reserve in the management of various bodies of the state civil service includes 387 people [11].

The development of the personnel support system for the civil service is closely linked to the introduction of new approaches, principles, mechanisms and technologies for the selection and training of candidates for the relevant positions.

Currently, the personnel selection system is a special form of activity, which is aimed at carrying out a set of measures to attract and evaluate candidates.

Today, political parties in Russia take an active part in the staffing of the state civil service.

In this article, as an example, we will consider the activities of the United Russia party.

For more than 10 years, the Party leadership has been implementing a project to create a system for forming a personnel reserve. Each of the specialists who will be included in the personnel reserve can apply not only for promotion to senior positions in the primary, local, and regional branches of the Party, but also to participate in elections to local self-government and state authorities.

The mission of the project «Personnel Reserve Professional Team of the Country» is to search for active and talented citizens, to assist in their promotion in society [21].

The project is focused on the formation of the personnel reserve of the Party in order to meet the needs of the civil and municipal service in effective specialists-managers.

The main objectives of the program are the formation and effective use of the personnel reserve for the needs of the municipal and public service in solving priority economic, political and social issues of state construction. One of the main tasks is to create a constantly updated database of professional managers.

The implementation of the project is entrusted to his team, which consists of the Federal Directorate, the Council of Experts and regional coordinators.

The strategic and tactical management of the project is carried out by the Directorate, which develops the methodology for the formation of the personnel reserve; oversees the activities of all parties interested in the implementation of the project; selects the winners.

The goals and objectives of the Expert Council are public control over the Activities of the Directorate.

The responsibilities of the project coordinators in the regions include ensuring cooperation with various organizations (professional associations, universities, public organizations) to attract suitable candidates to participate in the project; conducting interviews with potential candidates and interacting with the personnel reserve.

The reserve includes candidates who meet a number of requirements:

- they must have a higher education and be at the age of 2545 years;
- they must have a high level of development of the following four competencies:

Competence (assessment of the effectiveness of activities and uniqueness, stability of their results), Development (assessment of communication skills, outlook, ability to work in a team, desire to improve themselves, decency), Active life position (assessment of leadership qualities of the individual, desire to serve the people of Russia, willingness to take responsibility, confidence in the ability to improve the quality of life of citizens of the country, the desire to set their own positive example in the development and ability to solve the tasks facing a person) and Intelligence (assessment of the level of strategic and integrated, constructive and critical thinking). These four competencies were conventionally called «THE EDGE» by the authors of the project»;

- the activities of candidates for the personnel reserve in the social sphere, in the activities of municipal and state authorities, mass media, business structures, public and party activities.

The selection procedure includes 4 stages.

At the first stage, candidates fill out a questionnaire and log in on a special project website.

At the second stage, the project participants are tested to assess their intellectual potential and emotional intelligence (quantitative test) and write a mini-essay, answering open-ended questions (qualitative test).

At the third stage, candidates who scored 50% of the test points are interviewed, the purpose of which is to determine the level of development of the region's competencies, determine the civic position, and the sphere of priority interests.

At the fourth stage, candidates take part in the implementation of projects. In the process of working on the project, the motivation of the participants, the activity of their civic position and the compliance of its «EDGE» model with the requirements of the civil service are additionally evaluated.

It should be noted that in 2008-2009 candidates were included in the personnel reserve for three stages of work; and in 2010 – for four. In December of each year, the best project participants are included in the personnel reserve, the list of which is approved by the Expert Council on the basis of expert assessments through online voting.

In the personnel reserve of the Party, the winner of the project can be no more than 3 years from the moment of its inclusion there. By the decision of the Directorate, the laureate may be excluded from the reserve in the event of a long stay in it, exceeding the age limit of 48

years; having a criminal record; providing deliberately false information about himself and forged documents; non-compliance with the competencies of the «EDGE»; spreading false and unreliable information about the project; appointing the laureate to the position of a federal employee of class «A».

Work with the winners of the project is then carried out in the following areas:

- implementation of initiatives by the project laureates;
- conducting development and training programs, master classes and advanced training courses for them;
- identification of persons who will be able to take up the relevant positions in the party structure and public administration services today.

In recent years, the Party has been implementing a new project «Political Leader» [21], the purpose of which is to form the personnel reserve of the Party.

The project aims to identify:

- leadership qualities of the project participants (a set of emotional characteristics and personal qualities);
- ability to engage in public social and political work, constructive perception of conflict situations and independent decision-making;
- professional knowledge, skills, skills, competencies that are necessary in the performance of socio-political activities.

The project is implemented on the basis of compliance with the principles of justice, voluntariness, legality, equality and publicity.

Participants of the project can be both members and non-members of the party at the age of 20 to 50 years with a level of education not lower than the secondary professional level.

The implementation of the project involves a strict selection of possible candidates for inclusion in the personnel reserve group. Testing and interviewing of project participants is aimed at diagnosing their professional qualities, skills and competencies; personal and leadership qualities; communication skills, etc.

Based on the results of the testing, a group of candidates is selected, who are included in the personnel reserve and with whom training is conducted.

The project began to be implemented on December 7, 2018, and on February 20, 2019. The Presidium of the General Council of the Party approved the list of project participants who were selected.

The training of candidates in 2019 was carried out in streams and included training seminars, master classes, lectures and other forms of work.

Separately, projects for the formation of the Party's personnel reserve are being implemented in the regions of the Russian Federation. For example, in Crimea, the party is implementing the project «Team of the Future», which aims to create a team of effective, modern managers [19].

Project objectives:

- creation of a system for forming a personnel reserve of managers;
- introduction of the practice of social elevators in the territory of the Crimea;
- creating conditions for improving the professional development, competencies, motivation and responsibility of project participants;
- involvement of a wide range of citizens and the public of the Republic in the implementation of the project;
- formation of a positive image of the party in the region, etc.

The project is managed by the Organizing Committee, which includes representatives of municipal and state structures, heads of the KRO of the United Russia RUNWAY.

The project is implemented in several stages.

At the organizational stage, a competitive selection of candidates and their enrollment in the reserve is carried out.

At the stage of competitive selection, at the preliminary level, candidates submit documents for participation in the project; at the first stage, they undergo testing, the purpose of which is to assess the level of their knowledge in the field of municipal and public administration, ideas for improving the lives of Crimeans, through the implementation of social projects; at the second stage, participants undergo psychological testing, perform management tasks and evaluate their social projects; at the third stage, project participants undergo an individual interview and present their social projects.

At the next stage, according to the results of the competition, the best candidates are enrolled in the personnel reserve.

The last stage involves working with the laureates enrolled in the personnel reserve group.

The result of participation in the project is the creation by the candidates of their social project proposals to improve the quality and standard of living of the residents of the Republic. The criteria for evaluating such projects are their relevance (they must meet the modern requirements of state and municipal management); innovation (applied for the first time); orientation (contribute to the implementation of modern reforms, national projects and transformations); effectiveness (their implementation should improve the standard of living of specific categories of citizens); the reality of implementation (take into account regional, political, economic, and administrative risks); efficiency (the resulting result should exceed financial, material, and intellectual resources).

The text of each project proposal should contain not only its abstract, description of the problem, goals, tasks, tools and resources for implementation, but also the justification of the proposed solution to a specific social problem, a realistic, pessimistic and optimistic scenario for its implementation, the necessary set of steps and measures necessary for the practical implementation of the project.

Discussion

Thus, it can be noted that the leading political parties of the country take an active part in the introduction of social technologies for ensuring the state civil service in Russia.

When considering the activities of the United Russia party, we examined the system of training the personnel reserve, which can be attended not only by party members, but also by leaders of various social movements, employees of business and state organizations. The purpose of implementing the Party's projects at the federal and regional levels is to provide personnel for state and municipal authorities and self-government.

The selection of candidates for the personnel reserve group includes the use of various technologies (testing, interviewing, consideration of social projects of participants, training of selected participants in order to further prepare them for the state civil service).

Conclusion

In our study, we analyzed the socio-managerial aspect of the introduction of social technologies for the development of the personnel support system of the state civil service in modern Russian conditions.

Using the example of United Russia, we tried to show how political parties in Russia take an active part in the formation of a personnel reserve and the staffing of state and municipal bodies with highly qualified personnel who possess a number of professional, personal, leadership skills, skills and qualities; have a high level of social motivation and the ability to create and implement social projects that affect the quality of life of Russians.

