SOCIO-HUMANITARIAN RESEARCH

CUSTOMER CENTRICITY CONCEPT IN RUSSIAN HIGHER EDUCATION: IMPLEMENTATION PRACTICE AND EXPANSION PROSPECTS

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The article considers the process of digitalization of the Russian economy and the penetration of this process into the sphere of higher education. We show that the digitalization of applicants' admission to Russian universities takes place within the framework of a global trend aimed at introducing the customer centricity approach in the public administration system. In particular, we consider the results of three-year operation of a special electronic service "Admission to the university online", which is also called the Superservice. The analytical indices introduced into consideration make it possible to identify major technical and organizational issues that emerge in the course of digitalization of Russia's social space. These issues can be divided into objective and subjective, which equally hinder the final implementation of the new electronic system. The calculations carried out have shown that the peak load on the Superservice system is from 10.2 to 16.9 million simultaneous actions, which entails persistent technical failures in the operation of the platform. We substantiate an opinion, according to which the figures obtained do not go beyond the limits of modern computing capabilities of information services, which in turn indicates administrative miscalculations in making decisions about the smoothness of functioning of the Superservice. We have found the effect of artificial commotion, when the very options

of the Superservice provoke increased activity of applicants during the admission campaign, which leads to technical failures of the system. The calculations have shown that the number of applications submitted by applicants through the Superservice is on average more than three times higher than the same indicator for applicants using the traditional application form. We consider the prospects of gradual weakening and even disappearance of the artificial commotion effect as the services provided by the Superservice are becoming a common thing.

Customer centricity, public services, superservice "Admission to the university online", e-government, digital economy.

Introduction

In October 2021, RF Government Resolution 2816-r "On approving the list of initiatives for the socio-economic development of the Russian Federation until 2030" was approved; it contains 42 initiatives aimed at modernizing the economy and improving the quality of life. One of the initiatives is "customer centricity", provided in the framework of measures contained in the section "State for citizens", designed to focus the work of authorities around the interests of a particular person, to make them more attentive to citizens' needs. It implies a transition from processes reflecting the convenience of civil servants to public administration focused on ensuring effective and comfortable interaction between a person and the state by analyzing the actual needs and customer experience of an individual.

In relation to the field of higher education, this initiative was mainly expressed in the introduction of a special information service "Admission to the university online", which was called Superservice (further, we will use this name) and allowed Russian applicants to submit documents in electronic form via "Gosuslugi" portal during the admission campaign. Its development began in 2019 as part of the implementation of the Digital Economy project; in 2020, Superservice started working at the Unified Portal of State and Municipal Services of the Russian Federation (UPSS, Gosuslugi). To date, the experiment has been running for three years and allows for a completely objective and unbiased assessment of the new digital initiative proposed by the Russian government and dealing with the digitalization of the country's social space.

In this regard, the aim of our study is to consider the range of issues that are typical for the new digital service in the Russian higher education market, as well as identify promising areas for improving the tools created. To this end, we will use the available information databases on the work of the Superservice and specially designed analytical indices to assess the significance of certain problems that users encounter.

Customer centricity concept: from the general to the particular

The modern customer-centric approach emerged in the middle of the 20th century in the business environment as a modernization of the product approach and was focused on creating a product that best suits the customer and will undoubtedly be in demand. In the 1980s, customer centricity principles began to be introduced into the sphere of public administration: first within the framework of the managerial approach (*New public management*), then such participatory models as *Public Values, New Public Management, New Public Administration*, focused not on the "impact", but on the "interaction" of public authorities and the population and the officials' perception of citizens not as passive clients, but as participants in joint activities to achieve public welfare (Bogatyreva, Martynova, 2022). The introduction of these principles marked a new era in the field of public administration, the era associated with the formation of a digital government. The first step was the transition to a "one-stop shop" model of the government (OSSG), designed to create a positive experience of communication with customers. According to the degree of complexity of interdepartmental

interaction and the services provided, there are three models of the development of OSSG: the *first step model*, working on the principle of a help desk; the *convenience store model* focused on providing simple electronic services to individual departments; a *true one-stop-shop model* involving full interdepartmental integration, complex interaction and the provision of a wide range of services (Isupova, 2009).

The pace of development of e-government in different countries is quite diverse. *Canada* was one of the first to implement OSSG; in 1999, the formation of the *Service Canada* initiative began, and currently it is a single point of access to the most frequently used government programs, such as social insurance, pension plan, employment insurance, etc. Today, the Canadian authorities interact with the population through an information portal that unites more than 500 Internet sites, and provide more than 130 services in digital format according to the principle: if any service can be available online, then it must be provided in digital format (Nikitenkova, 2017, p. 202).

In 2000, *India* began legal consolidation of digital initiatives, after which information technologies started to be introduced into public administration. Currently, they are actively applied in education, agriculture, energy, taxation. The National Portal of India *India.gov.in* has been operating at the national level since 2005; it provides unified access to information and services from various government sources; and since 2014, a platform for interaction with the population *India MyGov.in* has been launched; via the platform, the citizens can take an active part in the governance of the country and its development. The main problem of digitalization of public administration in India is the lack of procedures for electronic interdepartmental interaction at the level of India's states and the national level (Krysenkova et al., 2020); this does not allow India to rise to high positions in the UN e-Government Development Index (hereinafter – the Index). Thus, in 2022, India ranked only 105th in the Index[1].

One of the world leaders, according to UN rankers, is Australia, which ranked 7th in the 2022 Index. Australia began its transition to digitalization in 2000 with the adoption of the Digital Government Strategy. To date, the country is implementing complex integrated models of interdepartmental interaction and service provision aimed at strengthening public and business confidence in the government and meeting high standards of customer service and service provision, including in the field of life events (Krysenkova et al., 2020).