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The Specifics of the Components of Empathy of Volunteers Providing Social Assistance to the Population in the Context of the COVID-19 Pandemic

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Annotation: the specificity of the components of empathy of volunteers providing social assistance to the population in the context of the COVID-19 pandemic was determined; the average degree of expression of the components of empathy, empathic empathy and empathy of an effective orientation; lower average severity of identification, general and penetrating empathy, intuitiveness, rationality and emotionality of empathy, empathic attitudes. Found: a marked connection between: effective and empathic empathy; identification and general empathy; intuitiveness of empathy and general empathy; general and penetrating empathy, and empathic attitudes; empathic empathy and empathy; moderate connection between: effective empathy and empathy; identification and empathic empathy, and empathic attitudes, and the intuitiveness of empathy, and the rationality of empathy; general empathy and rationality of empathy, and the emotionality of empathy, and empathy, and empathic empathy; penetrating empathy and emotionality of empathy, and empathy, and empathic attitudes; the rationality of empathy and empathic empathy; empathic empathy and emotionality of empathy; emotionality of empathy and empathy; weak link between: effective empathy and the emotionality of empathy; penetrating and empathic empathy; empathic and empathic attitudes. It has been proven that the higher the effective, identification, intuitive and empathic empathy, the higher the general and penetrating empathy, as well as empathic attitudes.

Key words: volunteers, components of empathy, population, COVID-19 pandemic, empathy.

JEL classification: A130, A230.

Introduction

Empathy is the empathy of a conscious plan with the actual state of the emotional nature of others without losing a sense of the reasons for these experiences. The range of empathy is

represented by both a light response of emotional manifestation and a clear immersion in the feelings and emotions of the environment. The markers of the current state of the emotional character of others are gestures, actions, reactions of mimic properties and speech, which, as external factors, are noticed by empathists, people with highly developed components of empathy [7].

Professional empathy is a set of components of empathy that make it possible for a specialist in socio-economic professions to empathize at a conscious level with the diagnosed state of the emotional nature of clients without losing attention to the factors that caused these experiences. Most often, the professional empathy of a specialist is represented by listening to an empathic orientation, that is, understanding the state of the client's emotional character (gestures, words, feelings, emotions) and confirming demonstration of this understanding [14].

In the process of forming professional empathy, it is important to focus on:

1) types of empathy: cognitive, based on analogy and comparison as processes of intellectual activity; predicative, serving the ability to predict the affective actions of others in certain conditions; emotional, based on the mechanisms of imitation of affective and motor actions and projection;

2) on specific forms of empathy: empathy as experiencing states of the emotional nature of partners by identifying with them; empathy as an empathic aspect of social orientation towards expressing one's state due to the experiences of others [18].

The result of the development of professional empathy is empathic ability of a very high level, which is a professionally important quality of specialists in socio-economic professions: personnel managers, teachers, salespeople, psychologists, psychotherapists, managers, caregivers, social workers, officials and others [13; 16].

Volunteers (and they can also be attributed to the group of helping others) are people who voluntarily perform activities that are useful for society voluntarily for a variety of reasons, since volunteering: makes it possible to establish acquaintance with interesting creative people; helps to gain new experience by helping others; involves participation in a variety of activities; promotes finding useful connections, organizing leisure and creative self-realization, mastering various types of activities, developing personal and professional qualities, solving personal problems; satisfies interest in the unusual, new, communicative need and psychological need to be needed [1; 3; 19; 21].

The peculiarities of volunteering in the context of the COVID-19 pandemic are a specific litmus of the moral component of society: overcoming the fear of infection, finding the strength to organize your life and helping others, demonstrating your personal qualities that contribute to the effectiveness of social assistance. Volunteer activities are aimed at providing social assistance to the population in quarantine and self-isolation, as well as refugees, homeless people, homeless people, former prisoners, people with disabilities, migrants, the elderly, students and others [11; 17; 24].

The empathy of volunteers who provide social assistance to the population in the context of the COVID-19 pandemic presupposes the totality of all components of empathy: identification, general, penetrating and empathic empathy; intuitiveness, rationality and emotionality of empathy; empathic attitudes and empathy of an effective orientation [2; 15].

Organization and methodology

The goal is to determine the specifics of the components of empathy of volunteers providing social assistance to the population in the context of the COVID-19 pandemic.

The study involved 60 volunteers providing social assistance to the population in the context of the COVID-19 pandemic.

To determine the specifics of the components of empathy of volunteers providing social assistance to the population in the context of the COVID-19 pandemic, we used:

1) questionnaire for identifying empathy of a social nature (authors: A.A. Megrabyan and N. Epshtein; the goal is to identify empathy of a social nature) [10, p. 21–23]; the author of the modification of the interpretation of the results – O.B. Polyakova (table 1);

2) questionnaire of the level of abilities of the empathic plan (author – V.V. Boyko; the goal is to establish the level of abilities of the empathic plan (rationality of empathy, emotionality of empathy, intuitiveness of empathy, empathic attitudes, penetrating empathy, identification empathy)) [6], author of modification of interpretation results – O.B. Polyakova (table 1);

3) questionnaire of empathy (authors: E.F. Zeer and E.E. ymaniuk; the goal is to determine the degree of empathy (empathic empathy, empathy of an effective orientation)) [26, p. 187–190]. The author of the modification of the interpretation of the results – O.B. Polyakova (table 1);

4) the author of the modification of the interpretation of general results for the block of diagnostics of components of empathy – O.B. Polyakova (table 1).

Table 1

Scales of components of empathy for volunteers providing social assistance to the population in the context of the COVID-19 pandemic

Empathy component levels		level low	level below average	level average	level above average	level high
Questionnaire for identifying empathy of a social nature (points)		0–5	6–12	13–19	20–26	27–33
Questionnaire of the level of abilities of the empathic plan	scores for individual components	0–1	2–3	4	5	6
	general empathy scores	0–6	7–14	15–21	22–29	30–36
Questionnaire of empathy (points)		0–3	4–8	9–12	13–17	18–21
General results for the block of diagnostics of components of empathy		0–18	19–36	37–54	55–81	82–90

Results

The results of determining the specificity of the components of empathy of volunteers providing social assistance to the population in the context of the COVID-19 pandemic showed (table 2):

1) according to the questionnaire for identifying empathy of a social nature: 18.6 – the average degree of expression of the components of empathy (table 2);

volunteers are characterized by: belief that animals can understand and experience; excitement when communicating bad news to others; a desire to engage in activities that allow frequent communication and to observe others; infection from the laughter of others; identification with the heroes of the books; negative experiences at the sight of helpless elderly people and a suffering animal; resentment at the sight of mistreating someone; unwillingness to burden others with their problems; rejection of people who are unrestrained and openly showing feelings and emotions; nervousness at the sight of a nervous and crying person; upset at the sight of a person feeling lonely; feeling happy when listening to some songs; experiencing the impact on the mood of others, for people who are easily upset over trifles, for the rash actions of friends, when listening to love songs; understanding tears of joy; attempts to restrain oneself in the manifestation of negative emotions; taking to heart the problems of others; irritation towards people who feel sorry for themselves; situational loss of peace of mind at the sight of people oppressed by something; sympathy at the sight of tears from others; taking into account the feelings of other people when making a decision;

2) according to the questionnaire of the level of abilities of the empathic plan: 13.67 of the general expression of empathy; 2.53 empathic attitudes; 2.68 penetrating empathy; 1.92 rationality of empathy; 2.18 intuitiveness of empathy; 2.3 emotionality of empathy; 2.05 identification empathy (table 2);

volunteers are characterized by: quick guessing in the surrounding soul mates; attentiveness when interacting; the perception of intuition as a reliable means of understanding others; a willingness to listen to other people; trust in both intuition and reason; desire to conduct conversations not only on business topics, but also on personal ones, as well as to understand the inclinations, abilities and character of others; infection from the laughter of others; sincere interest in the problems of acquaintances; concreteness, consistency and severity of thinking; easy entrance to trust people; easy getting used to different roles; ease in imitating other people and conducting intimate conversation even with alert people; curiosity when talking with fellow travelers; gentleness in communication; finding the right approach to people, even at random; tracking the consequences of spoken words; subconscious feeling of others; understanding the effect of trifles on mood; trying to stay calm even in a nervous environment; loss of mental balance at the sight of upset people; premonition of future events; the habit of focusing your attention on the faces and behavior of others; taking the problems of others to heart; dissolution in a loved one; merging with loved ones; calm attitude to minor troubles; creative dominant when performing different types of activities; frequent understanding of others without wasting words; frequent reflections on the reasons for the actions of others;

3) according to the questionnaire of empathy: average degree: 11 empathic empathy; 9.45 empathy of an effective orientation (table 2);

volunteers have observed: thoughtful pronunciation of phrases; the influence of the feelings of others on decision making; deep feeling of lyrical melodies and songs; willingness to help those in need; sadness at the sight of a lonely person; the desire to be in public even in a bad mood, to be alone on trips, to please even when you meet and independently resolve difficult and conflict situations; nervousness at the sight of a nervous person; maintaining composure when reporting unpleasant news around you; loss of mental balance at the sight of people crying; irritation at the sight of others who feel sorry for themselves and how others demonstrate their feelings; the desire to always greet first, fulfill the promises made and rejoice in the success of others; the ability to behave calmly even in a nervous environment; the value of a large number of friends and acquaintances, and reputation, and friendship, among others, both intelligence and sociability;

4) on the block of diagnostics of components of empathy: the average degree of empathy 52.72 (table 2);

volunteers demonstrate: Perception of participation in societies as a way to make acquaintances; an angry reaction at the sight of someone being mistreated; pity for the elderly; the desire to perform all types of activities independently, to find good in people, to openly show feelings with friends, to understand the reasons for the sadness and thoughtfulness of others; tracking the impression made on others; worries about other people; understanding attentive listening as a way to facilitate the state of others and the value of travel in the ability to communicate with new people; sympathy for crying people; the desire to listen to the speaker about their problems, maintain old connections, help those in need; happiness when listening to your favorite tunes; the value of both independence (autonomy) and affection (friendly feelings); the value of both loneliness and communication with friends.

The results of mathematical processing using the rank correlation coefficient Ch.E. Spearman and Chaddock's tables (table 3) indicate the presence of:

1) a noticeable connection between: effective and empathic empathy (0.508); identification and general empathy (0.63); intuitiveness of empathy and general empathy (0.547); general

Table 2

Results of determining the specifics of the components of empathy of volunteers providing social assistance to the population in the context of the COVID-19 pandemic

Names of diagnostics and components of empathy		Empathy component levels											
		level low		level below average		level average		level above average		level high		by sample	
		NP	%	NP	%	NP	%	NP	%	NP	%	AM	L
Questionnaire for identifying empathy of a social nature		0	0	5	8	30	50	25	42	0	0	18.6	LA
Questionnaire of the level of abilities of the empathic plan	The rationality of empathy	17	28	39	65	3	5	1	2	0	0	1.92	LBA
	The emotionality of empathy	18	30	29	48	9	15	4	7	0	0	2.3	LBA
	The intuitiveness of empathy	22	37	26	43	4	6	7	12	1	2	2.18	LBA
	Empathic attitudes	11	18	40	67	6	10	2	3	1	2	2.53	LBA
	Penetrating empathy	7	11	40	67	9	15	3	5	1	2	2.68	LBA
	Identification empathy	21	35	30	50	6	10	2	3	1	2	2.05	LBA
	General expression of empathy	0	0	39	65	19	32	2	3	0	0	13.67	LBA
Questionnaire of empathy	Empathic empathy	0	0	13	22	29	48	17	28	1	2	11	LA
	Empathy with actionable focus	1	2	21	35	32	53	6	10	0	0	9.45	LA
General results for the block of diagnostics of components of empathy		0	0	1	2	30	50	29	48	0	0	52.72	LA
Note: NP—number of people, AM—arithmetic mean, L—level, LBA—level below average, LA—level average.													

and penetrating empathy (0.52), and empathic attitudes (0.577); empathic empathy and empathy (0.565) (table 3);

2) a moderate connection between: effective empathy and empathy (0.333); identification and empathic empathy (0.353), and empathic attitudes (0.305), and the intuitiveness of empathy (0.35), and the rationality of empathy (0.43); general empathy and rationality of empathy (0.404), and emotionality of empathy (0.427), and empathy (0.385), and empathic empathy (0.46); penetrating empathy and emotionality of empathy (0.352), and empathy (0.371), and empathic attitudes (0.385); rationality of empathy and empathic empathy (0.366); empathic empathy and emotionality of empathy (0.327); emotionality of empathy and empathy (0.453) (table 3);

3) weak connection between: effective empathy and the emotionality of empathy (0.28); penetrating and empathic empathy (0.28); empathic and empathic attitudes (0.252) (table 3).

The higher the effective, identification, intuitive, and empathic empathy, the higher the overall and penetrating empathy, as well as empathic attitudes.

Also, a negative relationship was revealed between the rationality of empathy and the intuitiveness of empathy (-0.013), that is, the higher the rationality, the lower the intuition, and vice versa (table 3).

Discussion

The results of the study are confirmed by the urgent need for psychological prevention and psychological correction of the components of empathy of representatives of socioeconomic professions and volunteers, which is reflected in the works of foreign and domestic psychologists and sociologists, which emphasize the importance of optimizing such components of empathy as: identification, general, penetrating and empathic empathy [20; 22], intuitiveness, rationality

Table 3

Correlations of the components of empathy of volunteers providing social assistance to the population in the context of the COVID-19 pandemic

Abbreviations for tech- niques and components of empathy		QIESN	QLAEP							QE		Σ
			RE	EmoE	InE	EA	PE	IdE	GEE	EmpE	EWAF	
QIESN		1	0,052*	0,453	0,204*	0,188*	0,371	0,122*	0,385	0,565	0,333	0,764
QLAEP	RE	0,052*	1	0,071*	-0,013*	0,126*	0,105*	0,43	0,404	0,366	0,028*	0,273
	EmoE	0,453	0,071*	1	0,014*	0,167*	0,352	0,009*	0,427	0,327	0,28	0,497
	InE	0,204*	-0,013*	0,014*	1	0,176*	0,087*	0,35	0,547	0,073*	0,129*	0,349*
	EA	0,188*	0,126*	0,167*	0,176*	1	0,385	0,305	0,577	0,252	0,203*	0,417
	PE	0,371	0,105*	0,352	0,087*	0,385	1	0,134*	0,52	0,28	0,095*	0,446
	IdE	0,122*	0,43	0,009*	0,35	0,305	0,134*	1	0,63	0,353	0,043*	0,405
	GEE	0,385	0,404	0,427	0,547	0,577	0,52	0,63	1	0,46	0,173*	0,739
QE	EmpE	0,565	0,366	0,327	0,073*	0,252	0,28	0,353	0,46	1	0,508	0,807
	EWAF	0,333	0,028*	0,28	0,129*	0,203*	0,095*	0,043*	0,173*	0,508	1	0,619
Σ		0,764	0,273	0,497	0,349*	0,417	0,446	0,405	0,739	0,807	0,619	1

Note: QIESN–questionnaire for identifying empathy of a social nature; QLAEP–questionnaire of the level of abilities of the empathic plan; RE–the rationality of empathy; EmoE–the emotionality of empathy; InE–the intuitiveness of empathy; EA–empathic attitudes; PE–penetrating empathy; IdE–identification empathy; GEE–general expression of empathy; QE–questionnaire of empathy; EmpE–empathic empathy; EWAf–empathy with actionable focus; Σ–general results on the block of diagnostics of components of empathy; *- $p < 0,05$ ($r = 0,25$).

and emotionality of empathy [4], empathic attitudes; empathy of an effective orientation [8], which, in turn, helps to prevent asociality [5], depression [9], psychosomatization [23], dissatisfaction with professional activity [12] and reduced professional motivation [25].

Conclusion

Thus, the specificity of the components of empathy of volunteers providing social assistance to the population in the context of the COVID-19 pandemic is: the average degree of expression of the components of empathy, empathic empathy and empathy of an effective orientation; in a lower average degree of severity of identification, general and penetrating empathy, intuition, rationality and emotionality of empathy, empathic attitudes.

Found: a marked connection between: effective and empathic empathy; identification and general empathy; intuitiveness of empathy and general empathy; general and penetrating empathy, and empathic attitudes; empathic empathy and empathy; moderate connection between: effective empathy and empathy; identification and empathic empathy, and empathic attitudes, and the intuitiveness of empathy, and the rationality of empathy; general empathy and rationality of empathy, and the emotionality of empathy, and empathy, and empathic empathy; penetrating empathy and emotionality of empathy, and empathy, and empathic attitudes; the rationality of empathy and empathic empathy; empathic empathy and emotionality of empathy; emotionality of empathy and empathy; weak link between: effective empathy and the emotionality of empathy; penetrating and empathic empathy; empathic and empathic attitudes.

It has been proven that the higher the effective, identification, intuitive and empathic empathy, the higher the general and penetrating empathy, as well as empathic attitudes.

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Monitoring of Pests and Diseases of the Dendroflora of the Southwest Administrative District of Moscow

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Annotation: *the data of monitoring of tree stands of the Southwest Administrative District of Moscow for 2019–2020 are presented. Typical plant diseases and damage, as well as species resistant to diseases and pests, were identified. The plants were found to be highly affected by farinaceous food and marginal necrosis, as well as a high degree of damage by leaf beetles insects, and leafhoppers.*

Key words: *ecological problems, plant resistance, urban landscaped areas, tree species, plant diseases and pests, urbanized environment.*

JEL classification: *J190, J280.*

Introduction

Green spaces play an important role in life of humanity and the planet as a whole. In addition to their conservation and biosphere functions, forests largely meet the aesthetic,

recreational, and social needs of humans. The role of green spaces growing on the territory of urban agglomerations is particularly important. The beneficial effect of the forest on the psychoemotional and physical condition of the population of large cities has long been known. However, only when the forests are healthy can they fully perform their functions [7; 20].

When planting greenery in a modern metropolis, a number of problems arise, including environmental ones, which can be seen in the example of the city of Moscow.