The development of OSSG took place alongside the formation and implementation of customer centricity concept in public administration, which was accompanied by a number of organizational measures, including personnel training (Sladkova, Voskresenskaya, 2021; Kotlyarova, Baranov, 2022), the development of principles and standards of customer-centric public administration (Mazein, 2022) and approaches to its assessment (Yuzhakov et al., 2022), transformations in the context of digitalization (Sladkova, Voskresenskaya, 2021; Savtsova et al., 2022), etc. Despite the country-specific features, it is possible to identify common areas in the implementation of this concept: customer profiling and the provision of services in the context of life situations through the *Customer Journey Map* methodology adapted to the public sector (Rosenbaum et al., 2017); consolidation of the mechanism for implementing customer centricity principles at the level of methodological recommendations and IT solutions (Leontieva, Smirnova, 2022), adaptation of models for assessing the quality of services provided and the effectiveness of civil servants from the business environment in relation to the public sector, for example, *SERVQUAL* models for assessing the quality of service (Parasuraman et al., 1985) and *COSE* customer orientation of employees in the service sector (Hennig-Thurau, 2004), as well as the formation of key factors for assessing customer centricity based on existing models.

The analysis of domestic and foreign experience shows that the most significant indicators of customer centricity are technical and social skills, reliability and motivation (Leonteva, 2018); fairness, transparency and openness (Ivanyna, Shah, 2010), which can

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[1] UN e-Government Development Index. Available at: https://gtmarket.ru/ratings/e-government-development-index

be evaluated by the feedback mechanism and opinion polls (Aguilar, 2013; Ljungholm, 2019; Levitt et al., 2019; Gangl et al., 2020, Linnik et al., 2020). At the same time, one of the main conditions is the development of effective and adequate criteria for assessing customer centricity so that those criteria would not turn into a pile of requirements difficult to implement (Leonteva, 2018; Yuzhakov et al., 2022).

Russia joined the creation of e-government in 2002, when "Electronic Russia", an IT project for the transition to the provision of public services in electronic format was launched; in 2012, there began a gradual transition to electronic interdepartmental interaction. To date, according to *SimilarWeb* digital analysis platform, the portal of public services of the Russian Federation is the most visited website in the "Government and law" category and is more than three times ahead of its closest rival, the official website of the UK government[2]. Currently, within the framework of the federal projects "Digital public administration" and "State for the people", Russia is working on optimizing public services by creating monoservices that address the problem of digital transformation of priority state and municipal services, and superservices that provide a comprehensive solution in life situations for citizens and businesses. By the end of 2023, 18 such superservices should be launched[3].

The superservice "Admission to the university online" was one of the first to be implemented; the pilot project was launched on Gosuslugi portal in 2020. Its main goal is to facilitate applicants' interaction with universities and help them enroll in a university without personal visits to admissions offices, filling in paper applications, and standing in queues. Russia was among the pioneers of the new trend in this regard, but other countries have similar initiatives as well, for example: the state Swedish

service *Universityadmissions.se*, created by the Swedish Council for Higher Education in cooperation with Swedish universities and university colleges[4]; the German governmental project *Arbeits und Servicestelle für Internationale Studienbewerbungen (uni-assist)* (university application service for international students) with *Uni-assist* association[5]; the private British-Chinese project *Global Admissions*[6], etc.

The beneficiaries of the Superservice in Russia are applicants who can thus obtain reliable information about a particular higher education organization and about the entire higher education system and reduce the financial and time costs of processing documents and obtaining information about their future; besides, the beneficiaries are universities to which the Superservice should provide the opportunity to partially abandon traditional records management and reduce the costs of collecting and providing the reporting documentation.

In the framework of the 2022/2023 admission campaign, it was possible to submit documents to 970 educational institutions through the Superservice; this covers almost 80% of all universities in the country. The number of applicants who used electronic services increased to 336 thousand people, 3.4 million applications were submitted in various areas of training. The dynamics of the expansion of the activity of the Superservice are shown in *Table 1*.

Table 1. Indicators of connection to the Superservice by year of admission

Admission campaign, years	Number of universities and their branches, units	Number of applicants, thousand people	Number of applications, units
2020/2021	54	20,0	80 thousand
2021/2022	535	44,5	479 thousand
2022/2023	970	336,0	3.4 million
Source: Ministry of Science and Higher Education of Russia.			

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[2] Similarweb. Rating of the top websites in the category "Government and law". Available at: https://www.similarweb.com/ru/top-websites/category/law-and-government

[3] Departmental Program of Digital Transformation of the Ministry of Digital Development, Communications and Mass Media of the Russian Federation for 2021–2023 (approved by The Ministry of Digital Development of Russia). Available at: https://legalacts.ru/doc/vedomstvennaja-programma-tsifrovoi-transformatsii-ministerstva-tsifrovogo-razvitija-svjazi-i

[4] University Admissions.se. Available at: https://www.universityadmissions.se/intl/start

[5] Uni-Assist. Available at: https://www.uni-assist.de/en/about-us/press

[6] Global Admissions. Available at: https://www.globaladmissions.com

Despite the implementation of the super-service "Admission to the university online", the applicant and educational organizations need additional tools for analysis and comparison, tracking and entering new data, as well as performing other actions, including in "manual" mode, by both parties. This causes problems and difficulties faced by universities and applicants. The following sections of the work are devoted to their consideration.

Research methodology

In the course of further analysis, we use simple but quite effective analytical research methods. The *first approach* involves considering the available arrays of information with the opinion of users of the Superservice, with its subsequent aggregation and evaluation of special indices we have designed. To deepen the analysis, we introduce our own typology of registered user claims, which allows building own indices of severity of different types of problems. This methodological technique allows us to carry out quantitative measurements in relation to the issues of a qualitative type. The *second approach* is based on the use of information provided by the mass media concerning the issues arising when using the Superservice, with the allocation of objective and subjective claims of users to deepen the qualitative analysis. This technique is aimed at cutting off excessive claims to the Superservice and forming an unbiased picture of the current situation. The *third approach* coincides with the second one, but it is related to the data of an expert survey we conducted among insiders of the university sector. Finally, the *fourth approach* is based on calculating technical characteristics of the Superservice during periods of critical loads and comparing the statistics of appeals to the system for different groups of applicants. With the help of such procedures, it becomes possible to identify different behaviors among users of the Superservice system.

All of these approaches have long been tested many times, but it is the first time that they are applied to the subject area under consideration, which in turn allows us to give a comprehensive and fairly objective picture of the problems accumulated regarding the work of the Superservice. These circumstances substantiate both the use of the set of analytical procedures described and our contribution to the investigation of the issue under consideration. Specification of the above approaches will be carried out in the course of presentation of the relevant material.

Major trends in the work of the Superservice

Currently, we have at our disposal a database (hereinafter referred to as DB-1) accumulating questions from representatives of Russian universities to the superservice "Admission to the university online" (Superservice) and answers from authorized specialists. In total, the database includes 138 questions and answers, which are presented quite randomly in a standardized information form; the database was compiled in 2021. In order to obtain an analytical picture of the problems concerning the interaction between different users and the Superservice, it is advisable to arrange the available information base according to the nature of the questions and specifics of the answers.

To consider the interaction of universities with the Superservice, the following groups of questions can be proposed: technical issues regarding the user interface of the system and organizational, procedural and legal issues. This gradation allows identifying the type of problems that mainly arise when users interact with the Superservice. At the same time, indices can be constructed for the proposed gradation of questions/answers to quantify the severity of a particular type of problem. To do this, it is enough to enter two interrelated indices – the *level of severity of technical problems* (otherwise, the *index of technical discomfort of the system*; J_T) and the *level of severity of organizational problems* (otherwise, the *index of organizational discomfort of the system*; J_O), where $J_T = (x_T/x) * 100\%$ and $J_O = (x_O/x) * 100\%$, x_T – number of technical type questions; x_O – number of organizational type questions; x – total number of questions in the information base, $x = x_T + x_O$. It is clear that the equality

is true: $J_T + J_O = 100$. Identification of questions/answers involves the procedure of their expert evaluation, which should be discussed in more detail.

Here and further we will use the method of expert evaluation, which in the literature has been called the *open dialogue procedure*. It is considered much more effective than the *closed examination procedure* involving a simple averaging of anonymous individual expert assessments (Balatsky, Ekimova, 2015). The open dialogue procedure involves the following steps: 1) a group of experts is formed to assess the nature of the existing issues; 2) each of the experts presents their assessments on the existing set of issues; 3) an open discussion and coordination of assessments is carried out between the experts. This scheme of exchange of opinions and arguments allows us to form an agreed consolidated decision when the assessments are finally approved by all the experts. This approach helps to eliminate inevitable individual errors, draw the attention of experts to the facts they missed, correct the initial estimates and make more objective final estimates. Here and further, in all expert procedures, we used a group of four experts.

With the help of the proposed indices, the data presented in *Table 2* were obtained, allowing us to understand the general disposition of problems regarding the Superservice interface. For example, it is quite obvious that universities are characterized by the dominance of organizational issues on interaction with the system, while technical issues are less important (1.7-fold). However, we can argue that the share of technical problems is significant, too (more than one third of the entire sample); therefore, they cannot be classified as slight or insignificant.

Table 2. Typology of problems regarding the interaction with Superservice, 2021

Type of question/problem	Number of questions	Problem severity index (percentage in the sample), %
Technical questions regarding the Superservice interface	51	36.9
Organizational, procedural and legal issues arising when working with the Superservice	87	63.1
Total	138	100.0
Source: own elaboration.		

However, understanding the general disposition of the problems arising when working with the service is not enough to reveal their scale. For the purpose of a more in-depth analysis, we propose the following qualitative typology, overlapping with the existing sample of questions/answers: x_1 – proportion of clarifying questions/answers that do not require any effort from anyone; x_2 – proportion of clarifying questions/answers that require little effort on the part of applicants; x_3 – proportion of clarifying questions/answers that require minor efforts on the part of universities; x_4 – proportion of questions/answers that require improvement of the system by its developer. This gradation of problems can be applied to the entire array of questions/answers and to the arrays of technical and organizational problems separately; this allows us to obtain their summary characteristics. As in the previous case, identification of questions/answers presupposes their expert assessment. Then the following quantitative indicators should be introduced:

J – summary index of the system's discomfort;

J_T – index of the system's technical discomfort;

J_O – index of the system's organizational discomfort.

We assume that the general formula of the discomfort index is as follows:

$$J = \alpha_1 x_1 + \alpha_2 x_2 + \alpha_3 x_3 + \alpha_4 x_4, \qquad (1)$$

where:

i – index of the problem type;

α_1 – weighting factor of type 1 problem;

α_2 – weighting factor of type 2 problem;

α_3 – weighting factor of type 3 problem;

α_4 – weighting factor of type 4 problem;

x_i – proportion of type i questions/answers ($i = 1, ..., 4$).

Here and further we assume that $\alpha_1 = 10$; $\alpha_2 = \alpha_3 = 50$; $\alpha_4 = 100$. Such a scale of weighting factors is based on a natural premise according to which minor problems of the 1st type are rated as minor (10%), and significant problems of

the 4th type receive the maximum value (100%); problems associated with some effort on the part of users receive a median severity rating (50%). In addition, when postulating the equality $\alpha_2 = \alpha_3$, we believe that the efforts on the part of university administrations and applicants are equivalent, because in both cases large groups of users are affected, the ratio between which may vary depending on the competitive situation.

The completed specification of the index parameters (1) allows us to write it as follows:

$$J = 10x_1 + 50(x_2 + x_3) + 100x_4 \qquad (2)$$

In the course of calculations using the proposed methodology based on index (2) we obtained the data presented in *Tables 3–6*, which help to understand the scale of the

Table 3. Qualitative typology of problems of interaction with the Superservice, 2021

Type of problem/solution	Number of questions	Share in the sample (x_i), %
Clarifying question/answer that does not require any effort from anyone	79	57.3
Clarifying question/answer that requires little effort on the part of applicants	8	5.80
Clarifying question/answer that requires little effort on the part of universities	46	33.3
Questions/answers that require improvement of the system by its developer	5	3.6
Total	138	100.0
Source: own elaboration.		