The first of the environmental problems that complicate the existence of green spaces is the impossibility of timely implementation of agrotechnical measures; the second is connected to the fact that due to the negative impact of the urban environment on woody plants, their accelerated aging is observed; the situation is particularly amplified when replacing them with young trees dramatically reduces the phytomeliorative effect of plantings, and then in turn lose their ability to capture dust and gas. The next problem is connected to the fact that in the case of the construction of hot spots, green zones do not have enough space. It also may be said that the complex system of underground utilities restricts the use of trees. At last, the creation of green zones with only shrubs, flowers and lawn grasses minimizes the phytomeliorative effect of plantings that are unable to be an effective supplier of oxygen and a "green filter" [1]. Woody plants are the largest and most durable elements of the urban landscaping system, and they create its structure and conditions for long and stable existence and high protection effect in

Table 1

Species composition of woody plants in the research

Leninsky Prospekt	Gagarina Square
1. Weeping birch (<i>Bétula péndula</i>)	1. Japanese barberry (<i>Berberis × ottawensis</i>)
2. Hawthorn (<i>Crataegus laevigata</i>)	2. Weeping birch (<i>Bétula péndula</i>)
3. Nanking cherry (<i>Prunus tomentosa</i>)	3. Siberian pea shrub (<i>Caragana arborescens</i>)
4. European white elm (<i>Ulmus laevis</i>)	4. Horse chestnut (<i>Aesculus hippocastanum</i>)
5. Wild pear tree (<i>Pýrus commúnis</i>)	5. Norway maple (<i>Acer platanoides</i>)
6. Osier dogwood (<i>Cornus stolonifera</i>)	6. Amur maple (<i>Acer ginnala</i>)
7. English oak (<i>Quercus robur</i>)	7. Box elder (<i>Acer negundo</i>)
8. Siberian pea shrub (<i>Caragana arborescens</i>)	8. Small-leaved lime (<i>Tília cordáta</i>)
9. Horse chestnut (<i>Aesculus hippocastanum</i>)	9. European larch (<i>Larix decidua</i>)
10. Norway maple (<i>Acer platanoides</i>)	10. Pacific ninebark (<i>Physocarpus opulifolius</i>)
11. Amur maple (<i>Acer ginnala</i>)	11. Ramanas rose (<i>Rosa rugosa</i>)
12. Tartarian maple (<i>Acer tataricum</i>)	12. Quickbeam (<i>Sorbus aucuparia</i>)
13. Box elder (<i>Acer negundo</i>)	13. Blueash (<i>Syrínga vulgáris</i>)
14. Small-leaved lime (<i>Tília cordáta</i>)	14. Feather fern (<i>Spiraea japonica</i>)
15. European larch (<i>Larix decidua</i>)	15. Rough-bark poplar (<i>Populus balsamifera</i>)
16. Pacific ninebark (<i>Physocarpus opulifolius</i>)	16. Sweet mock-orange (<i>Philadelphus coronarius</i>)
17. Ramanas rose (<i>Rosa rugosa</i>)	17. Wild rose (<i>Rósa canína</i>)
18. Quickbeam (<i>Sorbus aucuparia</i>)	18. Black ash (<i>Fraxinus pennsylvanica</i>)
19. Blueash (<i>Syrínga vulgáris</i>)	
20. Waxberry (<i>Symphoricarpos albus</i>)	
21. Feather fern (<i>Spiraea japonica</i>)	
22. Rough-bark poplar (<i>Populus balsamifera</i>)	
23. Wild rose (<i>Rósa canína</i>)	
24. Cultivated apple (<i>Malus domestica</i>)	
25. Black ash (<i>Fraxinus pennsylvanica</i>)	

the environment. What is more, they are effective sources of oxygen and phytoncides, and they optimize temperature and light conditions and capture technogenic gases and aerosols [11].

The accelerated aging of trees in the urban environment compared to the rate of change in the phases of their ontogenesis in natural ecosystems makes it necessary to study the factors that negatively affect trees in the urban environment and develop compensatory measures [3].

Methodology

The objects of the study were 27 species of woody plants, 25 species of which grew on Leninsky Prospekt and 18 on Gagarin Square. The list of the studied species can be seen in Table 1.

In June – August 2019–2020, samples of damaged leaves were taken and the species (generic) belonging of the most common agents that caused their damage was determined.

Subsequently, the data were compared for different plantings and years of research.

The study was performed in the Southern Administrative District of Moscow on Leninsky Prospekt and Gagarin Square. These streets are city-wide thoroughfares that provide a link between transport, industrial areas and the public center, as well as thoroughfares of continuous traffic with intersections with other streets on the same level.

Their main features include: high traffic intensity, a variety of vehicles, a diverse mode of transport, which provides, along with continuous traffic and self-regulating traffic, the placement of stopping points for mass public transport, the provision of entrances to ensure various urban development, the passage of transit traffic, the frequent location of intersections and intersections of city streets and roads among themselves, pedestrian traffic of very high intensity in combination with high traffic intensity, placement of parking lots of various types: from short-term along the sides of the roadway to parking lots for long-term storage of cars; underground and aboveground engineering networks with special structures (wells, chambers, etc.).

Residential buildings along the route of the monitoring of green spaces are represented by multi-storey buildings.

On the monitored territory, 27 species of woody and shrubby plants were noted. Most of them are deciduous trees and shrubs.

The climate of the city is influenced by its geographical location in the temperate zone in the center of the East European Plain, which allows the waves of cold and heat to spread freely. The absence of large bodies of water contributes to quite large temperature fluctuations.

The climate of Moscow is moderately continental, but the degree of its continentality, relative to other major European cities, is much higher. The annual amplitude of the temperature drop in Moscow has the highest value, which is 28 degrees.

Winters are long and severe. The weather and climatic conditions prevailing in Moscow in 2019 were favorable for vegetation. In the winter season from January to March, the amount of precipitation exceeded the norm, so that the plants were not subjected to temperature stress, and a sufficient supply of moisture was formed in the soil. After the snowfall, no frost was observed, the beginning of summer (June) was very warm and humid, so the vegetation was able to gain high biomass.

In July and August, precipitation fell below normal, but in June there were high temperatures (which could lead to a lack of moisture), and in July and August it was not hot and outbreaks of insect pests during the growing season of 2019 were not recorded.

In 2020, the following temperature indicators are recorded: the maximum air temperature in July is 20.1°C, and the minimum air temperature in January is 6.6°C.

Depending on the month, the humidity ranged from 66% to 86%. In turn, the maximum humidity in Moscow was observed in December, the minimum in April.

According to the Meteorological Center, the abnormal months are June and July 2020, because precipitation was about 200% of normal, as well as in August, when it was less than 60% (Figure 1, 2).