Table 4. Qualitative typology of technical problems of interaction with the Superservice, 2021

Type of problem/solution	Number of questions	Share in the sample (x_i), %
Clarifying question/answer that does not require any effort from anyone	20	39.2
Clarifying question/answer that requires little effort on the part of applicants	2	3.9
Clarifying question/answer that requires little effort on the part of universities	24	47.1
Questions/answers that require improvement of the system by its developer	5	9.8
Total	51	100.0
Source: own elaboration.		

Table 5. Qualitative typology of organizational problems of interaction with the Superservice, 2021

Type of problem/solution	Number of questions	Share in the sample (x_i), %
Clarifying question/answer that does not require any effort from anyone	59	67,8
Clarifying question/answer that requires little effort on the part of applicants	6	6,9
Clarifying question/answer that requires little effort on the part of universities	22	25,3
Questions/answers that require improvement of the system by its developer	0	0
Total	87	100,0
Source: own elaboration.		

Table 6. Indices of discomfort when interacting with the Superservice, 2021

Type of problem	Discomfort index, %
Technical	39.2
Organizational	22.9
Total	28.9
Source: own elaboration.	

existing problems that arise when interacting with the Superservice. The analysis of the obtained digital data allows us to draw the following general conclusions.

First, the generalized efficiency of the Superservice can be considered quite acceptable, as indicated by the discomfort index, the value of which is less than 1/3 (see Tab. 5). Such an assessment is acceptable by all standards, although we observe actual opportunities to improve the service. This conclusion is confirmed by the data in Tab. 3, which show that more than half of the problems that arise do not require almost any effort from the system's customers, and the problems that require intervention of the system developer make up an insignificant part of the requests.

Second, the level of comfort of working with the Superservice system is characterized by a high degree of heterogeneity of the affected areas – technical and organizational. Thus, the main contribution to the violation of the comfort of interaction with the system is made by technical difficulties rather than organizational ones: the level of technical discomfort is 1.7 times higher than organizational (see Tab. 6), which confirms the conclusion we have made. Tab. 4 and 5 make it possible to understand the source of such a discrepancy in estimates – for technical issues, the share of problems requiring intervention of the system developer is almost 1/10 of all requests, whereas such intervention is not required at all in the case of organizational issues.

Third, in general, we can argue that the organizational component of the Superservice can be characterized as customer-friendly, and the technical component as customer-unfriendly. To explain this conclusion, it is enough to introduce the following quite logical gradation of the index of discomfort: an environment is *friendly* if the index is in the range of 0–33%; an environment is *unfriendly* if the index is in the range of 33–66%; an environment is *hostile* if the index is in the range of 66–100%. Tab. 6 shows that the index of organizational discomfort confidently falls

into the first zone, and the index of technical discomfort – just as confidently into the second zone.

If we talk about who is more affected by the problems with the Superservice, we should state that these are universities and not applicants. For example, Tab. 3 shows that, according to the average data, it is clear that the burden of emerging problems requiring certain efforts on the part of universities is almost six times higher than for applicants. Moreover, if in relation to organizational problems, the gap in this burden between universities and applicants reaches 3.7 times, then for technical problems it rises to 12 times. Thus, the Superservice system is designed in such a way that the burden of coordinating and resolving problems of interaction with it is overwhelmingly shifted to the *institutional* user (universities) rather than to population (applicants). This fact can be classified as a strategically adequate solution when designing the Superservice. From the viewpoint of the university administration, the greatest degree of vulnerability is typical for the organizational component of the Superservice, which requires significant attention and effort from universities. Therefore, the improvement of the system assumes, first of all, a more efficient interface, rather than its actual content.

Testing the results

Obviously, the conclusions regarding the operation of the Superservice system are completely dependent on the available information. In this regard, it is advisable to test the conclusions obtained earlier and at least calibrate them taking into account additional circumstances. To do this, we will use the document "Answers to questions from universities on the meeting via videoconference with the Apparatus of the Government of the Russian Federation" dated June 25, 2021, posted on the portal of information support for projects of the Ministry of Science and Higher Education of Russia[7]. It contains the most significant questions from representatives of Russian universities to the superservice "Admission to the university

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[7] Portal for information support of the projects under the Ministry of Science and Higher Education. Available at: https://fedproekt.minobrnauki.gov.ru/document/vks_25062021

online" and the answers given to them. In total, the database (hereinafter referred to as DB-2) includes 56 questions and answers, which are presented randomly in the document; the date of compilation of the database is 2021.

The difference between DB-1 and DB-2 consists in the surface processing of the primary data of DB-1 with its compression while preserving the main semantic elements in DB-2, i.e. the second base is a kind of aggregation of the first one with some addition. In this regard, it is natural to raise the question concerning the invariance of the conclusions made regarding the operation of the Superservice based on two databases. To do this, let us compare the final parameters of the service for two databases (*Tab. 7, 8*). The comparison allows us to draw the following conclusions.

Table 7. Typology of problems of interaction with the Superservice on DB-1 and DB-2, 2021

Type of question/problem	Number of questions		Problem severity index (percentage in the sample), %	
	DB-1	DB-2	DB-1	DB-2
Technical questions regarding the Superservice interface	51	33	36.9	60.0
Organizational, procedural and legal issues when working with the Superservice	87	22	63.1	40.0
Total	138	55	100.0	100.0
Source: own elaboration.				

Table 8. Superservice discomfort indices for DB-1 and DB-2, 2021

Type of problem	Discomfort index, %	
	DB-1	DB-2
Technical	39.2	48.7
Organizational	22.9	20.8
Total	28.9	37.1
Source: own elaboration.		

First, the structure of the two databases is fundamentally different. For example, DB-2 is 2.5 times more extensive than DB-1, but the number of organizational issues in it is 1.7 times more than technical ones, whereas in DB-1, on the contrary, it is 1.5 times less (see Tab. 7).

Thus, data aggregation is due to enhanced compression of organizational information, which leads to subsequent offsets of the results.

Second, the DB-2 test base provides a different disposition of technical and organizational issues compared to DB-1. Thus, organizational problems dominate in the first base, and technical problems dominate in the second one. This effect is associated with the above-mentioned restructuring of the internal content of the test base. Given this circumstance, it is possible to proceed from the working hypothesis, according to which the truth is in the middle. Then the severity index of technical problems will be 48.5%, and the index of organizational problems – 51.6% (see Tab. 7). Thus, even if we assume that there are certain biases in one direction or another in each sample, the final result leaves the initial conclusion about the dominance of organizational problems unchanged. In other words, a sample with a different data structure gives a result not so different from the original one; thus, it cannot be discarded as insufficiently relevant.

Third, the transition from one database to another does not change the ranking structure in the three discomfort indices of the Superservice. However, the greater sensitivity of the DB-2 indexes leads to some bias in understanding the overall effectiveness of its work. For example, according to DB-1, the Superservice service as a whole is identified as friendly, whereas according to DB-2 it is identified as unfriendly. If we use the averaging method, we will get an index of exactly 33% (see Tab. 8), i.e. the functional potential of the service is on the border between friendly and unfriendly. Apparently, this is the most objective assessment. As for the indices of technical and organizational discomfort of the Superservice, their initial characteristics are preserved and even enhanced: the organizational component of the service is characterized as friendly, and the technical component is characterized as unfriendly. The averaged values allow us to say with great confidence that the organizational component of the Superservice is consistently friendly (JO = 21.9%, i.e. much less than 33%),

and the technical component is consistently unfriendly (JT = 43.9%, i.e. much more than 33% and much less than 66%).

Thus, the test sample helped to clarify and objectify the estimated results obtained regarding the effectiveness of the Superservice, which in turn allows us to treat them with a fairly high confidence.

Key problems in the functioning of the Superservice

To identify the most significant problems arising when working with the Superservice, it is advisable to use the principle according to which the typical and most serious problems, as a rule, receive wide coverage in the media. This thesis can be accepted as a working one, since it seems fair that it is pointless to bring minor problems to the public, because they will be of no interest to anyone. Otherwise, it is necessary to conduct an expert assessment of the significance of the problems arising in the databases; this is a rather time-consuming procedure and still does not guarantee full relevance of the results.

The above allows us to first outline the scope of the public information space (PIS), to which here and further we will refer the websites of specific Russian universities, official media and social media. Here and further, we will rely on several information sources[8] that can be considered the most representative ones for the Russian PIS; the data used reflect the current events of 2022 and thereby clarify previous conclusions taking into account recent events and trends.

Here and further we will also proceed from the idea that all the shortcomings in the work of the Superservice can be divided into two large groups – *objective* and *subjective*. The former are the disadvantages associated with initial flaws in the system relative to its intended functionality, the latter are the disadvantages that are subjective in nature (user opinion), have typical features of educational organizations and are not related to the original goals of the Superservice. The practice of working with the system shows that its users often make excessive demands to it, the justification of which is doubtful or which can be considered destructive in general. The separation of the two types of claims put forward by the community of users of the Superservice is fundamental for the formation of a correct understanding of the key problems of the information system under consideration. This classification is also of great importance for practical recommendations, because the developer of the Superservice does not always have to overindulge the users; such attempts can lead to excessive complication of the system and the growth of subsequent failures in it.

I. Objective disadvantages of the Superservice

1. Absence of the option for automatic verification and presentation of information about the winners and prize-winners of the Olympiads for the whole amount of applicants. This disadvantage is indicated by Saint Petersburg State University, for which the number of documents requiring additional manual verification was 2,418. Accordingly, such an option should be provided in the system not only to save time and effort of university employees, but also to ensure higher reliability of the very fact that applicants have these achievements.

2. Absence of the option for automatic verification of important parameters of the applicants' education certificate (for example, a certificate with honors; absence of a bachelor's or specialist diploma). This drawback was also indicated by Saint Petersburg State University, for which the number of certificates with honors requiring manual rechecking amounted to

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[8] Materials of the Rector's meeting no. 538 (August 15, 2022). Available at: https://spbu.ru/openuniversity/documents/materialy-rektorskogo-soveshchaniya-538#p3; St. Petersburg State University criticized the work of the superservice "Admission to the university online" (August 19, 2022). Available at: https://skillbox.ru/media/education/v-spbgu-raskritikovali-rabotu-superservisa-postuplenie-v-vuz-onlayn; Agranovich M. Rectors of leading universities told Rossiiskaya gazeta about the results of admission-2022 (September 18, 2022). Available at: https://rg.ru/2022/09/14/kak-kuiutsia-kadry.html; Kurilova A. Rectors of universities complained about failures in the work of the service "Admission to the university online" (August 30, 2022). Available at: https://www.vedomosti.ru/society/articles/2022/08/30/938312-rektori-pozhalovalis-na-sboi

13,620, and diplomas of secondary vocational education with honors – 79.

3. Absence of an option in the system that allows applicants to record the fact of submitting an original document of education to a specific educational organization.

4. *Long-term failures* in the system at the most crucial moments of the admission campaign. Thus, due to the inactivity of a separate functional module of the Superservice in the period from June 20, 2022 to July 21, 2022, during 32 of the 36 days when the documents were being submitted (89% of the time of the admission campaign), there was no verification of applicants' educational documents.

5. *Short-term failures* in the system during the admission campaign. Thus, in the specified period of 2022, the Superservice was "hanging up" for several days: for example, it "hung up" on Friday evening, and started working again only on Tuesday morning. For universities with a large number of candidates competing for admission, such failures were extremely painful. For example, in the Russian Institute of Theater Arts (GITIS), the competition was 450 people per place, which, when the service was failing, required round-the-clock duty of the educational staff of the university and led to physical exhaustion of its employees.

6. *Delays* in the work of the Superservice regarding its processing and provision of information that is required promptly. Such situations led to various problems. For example, the delay in transferring Superservice data to the university system caused misunderstanding among applicants, since they appeared in the enrollment lists later than they themselves and university staff expected. MGIMO had to involve its own IT specialists in solving the problem, with the resulting additional costs for the university. "Flaws" in the work due to such delays also led to the fact that some applicants who had been enrolled according to their exam points, were not included in the lists of those whose education expenses would be covered by the state. In order to avoid legal conflicts, MGIMO, for example, had to take the blame upon itself and enroll an applicant who found themselves in such a difficult situation and

train them at the expense of the university's own funds. Another modification of the problem regarding delays was manifested in the fact that the Superservice showed that some students were admitted to several universities at once. Such cases required the management of Bauman Moscow State Technical University to increase the number of employees of the admission campaign so that they would solve arising problems in a "manual mode" together with applicants and their parents. At the same time, an important circumstance is that it is the universities that bear the legal responsibility for applicants. Consequently, there is an *effect of shifting problems and responsibility* for system failures from the Superservice to universities.