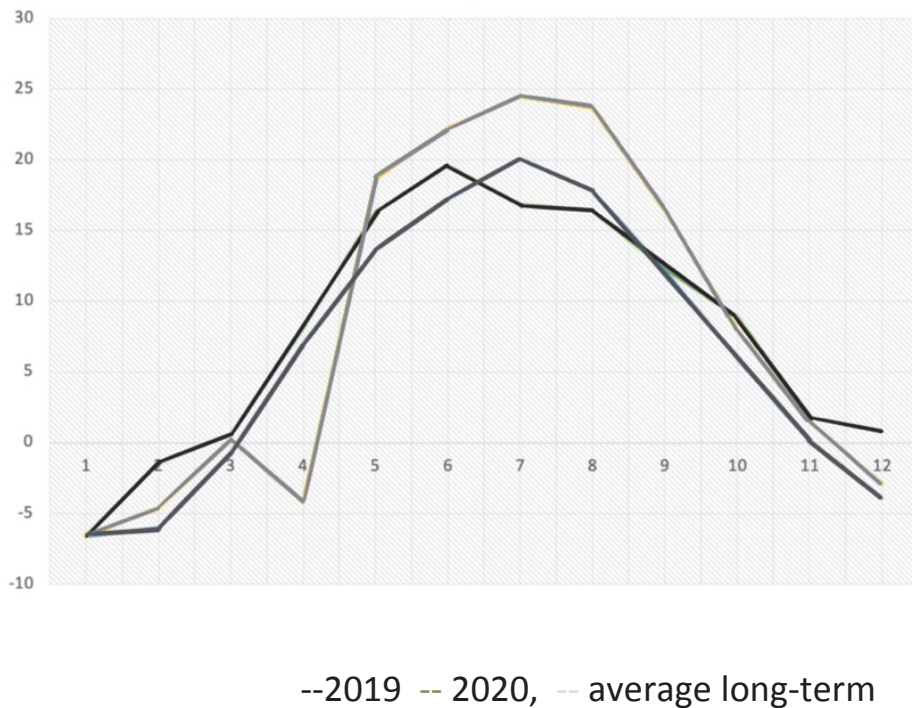


Figure 1. Air temperature in 2019–2020 and average long-term value in °C

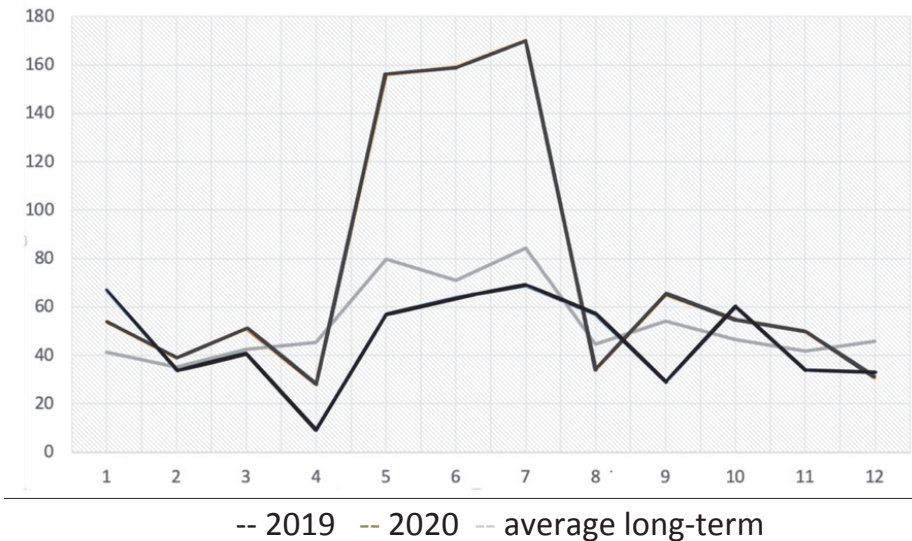


Figure 2. Precipitation for 2019–2020 and average long-term value in millimeters

Results

At the facilities of the Southern Administrative District of Moscow, the following pests were noted – aphids, leaf beetles, leafhoppers, miners, sawflies, leaf-rollers (Table 2). The most common tree pests on Leninsky Prospekt in both 2019 and 2020 were leaf beetles and leafhoppers. On Gagarin Square, with the same pattern of damage, the leafhoppers are particularly distinguished.

Table 2

Species diversity of pests on trees and shrubs in urban green spaces of the Southern Federal District of Moscow*

Species	Leninsky Prospekt		Gagarin Square	
	2019	2020	2019	2020
Plant lice (Aphidoidea)	6/24	6/24	4/22	3/17
Leaf beetles (Chrysomelidae)	14/56	14/56	6/33	8/44
Leafhoppers (Cicadellidae)	12/48	12/56	10/56	11/61
Ohrid miner (Gracillariidae)	2/8	2/8	1/6	1/6
Sawflies (Tenthredinidae)	1/4	1/4	1/6	1/6
Leaf rollers (Tortricidae)	4/16	4/16	-	1/6
Blister mites (Eriophyoidea)	1/4	1/4	-	-
Red spider mite (Tetranychidae)	6/25	5/20	2/11	3/17
Grape tick (Eriophyoidea)	1/4	-	-	-
Casebearer (coleophoridae)	1/4	1/4	1/6	1/6
Miner moth (Lyonetiidae)	1/4	1/4	-	-
Snout beetles (Curculionidae)	2/8	2/8	1/6	1/6
Birch pear-shaped weevil (Curculionidae)	-	-	-	1/6

* Damaged trees are in the numerator, the percentage and the total number of trees and shrubs is in the denominator.

During the monitoring period of 2019–2020, 6 types of diseases were detected for 27 species of woody plants (Table 3).

Table 3

Diseases of trees and shrubs in urban green spaces of the Southern Federal District of Moscow*

Species	Leninsky Prospekt		Gagarin Square	
	2019	2020	2019	2020
Farinaceous food (Erysiphales)	16/80	16/80	4/33	10/83
Marginal necrosis	7/35	7/35	2/17	4/33
Graphiosis (Ophiostoma)	1/5	1/5	-	-
Phyllosticta leaf spot (Phyllosticta)	1/5	1/5	-	-
Thyrostroma compactum (Stigmina compacta).	1/5	1/5	-	-
Chlorosis	2/10	3/15	-	1/8

* Damaged trees are in the numerator, the percentage and the total number of trees and shrubs is in the denominator.

Among them, in all the years of research, farinaceous food absolutely dominated in all areas, it affected more than 80% of all the trees examined.

A large proportion of trees were also found with leaf damage by marginal necrosis (up to 35%).

The most vulnerable to diseases were elm and small-leaved lime (Table 4).

Table 4

Specific features of plants in disease damage

Species	Number of diseases		Species	Number of diseases	
	2019	2020		2019	2020
1. Weeping birch (Bétula péndula)	1	1	11. Box elder (Acer negundo)	1	1
2. Nanking cherry (Prunus tomentosa)	1	1	12. Small-leaved lime tree (Tília cordáta)	3	3
3. European white elm (Ulmus laevis)	3	3	13. Ramanas rose (Rosa rugosa)	2	2
4. Wild pear tree (Pýrus commúnis)	1	-	14. Quickbeam (Sorbus aucuparia)	1	1
5. Osier dogwood (Cornus stolonifera)	1	1	15. Waxberry (Symphoricarpos albus)	1	1
6. English oak (Quercus robur)	1	1	16. Feather fern (Spiraea japonica)	2	2
7. Siberian pea shrub (Caragana arborescens)	1	1	17. Rough-bark poplar (Populus balsamifera)	1	2
8. Horse chestnut (Aesculus hippocastanum)	2	2	18. Sweet mockorange (Philadelphus coronarius)	2	2
9. Norway maple (Acer platanoides)	2	2	19. Dog rose (Rósa canína)	1	2
10. Tartarian maple (Acer tataricum)	1	1	20. Cultivated apple (Malus domestica)	1	2

Unfavorable living conditions in the urban environment lead to the premature death of trees. Thus, the number of fallen trees in the Southern Administrative District of Moscow in 2020 increased by 41% compared to 2019 (Table 5).

Table 5

The number of fallen trees in the Southern Administrative District of Moscow

	Year	Number of fallen trees
	2019	168
	2020	285
Total		453

At the same time, only in the territories of Special Protected Natural Areas 20,381 trees were cut down in 2020 (Table 6).

Table 6

Trees cut down in the Southern Administrative District of Moscow, 2020

Cut down according to the regulations	Cut down at Special Protected Natural Areas	Cut down dead-wooded at Special Protected Natural Areas	Cut down illegally	Total
8930	5756	5690	5	20 381

Discussion

One of the reasons for the weakened state of woody plants in the city is damage to them by pests and diseases. Numerous insects cause great harm to woody plants, damaging the bark, wood, leaves, flowers and fruits. The destruction of needles and foliage by insects leads to a number of successive changes in the life of tree stands. In trees that have lost their foliage (needles), normal water exchange and photosynthesis are disrupted, which leads to a decrease or complete loss of growth and stability. Coniferous stands, as a rule, react more strongly to the complete or partial loss of needles than deciduous ones. They sharply reduce the growth under the influence of overeating needles and with repeated overeating begin to shrink and are attacked by stem pests.

Due to the peculiarities of urban conditions that affect the development of both plant and animal organisms, a certain biological complex of pests and plant pathogens has developed in typical urban plantings and parks. Most of them have developed several typical adaptations to "life in the city" (features of pupation, wintering sites, time shift of individual phases of development, etc.) [2].

Great damage in urban conditions is caused by the following pests: linden - linden aphid, red spider mite, lepidosaphes ulmi, Eriophyes tillae var. Leosoma nal and geometrid; poplar - poplar moth, poplar flat aphid, unpaired and ringed silkworms, Eriophyes tillae var. Leosoma nal; oak - green oak leaf rollers, oak yellow aphid; larch - casebearers, spruce spinning mite; elm - elm psyllidae, elm polychloros and noctuidae. There are many different pests on lilac, acacia, dogwood, hawthorn, mountain ash, rose hips and other tree and shrub species [17].

There are many plant diseases that also cause great damage and lead to death if you do not take timely protective measures, on the tree and shrub species of green spaces of cities, for example on the linden there are leaf spotting and branch necrosis, on the poplar - brown spotting and rust, on the elm - Dutch disease, on the maple - necrosis [5].

The most acceptable methods of pest control, according to the opinion, include preventive methods aimed, on the one hand, at preventing the spread of pathogens, and on the other - at increasing the biological resistance of plants to biological and abiological environmental factors. This can be achieved by strengthening agrotechnical measures, developing biotic techniques based on the use of the natural properties of the plant world, and the widespread use of biological methods [18; 4].

Systematic monitoring of the state of green areas in Moscow began in 1997. Currently, the observation network consists of 130 permanent observation sites located on territories of various functional purposes and different levels of human pressures (squares, highways, courtyards, parks). 100 sites are located in Moscow within the boundaries of the Moscow Ring Road, 18 - in Troitsk, 12 - in Shcherbinka [16].

Green plantings of the city of Moscow most often suffer from diseases such as Thyrostroma compactum (common in linden plantings), rotten diseases, elms are prone to graphiosis. Among the pests, the most dangerous is Agrilus planipennis, the Cameraria ohridella is found in chestnut plantations, and weather conditions can cause outbreaks of aphids and leaf rollers pests. Thyrostroma compactum (infectious drying out) of linden is caused by fungi of the genus

Thyrostroma compactum, which, penetrating into the tissues of young branches, cause the formation of necrotic areas, then the infection penetrates into larger branches. After the thin branches dry off, tufted shoots form in their place, which give the tree an untidy “disheveled” appearance. Despite the fact that Thyrostroma compactum does not belong to dangerous diseases, it gradually weakens the tree, deforms the crown, reduces the decorative qualities, especially severely damaging young plants [18].

In most cases, wood-destroying fungi cause stem and root rot and most of them belong to the combined non-systematic group of fungus. Infection caused by wood-destroying or xylotrophic fungi happens in open areas of wood: in cut or open branches, dry edges, wounds, frost and mechanical damage, bark cracking caused by thermal damage, etc. While being suspended in the air, fungal spores fall on exposed areas of wood and spire. Consequently, the mycelium of the fungus secretes enzymes that decompose wood. Moreover, some types of wood-destroying fungi emit different toxins. As a result, the tree starts rotting. Often it leads to a decrease in the growth of trees, to a violation of the normal course of physiological processes like weakening, disease and pests resistance which that leads to death. The rot developing in the trunk reduces the mechanical stability of the tree and it becomes unsafe to use [13].

That is why timely diagnosis and monitoring of fungal diseases is especially important for urban plantings. botanical gardens are a good exemplar for researching the connection between phytopathogenic fungi and plants in urban settings , where a large number of plants of native flora and introduced species are concentrated [14].

Rotting usually happens in trees older than 40 years, the causative agents are wood-destroying fungi that penetrate the tree tissues through bark damage, frostbreaking cracks, and broken branches. The development of rot reduces the viability, decorative and protective functions of trees, but the destruction processes are slow, over many years, so the level of damage to Moscow plantings by this type of disease is relatively constant [10].

The focus of Dutch elm disease (graphiosis) have been identified in almost all types of green areas in Moscow. Graphiosis refers to vascular diseases and is characterized by damage and death of the conducting system of trees. As a result of clogging of the water supply vessels of the tree and poisoning them with toxins, the affected trees wither in acute form in a few weeks, in chronic form – in several years [16].

In most cases, the disease in the identified focus is chronic, trees get sick and wither within a few years, but there are examples of a fast development of the disease, when a tree can die within one season.

In Moscow, the problem of ash stands with an aggressive stem pest – emerald ash borer still remains. While the degree of damage to the tree by larvae is small, there is no threat to its life, but when ash is inhabited by new generations of emerald ash borer for several years, there are signs of oppression of the tree. The larvae damage conducting tissues through which water and organic substances are transported, the tree’s nutrition is disrupted, the branches begin to wither and then the tree dies [15].

Despite the implementation of sanitary and health measures, the pest continues to spread and populate new trees. In the existing focus, there is a gradual deterioration of the condition of trees; over the past year, the proportion of shrinking ash trees inhabited by the pest increased by 3.8% and amounted to 33.6% [8; 12].

Horse chestnut leaf miner (Ohrid miner) was first discovered in chestnut stands in Moscow in 2005 [9].

The caterpillars of the pest in the process of their development feed on the cell juice and soft tissues of the leaves, in the middle or late summer, the leaves devoid of chlorophyll dry out, and then fall off, which leads to a decrease in the intensity of photosynthesis and weakens the overall condition of the tree.

Usually, in the conditions of the Moscow region, the Ohrid miner gives two full-fledged generations, but high temperature in the spring and summer allows the butterflies to make a third flight, thereby increasing the number of the pest.

It should also be noted that weakened specimens are more susceptible to infectious diseases. thorough cleaning of the foliage during leaf fall at least 3 or 4 times is a prerequisite for maintaining the viability and high decorative qualities of horse chestnuts. This process allows you to reduce the number of pupae before wintering. During the flowering period of horse chestnut, it is necessary to install 2 pheromone traps for catching males of the Ohrid minelayer, which help to reduce the number of individuals of the pest [19].

Aphids actively reproduce in thickened plantings at temperatures from 25 to 30°C and can affect almost all hardwoods.

Since the pest feeds on the juice of plants, in the presence of a developed root system, it can not reduce the decorative and viability of adult trees, but it can cause some damage to seedlings.

In 2019, in the second half of May and June, the weather conditions were favorable for the reproduction of the pest – dry hot weather with occasional heavy rains.

The most severely affected aphids were: linden (52.3% of the trees on the permanent observation sites), elm (28.5%), apple (27.1%) and willow (20%). Most noticeably over the past year, the number of affected willows has increased (by 5 times), which may be due to their thickened plantings, in such conditions, with favorable weather conditions, aphids quickly spread. The number of other insect pests in 2018 remains at the average annual level.

Despite the abundance of works on phytopathology and entomology, including those related to the regional characteristics of forest stands, there is currently a lack of research on the assessment of the resistance of woody plants to pests and diseases in specific habitats.

Therefore, the aim of the study was to research the features of the lesion of woody plants in the South-Western Administrative District of Moscow by pests and diseases, depending on the environmental conditions of the years and growth places

Conclusion

Urban street tree stands have a low level of species diversity, minimal similarity to forest communities. They grow at a high level of man-made air pollution and the maximum change in light and temperature conditions. At the same time, a high level of negative human pressure on the soil and plants reduces the life expectancy of trees in comparison with that in nature.

In street plantings as well as in squares, trees leaves and shrubs diseases are less common than in parks and forest parks. Chemical air pollutants can inhibit the development of phytopathogens and pests.

At the same time, favorable conditions may be created for the development of certain diseases, for example, necrosis on weakened trees, resistant to air pollution pathogens.

The number of pests is also affected by chemical and thermal pollution. It can vary from low to flash, influenced by weather conditions. At the same time, cyclical changes are less noticeable.

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Water Quality of the Hodza River in the Area of Activity of PJSC “Machine-Building Plant” Elektrostal

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Annotation: *a spatio-temporal analysis of the main indicators of the water quality of the Hodza River, the change in time of water quality along the river under the conditions of anthropogenic impact is carried out. In general, the waters of the river are characterized as “extremely dirty”. Among the pollutants, iron and ammonium nitrogen compounds absolutely prevail. There is a tendency to some improvement in the quality of river waters downstream. In the upper reaches, the COD is 1.7 and 2.5 times higher than in the middle and upper reaches; BOD – 1.6 and 2.3 times, respectively.*

Key words: *Hodza river, organoleptic characteristics, cations, anions, heavy metals, metalloids.*

JEL classification: *J190 J280.*

Introduction

The bulk of small rivers are the upper links in the chain of river systems of larger orders [12]. The significance of small rivers in ecology lies in the fact that directly, by draining a significant portion of the catchment area, the abundance, properties and other characteristics of large watercourses are established [10]. The lack of protection of small rivers due to their size and low ability to resist anthropogenic influence leads to qualitative and numerical changes in water bodies. [6]. This makes it possible to consider small rivers as an indicator of the conservation status not only of drainage areas, but also of water bodies in the region as a whole [5]. Flowing into large rivers, they are ready to modify the structure also properties, in local areas in confluence zone.

In the current conditions of active nature management, an anthropogenic effect on river ecosystems is often a characteristic condition in the modification of the component composition of the aquatic environment [7; 19]. Against the background of such prevailing natural conditions for the development of the chemical composition of waters, as well as the composition of soils and the structure of rocks with which the waters come into contact, the anthropogenic condition is often characteristic [15]. Thus, for example, the property Hodza is explained, first of all, by the nature of the pollution coming with wastewater from the production facilities of Elektrostal.

Methodology

The assessment of the state of the Hodza River according to the most complete set of quality indicators was carried out during the spring flood of 2018, due to the fact that this period, as a rule, is characterized by the highest set of pollutants. In the remaining periods, a limited set of indicators was determined, characterizing, first of all, the polluting effect of anthropogenic impact.

The general method of work included taking water samples from the Hodza River from the source of Elektrostal to the mouth of the river in the area of Pavlovsky Posad, in three sections, evenly distributed along the length of the river.

Geographic coordinates of the crossings location: cross-section 1–55° 48' 44" northern latitude; 38° 29' 44" eastern longitude; section 2–55° 47' 11" northern latitude; 38° 32' 42" eastern longitude; section 3–55° 46' 29" northern latitude; 38° 37' 40" eastern longitude.

The sites with sampling points were located perpendicular to the river bed at a specific sampling site.

Sampling sites were linked using a Garmin eTrex 20x GPS navigator.

The studies were carried out within the framework of monitoring the state of the ecosystem of the small river Hodza on the basis of accredited laboratories: Moscow State University named after M.V. Lomonosov; Center for Hygiene and Epidemiology in the Moscow Region; Center for Certification and Environmental Monitoring.

Sampling device – sampling system for environmental studies PE-12. The volume of samples taken is 1 + 1 + 1L.

Water samples were taken into plastic containers with a volume of 1 liter, oil products were taken into glass containers for an indicator.

To analyze the level of pollution of the Hodza River, we used the method of complex assessment of the level of pollution of surface waters, based on the assessment of water quality for individual pollutants using statistical methods, taking into account the MPC. According to this method, the UKIZV are considered more informative group signs.