II. Subjective shortcomings of the Superservice

1. The Superservice does not provide information on applicant's high school graduation results, which is contained in high school diplomas. This requirement may be desirable for some universities to obtain additional information about an applicant, but it is not mandatory and cannot be interpreted as mandatory.

2. In 2021, enrollment in the framework of the main stage was carried out in one wave; however, applicants did not have to provide original documents on education; whereas in 2022, the requirement to submit an original document on education for enrollment was introduced; as a result, a significant number of applicants with high scores on the unified state exam did not submit their original documents on education and an enrollment application to authoritative Russian universities, because they were afraid they would not pass through the competition and be admitted to study at the expense of the budget in any educational organization. This disadvantage is purely subjective and is based on the desire to eliminate all kinds of risks for applicants and create greenhouse conditions for them, which is a direct violation of the competitive system – everyone weighs all the risks and opportunities on their own.

3. The Superservice does not provide a procedure for automatically determining the preferences of applicants regarding the

universities to which they have applied. In this regard, in 2022, the Association of Leading Universities of Russia sent a letter to the Minister of Science and Higher Education of the Russian Federation as to whether it is expedient to accept applicants to undergraduate and specialty programs with the use of the Superservice alone and with a gradual abandonment of the use of information systems (personal accounts) of educational organizations, subject to the improvement of the legal regulation of admission procedures and information and technological improvement of the Superservice itself. At the same time, this initiative implies the introduction of an enrollment system based on priorities formed in advance, according to which the applicant, when applying for admission, ranks educational organizations, indicating which of them they would like to be enrolled in the first place, which in the second, etc.; similarly, the applicant must rank educational programs. However, it is quite obvious that the absence of such a system leaves the applicant with additional time for the final choice of a university for admission, whereas in the proposed system, the choice rests with the Superservice on the basis of previously and, possibly, hastily formed priorities. This perpetuates the phenomenon of "digital slavery".

4. Currently, the Superservice does not take into account the specifics of creative orientation tests, since admission contests in the relevant universities begin long before the start of the admission campaign itself – in March – April. This means that an applicant to a university such as, for example, GITIS, even before submitting documents, must pass 2–3 creative tests, and in some cases 4–5. The Superservice does not take this into account in any way, i.e. there is no possibility of starting an admission campaign and taking into account its results before its official announcement. It is possible that the expansion of the Superservice functionality would be convenient for some universities, but the very requirement to introduce these exclusive tests into the national information standard is unduly burdensome.

Naturally, the work of the Superservice is not limited to the listed problems, but we can argue that they quite adequately reflect the sore spots and bottlenecks of the initiative under consideration.

Expert assessment of problems arising in the work of the Superservice

We have focused on identifying the problems of universities that are key users of the Superservice. However, the final consumers of Superservice services are applicants and it is they who have the most refined problems due to the shortcomings of the implemented information system. Thus, let us consider their problems in more detail. At the same time, we should note that it is completely impossible to separate the problems of universities and applicants, since in most cases they turn out to be universal and "overlap", i.e. they equally concern both types of participants in the system. In order to display the situation among applicants in a more contrasting way, let us consider several areas of work of the Superservice, revealed as a result of the in-depth interviews of experts from several leading universities in Moscow, regarding the work with the Superservice.

1. *Scale of applicants' coverage by the Superservice.* It was found that about a third of all applicants submit an application through the Superservice (33% of those who enter universities, taking into account branches, submitted applications through "Gosuslugi" portal). Without going into a detailed discussion of this figure, we should note that it looks quite modest. This indicates that the community of applicants, which is modern youth with a pronounced orientation toward the use of online technologies, has serious grounds for refusing the widespread use of the Superservice. The reasons for the current state of affairs will be disclosed below. Of course, this figure can vary greatly for different universities in the country.

2. *Homogeneity of problems regarding the Superservice.* Attempts to identify the education programs or areas more preferable to applicants according to the number of applications submitted via the Superservice in the context of universities have led to nothing. Apparently, the specifics of professions and specialties do

not affect the attitudes of applicants regarding the use of the federal information system. Thus, the "pain" points in the composition of the areas of training of specialists are not yet visible.

3. *Frequency of failures in the system and the efficiency of their elimination.* Most often, failures in the work of the Superservice occur during peak hours, when universities and applicants use the system most intensively; technical problems arise significantly less during data collection periods. In these cases, when the user contacts the technical support service of the Superservice, it either does not respond to requests, or when structural defects are detected, it postpones the decision for a long time, for example, for the next year. Thus, the Superservice is characterized by *irregular operation* and *chronic ignoring of user requests*.

4. *Changes in the interaction of universities and applicants.* The general hypothesis at present is the assumption that after the introduction of the Superservice, the contact between universities and applicants has become easier, but the surveys conducted have not confirmed this hypothesis. Experts unanimously note that this interaction had been extremely difficult before the introduction of the Superservice, but it remained just as difficult after it. In fact, only the form of interaction has changed, which turned out to be comparable in complexity to the previous model of work. Experts say that the interaction of universities and applicants would become easier if the Superservice worked as it was initially declared at the stage of its implementation; constant deviations from the intended functionality of the system *de facto* negate its positive impact on the "applicant – university" contact mode.

5. *Changes in the work of the Superservice.* So far, the Superservice has been in operation for three years: from 2020 to 2022. It is quite reasonable to wonder whether the work of the Superservice has improved over the years. Experts answer this question quite categorically – it has not improved, because every year a new Superservice system is actually created due to the annually updated rules for admission and enrollment of applicants. In other words, organizational and legal innovations in the field of admission of applicants to universities hamper technical improvement of the information system due to the need to reconfigure its functionality. It is possible to improve the Superservice only if the requirements for it are stabilized, while organizational and legal innovations entail technical innovations and interfere with the process of stabilization and debugging of technical functionality. This conclusion reveals the calculations presented in Tab. 2, which provides a typology of problems of interaction with the Superservice and shows the dominance of the segment of organizational and legal problems. Consequently, the main thesis arising from the results of the survey consists in the fact that it will be possible to talk about the satisfactory work of the Superservice only when 1–2 years have passed since the last introduction of any organizational and legal innovation in the field of higher education in Russia.

6. *Organizational and technical parity of problems in the work of the Superservice.* To reveal the nuances of the symbiosis of organizational and technical problems in the work of the Superservice, the experts were asked which of the two types of problems is more significant. When answering this question, they could not give a clear preference to one class of problems, believing that technical and organizational difficulties are approximately equivalent. The importance of the technical component of the Superservice is determined by its inability to simultaneously process all the applications during peak periods of time, which disrupts the entire course of the admission campaign and generates legal conflicts with applicants. The importance of the organizational component of the Superservice is determined by the normative activity of the Ministry of Science and Higher Education, which changes the rules of admission and enrollment of applicants every year and thereby actually changes the entire technological platform of the admission campaign. The Ministry of Finance of Russia and the Ministry of Science and Higher Education inform consumers in

advance about the features of the new version of the Superservice and organize courses on mastering its updated functionality, but even such informational and organizational support does not completely eliminate the problem of adaptation. Consequently, the technical and organizational problems of the Superservice form a kind of *symbiosis of problems*, in which the shortcomings of one part give rise to shortcomings in another part and, due to this, form a self-sustaining regime of chronic failures. In such conditions it is difficult to determine the significance of a particular type of problems, which determines the organizational and technical parity of problems in the work of the Superservice.

7. *The need to back up the Superservice.* Even before the introduction of the Superservice in Russia, there was a system of personal accounts (SPA) for applicants in every university in the country. The introduction of the Superservice led to the fact that two information systems – federal, represented by the Superservice, and corporate, represented by the SPA of universities – began to operate simultaneously and largely duplicate each other. In this regard, experts were asked questions about whether the universities still have an applicant's SPA and whether they can abandon it if the Superservice works smoothly. The answers received reveal a set of risks in relation to the federal information system. First, the SPA of universities is still preserved; second, even if the Superservice operates smoothly, the SPA should not be abandoned. Although experts theoretically admit the very possibility of abandoning the SPA, but so far it seems clearly premature, since the preservation of the SPA helps to back up the work of the Superservice, which can still be highly unstable. Consequently, the SPA acts as the main back up for the Superservice and, apparently, will remain as such for a very long time. It is possible that even the strong desire of universities to save their budgets by introducing the Superservice will not lead to the final abandonment of the SPA.

8. *The nature of conflicts between the university and the applicant.* Studies show that a typical conflict takes place between

universities and applicants from year to year; the mechanism of the conflict is as follows. Due to failures in the Superservice system and lack of transparency in determining the ratings, an applicant may mistakenly decide that they have been enrolled in the desired university; the applicant withdraws applications from all other universities and sends consent to the desired one, but in the end it turns out that they are not enrolled in any university and cannot reenter the system. As a result, the applicant does not get a place in any of the universities, and the university, in turn, cannot forecast the achievement of admission goals and the end of admission campaign. In the future, such situations are resolved on an individual basis. It is clear that the possibility of resolving such situations remains only if there are a small number of them; if there are many of them, it is fraught with mass lawsuits and investigations.

9. *Types of problems for applicants when interacting with the Superservice.* The surveys allow us to systematize the problems that applicants face when working with the Superservice (in addition to those mentioned earlier):

– relevant documents are not added automatically to the Superservice from other state databases; thus, applicants have to send scans or come to the university in person;

– in case of the system failure, there arises a need to duplicate applications;

– the system does not have a clear and user-friendly interface; thus, it is often unclear which documents, what data and in what format should be entered into the system; the system lacks clear prompting (for example, what exactly needs to be written in the appropriate field when specifying who issued the certificate of education; the problem is automatically solved by reloading data from other systems without participation of the applicant, however, this is not yet available); inconvenient UX/UI design[9], which does not always contain clear instructions to the user where to look for a button or a hint;

– lack of a built-in system for checking the input data, for example, their format, which makes it difficult to further verify them;

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[9] UX/UI design refers to the design of the user interface of an information system (User Experience/User Interface).

– although the UPSS should work according to the API, but technically it is not implemented; therefore the applicant has to download documents in a package; if one package is not downloaded, then the entire download queue stops;

– lingering problems of reliability and security of the data transmission process;

– an applicant from a region cannot make an advance payment for paid tuition, since the corresponding functionality is not available at the UPSS;

– foreigners who apply not according to a quota (supervised by Rossotrudnichestvo), but according to intergovernmental agreements, face great difficulties since such foreign citizens (for example, from Uzbekistan) can legally use the UPSS, but they do not have an account in the UPSS and do not have a personal insurance policy number (SNILS);

– the university does not have the opportunity to send documents for revision (now it can only accept or reject documents), which is why in case of rejection of documents (even on the formal grounds of a typo), the applicant can no longer re-submit documents to this university;

– there is no effective dashboard option (interactive information panel) that would give the applicant operational information from the university about admission (dates, scores, results, etc.);

– rapid emergence of the problem of new territories (LNR, DNR, Zaporozhye and Kherson oblasts), concerning which new rules and exceptions are being introduced (availability of benefits, other education system) without instructions on their processing.

The problems listed above regarding the interaction of applicants with the Superservice can serve as the most significant "sore spots" that require the fastest possible intervention on the part of the regulator.

Peak loads, new solutions and artificial commotion syndrome

Currently, the largest and most complex organizational and technical problem of the Superservice is the occurrence of peak loads (OPL) at the time of closing the admission campaign. We emphasize that the problem of

OPL is fundamentally hybrid, because it arises due to the simultaneous overlap and action of two factors – technical and organizational. Let us look at this problem in more detail.