Results

As a result of the studies, it was determined that the water quality of the river. Hodza during the flood period does not comply with the sanitary and epidemiological rules and regulations of SanPiN 2.1.5.980-00 in terms of the following indicators: color, turbidity, permanganate oxidizability, aluminum, iron.

Thus, in terms of turbidity, the standard value was exceeded on average over three years by 3.2; by color – 2.9 times (table 1).

Table 1

Organoleptic characteristics of the Hodza river water

Defined indicator	Years of research			Units of measurement	Normative value 2018
	2018	2019	2020		
Turbidity	9	8	8	Turbidity	9
Chromaticity	60	58	60	Chromaticity	60
Smell	1	1	1	Smell	1

Turbidity or opacity occurs when small particles are present in the water that can not settle to the bottom of the vessel for some time. Natural waters are generally characterized by a high content of suspended solids in the water. The danger of these particles to humans depends on their composition [4].

"In general, for many watercourses, the following regularity of turbidity changes along the length of the channel was revealed. For rivers carrying their waters from north to south (rivers of the Russian Plain), an increase in turbidity towards the mouth is characteristic. This is explained

by the greater intensification of erosion processes in the same direction in comparison with the increase in water content" [14]. Determination of water turbidity during the autumn low-water period also showed an excess of the standards for this indicator at the source and intermediate point, however, due to an increase in its water content downstream, the water turbidity decreases to acceptable values (table 2).

Table 2

Spatial pattern of turbidity distribution in the Hodza river

Defined indicator	Autumn low water			Units of measurement	Normative value
	Upper current	Average current	Lower current		
Turbidity (according to kaolin)	4,64	4,64	1,16±0,23	mg/dm ³	1,5 mg/dm ³
Transparency	10	10	10	cm	20
Smell	1	1	1	Points	2

In terms of transparency, the water can also be classified as "cloudy – very cloudy". The odor of the water is characterized as very weak.

The smell of water also depends on the concentration of substances in water, temperature, pH, microorganisms [13]. Concentrations of different elements, at which a smell or taste is felt in water, are not the same [1]. Hydrogen sulfide is felt when it is concentrated in water more than 0.2–0.3 mg / l, chlorine – more than 0.3 mg / l, chlorophenol – more than 0.02 mg / l, waste products of actinomycetes (give water an earthy smell) are felt at a concentration of more than 10-8 mg / l.

"Surface springs are characterized by large fluctuations in water quality and the amount of pollution in certain periods of the year. The water quality of rivers and lakes depends to a large extent on the intensity of atmospheric precipitation, snow melting, as well as its pollution by surface runoff and wastewater from cities and industrial enterprises".

The total content of absolutely all mineral elements found in the chemical analysis of water; as a rule, it is expressed in mg / dm³ (up to 1000 mg / dm³) and ‰ (more than 1000 mg / dm³).

"Natural waters are classified according to a number of characteristics, the simplest of which is the salinity or mineralization of water. Mineralization of water shows the total content of all minerals present in the water". The salt content of natural waters, which determines their electrical conductivity, varies within wide limits. Most of the rivers have mineralization from several 10 milligrams per liter up to several hundred [18].

Among the metal cations during the flood, the standards for the content of iron and aluminum in water were exceeded (table 3).

Table 3

Composition of cations and anions in the water of the Hodza river, mg / l

Defined indicator	Average for 2018–2019				
	mg/l	Defined indicator	mg/l	Defined indicator	mg/l
Magnesium	2,95	Aluminum	0,562	Bicarbonate	23,8
Calcium	11,9	Ammonium	0,580	Carbonate	<6
Manganese	0,059	Lithium	0,003	Nitrite	<0,1
Iron	0,984	Sulphate	20,5	Bromide	<0,05
Potassium	1,62	Chloride	11,7	Phosphate	<0,1
Sodium	5,29	Nitrate	1,51	Fluoride	0,235

Aluminum is emitted with insignificant toxic effects, however, many water-soluble inorganic aluminum compounds remain in a dissolved state for a long period and also have a chance to show harmful effects on humans and warm-blooded animals through drinking water. More dangerous chlorides, nitrates, acetates, sulfates. First of all, these salts act on the nervous system (they accumulate in the nervous tissue, leading to serious disorders of the central nervous system).

Iron is considered a characteristic element of the natural waters of the excessively humid zone, on the territory of which, including Moscow, are located. The content of iron in groundwater in the capital of the Russian Federation and the Moscow region exceeds the MPC value almost everywhere. The enrichment of natural waters with iron occurs, most often, upon contact with iron-containing rocks, in addition, also as a result of human activity.

With a high iron content, the water has an unpleasant glandular taste, odor and can change color, acquiring reddish-ocher shades. Increased iron content in water can lead to rust, clogged pipes, and more.

For humans, an excess of iron is dangerous by the development of hemochromatosis, especially in the case of a genetic predisposition to this disease [2].

Hydrocarbonates, sulfates, chlorides prevail among the anions in the composition of water in permissible quantities.

In terms of the content of heavy metals and metalloids during the flood, the water under study did not exceed the standard indicators, while in terms of silicon content the result was within 0.61 MPC (table 4).

Table 4

Content of heavy metals and metalloids in the water of the Hodza river, mg / l

Defined indicator	Year, date					Normative value
	2018			2019	2020	
	6.IV	11.IV	16.IV	14.IV	1.IV	
Hg	<0,00001	<0,00001	<0,00001	<0,00001	<0,00001	0,0005
V	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	0,1
Ba	0,028	0,020	0,029	0,30	0,32	0,1
Be	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	0,002
B	0,05	0,05	0,05	0,07	0,07	0,5
Mo	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	0,25
Co	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	0,1
Ag	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	0,05
Zn	0,020	0,018	0,021	0,25	0,28	1,0
Ni	0,005	0,009	0,008	0,09	0,09	0,1
Si	6,22	5, 83	6,11	6,18	6,31	10
Cr _{common}	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	0,05
Sr	0,55	0,044	0,049	0,54	0,53	7,0
Cd	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	0,005
As	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	0,05
Cu	<0,001	<0,001	<0,001	<0,001	<0,001	1,0
Pb	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	0,006

Since the Hodza River, like other small rivers, is the recipient of household, industrial and agricultural wastewater carrying the concentration of harmful substances, the analysis of the hydrochemical composition of water in space and in time is of great interest (tables 5, 6).

Table 5

Anionic composition of water in the Hodza River, average 2018–2020

Anions	Source		Average current		Lower current	
	April	November	April	November	April	November
NO ₃ ⁻	1,5	1,7	3,8	5,6	3,7	4,9
NO ₂ ⁻	0,05	0,05	0,10	0,14	0,09	0,14
PO ₄ ³⁻	0,10	0,15	0,55	0,78	0,67	0,91
SO ₄ ²⁻	20,5	30,6	25,6	58,1	26,2	61,2
Cl ⁻	11,7	16,1	17,2	23,8	13,1	13,4
HCO ₃ ⁻	23,8	61,0	51,1	76,3	52,1	88,4
F ⁻	0,24	0,27	0,27	0,33	0,25	0,29

The nitrate content in the upper course of the Hodza was 1.5–1.7 mg / dm³ (April – November). Downstream, the level of the toxicant increased by more than 2.5 times. In the channel, they are diluted, due to this, the concentration at the mouth decreases. The amount of nitrites along the entire length of the watercourse does not exceed the MPC (0.05–0.14 mg / dm³). No spatiotemporal changes in their concentration were revealed.

Phosphates are also normal. As they approach the mouth, their concentration increases. At the mouth, in comparison with the source, the amount of phosphates in April – November increased more than 6 times.

The content of sulfate ions is low. At the same time, their concentration increases by the fall by 1.3–2 times.

Chlorides, which have the highest migration capacity of all anions, are one of the criteria for surface water pollution. In the Hodza River, the concentration of chlorides increases from source to mouth.

It is necessary to note the higher content of chlorides in the middle course of the river at all periods of determination.

At all points of water withdrawal, the concentration of HCO₃ – in autumn exceeds their concentration in spring during the flood period. Probably, the intense melting of snow, which is soft water, contributes to the dilution of natural waters and, in general, to a decrease in hardness.

The fluorine concentration varied in space and time from 0.24 to 0.33 mg / dm³, which is significantly lower than the MPC (1.5 mg / dm³).

Table 6

Cationic composition of water in the Hodza River, average for 2018–2020

Cations	Source		Average current		Lower current	
	April	November	April	November	April	November
Ca ²⁺	2,95	3,04	2,59	2,98	3,11	3,55
Mg ²⁺	11,9	15,47	21,73	12,85	10,66	15,40
Fe ³⁺	0,984	0,970	0,901	1,06	0,983	0,712
K ⁺	1,62	2,87	3,17	3,94	2,18	3,91
Na ⁺	5,29	7,61	5,91	8,43	7,22	9,16
NH ₄ ⁺	0,580	0,68±0,20	0,90±0,18	1,2±0,4	0,37±0,08	0,23±0,07

The content of ammonium nitrogen slightly increased in the middle course, reaching a maximum in November – 1.2 mg / dm³.

The sodium concentration at the head of the river is 1.4 times higher than at the mouth in April, and 1.2 times higher than in November; the calcium concentration remains fairly constant.

The concentration of iron throughout the river and during all sampling periods is 2.4–3.0 times higher than the permissible value.

The total content of all mineral substances found during the chemical analysis of water during the flood in the source was 87.9, in the autumn low-water period – 140.5; in the middle reaches – 133.8 and 195.5; in the lower reaches – 120.6 and 202.2 mg / kg, respectively, which makes it possible to characterize the water as ultra-fresh and fresh.

According to the predominant anion, the water is hydrocarbonate, and the cation is magnesium.

In river valleys and on floodplains, most often alluvial soils prevail, regularly flooded in spring during floods.

The greatest presence of magnesium in the middle reaches, in our opinion, is due to the fact that the inhabitants of the Subbotino village use limestone dolomite flour to fertilize the soil, the introduction of which affects the decrease in soil acidity and its saturation with magnesium and calcium (carbonate rock).

The conditions of individual years can leave an imprint on the spatio-temporal concentrations of individual compounds [17]. Thus, the absence of precipitation almost until the summer low-water period in 2018 reduced the river flow in the upper reaches, which led to a sharp increase in the source of the content of ammonium ions in the water (more than 20 times in the middle reaches and more than 50 times in the lower reaches) and iron ions. (more than 6 times in the middle course and more than 11 – in the lower one) (table 7). It should be noted that the content of the ammonium cation in the upper reaches exceeded the MPC by 9 times, and the iron content exceeded the MPC in the upper reaches by 61, on average – by 10, in the lower – by more than 5 times. Also, the content of oil products decreased from source to mouth in August.

Table 7

Indicators of water quality in the conditions of 2018

Defined indicator	Upper current	Average current	Lower current
	02.08.2018/ 21.11.18	02.08.2018/ 21.11.18	02.08.2018/ 21.11.18
pH, units of measurement pH	7,68±0,20	7,42±0,20	7,74±0,020
Ammonium ion (by nitrogen), mg / dm ³	18,7±3,7/ 0,68±0,20	0,90±0,18/ 1,2±0,4	0,37±0,08/ 0,023±0,07
BOD total, mg O ₂ /dm ³ .	12,7±1,3	8,0±0,8	5,5±0,6
COD, mg O ₂ /dm ³	14,1±2,8	8,4±2,5	5,7±1,7
Petroleum products, mg / dm ³	0,084±0,029/ 0,029±0,010	0,076±0,027/ 0,33±0,12	0,011±0,004/ 0,013±0,04
Aluminum, mg / dm ³	0,04	0,04	0,2
Iron, mg / dm ³	18,2±1,8/ 30,5±5,3	3,0±0,4/ 5,9±0,6	1,58±0,24/ 12,9±2,3
Arsenic	0,0026±0,0012/ 0,009±0,004	0,002/ 0,007±0,003	0,0034±0,0015
Mercury, mg / dm ³	0,0001	0,0001	0,0001
Dry residue	60,84	54,76	46,54

The study of surface water bodies refers to trace analysis. Due to the large number of standardized indicators, it is almost impossible to assess the quality of water using only information on the content of individual components in it. The basis of the water quality assessment system should be the so-called generalized indicators – quantitative characteristics

of water properties determined by direct measurement, predetermined by the general impact of the components contained in them and necessary for assessing its quality [3].

To assess the degree of water pollution, the most convenient and easily implemented methods are used, based on the analysis of indirect indicators, one of which is the chemical oxygen demand (COD). Chemical reactions of oxidation of organic and inorganic compounds contained in water are accompanied by the consumption of oxygen, the consumption of which is functionally related to the concentration of decomposed substances [20].

Biochemical oxygen demand (BOD) is the amount of oxygen consumed by microorganisms during the biochemical oxidation of pollutants. BOD is an indicator of the concentration of organic compounds in water.

Biochemical oxidation takes a longer time than chemical oxidation, since it is associated with the vital activity of microflora. Therefore, to assess the initial concentration of organic matter, it is important to take into account the conditions and timing of biodegradation processes.

The values of COD and BOD serve as criteria for assessing water pollution; their limiting norms have been established for water for various purposes.

BOD and COD are independent indicators that differ in content.

During the observation period, a tendency for a decrease in COD values from the upstream to the downstream was noted. Thus, in the upper reaches, the COD was 1.7 and 2.5 times higher than in the middle and upper reaches; BOD – 1.6 and 2.3 times, respectively. In our opinion, this is due, first of all, to the flushing into the river of a significant amount of pollutants (oil products, soot, various kinds of organic waste, etc.) accumulated during the winter period, melt and rainwater. It is also possible that humic elements and other decay products of plant and animal organisms can be washed out of the soil. The increase in oxidizability, as well as the principle, is considered to be a consequence of the discharge of wastewater.

The use of two different indicators – oxygen consumption by biochemical and chemical processes – is not accidental. The ratio of BOD and COD allows you to determine the nature of water pollution and select an effective treatment method. The COD value is usually greater than the BOD. A small difference between these indicators indicates that biological purification methods will lead to a good result, and vice versa, a large gap in the COD value indicates that chemical purification is most effective. The water in the Hodza River is characterized by very low biochemical parameters (Biological oxygen demand total / Chemical oxygen demand). For the top point, it is 0.90; middle and bottom points – 1.05 and 0.96, respectively.

Under the conditions of 2018, not a single COD value was recorded that would not exceed the standard. This state of the river basin cannot be explained only by the ingress of contaminants into the surface water together with melt water [16].

The degree of toxic pollution of the river by the content of inorganic substances (heavy metals and metalloids), established in the autumn-winter low-water period, indicates an excess of the MPC in all periods and years of research for iron, in the lower reaches – for cadmium, as well as a content close to the MPC for manganese and nickel (table 8).

During the summer dry season in the upper reaches of the river, in some years the MPCs for cadmium were exceeded 10 times, and for lead – 2 times.

Determination of the combinatorial index of water pollution for all points and periods of sampling to summarize information on its chemical composition with the determination of the frequency of exceeding the MPC and the recurrence of cases of exceeding the standard values, showed in accordance with the integrated methodology adopted in the Roshydromet system using the integral indicator UKIZV – specific complex index of water pollution [11] showed that the water in the Hodza River, flowing through the territory of the city of Elektrostal at the source during the spring flood (dirty), summer and autumn low-water periods is extremely dirty (pollution class V); at an intermediate point in the summer and autumn dry season – extremely

dirty, and during high water – dirty (IV class); at the mouth during the summer and autumn low water period – extremely dirty (V class), spring flood – dirty (table 9).

Table 8

The content of inorganic toxicants in the water of the Hodza River, average for 2018–2020

Defined indicator	Upper current	Middle current	Lower current
Iron	30,5±5,3	5,9±0,6	12,9±2,3
Arsenic	0,009±0,004	0,007±0,003	0,005
Manganese	0,01	0,01	0,077±0,019
Nickel	0,015	0,01	0,015
Copper	0,01	0,01	0,025±0,008
Zinc	0,011±0,003	0,012±0,004	0,046±0,013
Strontium	0,25	0,25	0,25
Cadmium	0,0005	0,0005	0,01
Lead	0,005	0,005	0,0052±0,001

Table 9

Combinatorial index of water pollution of the Hodza river for 2018

Indicators	Place
Upper current	
Combinatorial pollution index	19,47
Water pollution class	V – extremely dirty
Average current	
Combinatorial pollution index	26,02
Water pollution class	V – extremely dirty
Lower current	
Combinatorial pollution index	15,02
Water pollution class	V – extremely dirty

Discussion

Based on the results of laboratory analysis, it is possible to trace the variability of the water composition along the length of the river. Thus, the chemical composition and quality of river waters are the most important characteristics of a water body, which make it possible to argue the degree of compliance of water with the requirements of certain water users, to detect sources of pollution and the level of water pollution, to determine the supply of nutrients to the aquatic environment for the preservation and development of aquatic biota [8].

Conclusions

Numerous monitoring studies of the state of freshwater ecosystems show significant disturbances in their state, occurring under the influence of anthropogenic impact, especially in industrially developed regions.

Over the past years, new environmental difficulties in the regions have arisen that require constant monitoring – global deforestation, which violates the hydrological regime, intensive siltation as a result of soil erosion, the emergence of industrial reservoirs and techno-ecosystems, and others [9]. A significant factor is climate change, which has an increasingly significant impact on aquatic organisms and the structure of aquatic ecosystems [1].

At present, a systematic and integrated approach to assessing the state of aquatic ecosystems and the quality of their waters should prevail, in which biological assessments (bioindication

and biotesting) are primarily necessary, since the main strategic task in modern conditions is to maintain the biodiversity of water bodies, which is directly associated with water quality.

The spatio-temporal organization of the river is a reaction to the anthropogenic transformation of catchment areas and should be taken into account when planning monitoring studies and environmental rehabilitation measures.

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