According to modern Russian legislation, an applicant can apply to five universities for ten specialties in each. As a result, there are potentially 50 applications per applicant. According to the results of the rating in Russian universities, applicants must withdraw all applications and submit admission consent to only one university that they have ultimately chosen. However, the procedure for withdrawing applications leads to the reformatting of all university rankings. So, if a conditional applicant ranked 20th before the withdrawal of applications at a certain university and did not pass through the competition for a budget place, then after the mass withdrawal of applications the applicant can move to the 19th or 18th place and pass through the competition, but in order to realize their potential opportunity, they must know about it. It is at this point that a problem arises: if, due to problems with the work of the Superservice, information is not updated on time and does not reach the applicants, this affects the decision they make and generates errors. In turn, universities set a time limit (hour) before which it is necessary to send consent on the last day of admission. This procedure is currently not synchronized – one university sets the time limit at 20:00, another at 23:59, etc. In this regard, on one day across the country with regions located in different time zones, many thousands of applicants withdraw 49 applications and send one consent at a time. At this moment, the load on the Superservice for performing a complex multiparametric computational task becomes prohibitive, which logically leads to failures in its operation and the inability to ensure an effective dashboard – the system does not have time to calculate changes in the ratings of all applicants, and those who have not previously passed, but can now pass, do not know about it. In addition, the application can be withdrawn by phone, which further complicates the process of tracking a place in the ranking. As a result, all applications can be withdrawn by

the applicant, but his/her final consent will not get to the chosen university in time, which will entail his/her "failure" in the admission campaign for reasons beyond his/her control.

To understand the level of computational load during the peak period, one can perform simple, but very indicative calculations. According to the reporting data, during the admission campaign of 2022/2023, the total number of applicants who used the services of the Superservice amounted to 336 thousand people who submitted 3.4 million applications. This means that out of 50 potential applications, an average of 10.1 applications were actually submitted, i.e. the potential of the submitted applications was realized only by 20%. At the moment of recalculation of the applicants' ratings, a wave of technical actions with the Superservice system is formed according to a simple rule:

$$N = xyz, \qquad (3)$$

where:

N – peak value of operations with the Superservice system;

x – number of applicants in the Supeservice;

y – average number of applications submitted by applicants;

z – number of processing operations for each application.

If we assume that an average of 3–5 requests are required to process each application, then the final value N will be from 10.2 to 16.9 million simultaneous actions with the Superservice system. It gives a clear idea of what kind of load falls on the Superservice during peak periods of information processing. We should point out that the figures obtained do not lie beyond the limits of modern computing capabilities of information services. Rather, they indicate clear administrative miscalculations in making decisions about the rhythmicity of the work of the Superservice.

Understanding the considered problem requires making adequate decisions at all levels of management. We should note that universities are already actively countering this prob-

lem by introducing relatively nonconventional mechanisms. Currently, experts are talking about three types of new solutions from the university administration. The first one is that some universities reserve dates in enrollment orders in case of problems with the Superservice and enroll students after the fact, although formally they can already be enrolled in another university by competition and an enrollment order has already been issued for them there. The second solution is as follows. Universities work with paper documents by using a system for automatic recognition of documents and filling out applications based on them; an operator working with paper documents has the ability to compare documents, but in order to exclude tampering, they cannot edit the application. The third solution is that during the admission campaign (sometimes annually), access to filling out applications using the university's computer system is organized in the reading room of the university. These measures make it possible to reduce peak loads on the Superservice and the risks of gross errors.

Apparently, certain questions to the Superservice holder about why it does not regulate peak loads in advance have already emerged. We think that the actions to eliminate failures should include two separate, but closely related activities. The first is to secure an agreement with the hosting company that services the Superservice server regarding the increase in computing power during a predetermined period of mass rating and recall/submission of applications. Certain few days should be provided with increased computing capabilities of the hosting company in accordance with the calculations carried out above. The second activity is to develop a detailed schedule for the rating of applicants and operations with the system, taking into account the reserve days provided, during which adjustments in the system are still possible. For example, after the expiration of the standard enrollment period, it is necessary to reserve two or three days, during which all detected errors will be promptly eliminated.

At the moment there are no fundamental problems and contraindications in the implementation of the proposed measures.

We cannot but touch upon another important issue related to the distortion of the natural behavior of applicants by the Superservice. The fact is that the information system, which allows submitting a large number of applications to a large number of universities without physically moving applicants in space and large physical and financial costs, encourages "idle" applications. In fact, school graduates are beginning to experiment with admission, which they would not do if it were necessary for them to interact with specific universities. There is a kind of artificial (virtual) excitement during the admission campaign due to the irresponsible behavior of applicants trying to use the full capabilities of the Superservice. Subsequently, artificial commotion affects the peak loads of the Superservice and leads to its overload.

In order to assess the scale of the artificial commotion, we will calculate the balance of the number of applicants and applications submitted by them through two channels – via the Superservice and in the traditional way *(Tab. 9)*. To do this, we will proceed from the fact that the number of applicants coincides with the number of enrolled students (if there is an extrabudgetary form of education and an excess of educational capacity, this assumption is fair), and the number of those enrolled in 2022 and 2021 is approximately the same (statistics show that annual fluctuations of this value are minimal). Then the data obtained allow us to establish the expected fact: the number of applications submitted by applicants through the Superservice, on average, is more than three times higher than the same indicator for applicants using the traditional form of submitting applications to the PA of universities and by physically providing the necessary documents. Consequently, the Superservice options themselves contain opportunities to create artificial excitement during the admission campaign and thereby provoke technical failures of the system. In this case, the effect of artificial commotion should be perceived as an integral property of the Superservice, which will have to be put up with for a long time.

Table 9. Parameters of activity of two groups of applicants, 2022

Indicator	Way to file an application	
	via the Superservice	traditional way
Number of applicants, thousand people	336	672
Number of applications submitted, million	3,4	2,1
Average number of applications submitted by applicants, units	10,1	3,1
Source: own compilation.		

It is possible that over time, when the services of the Superservice become the norm of the applicant's interaction with the universities in Russia, the artificial excitement will subside. However, it is too early to talk about this and we should proceed from the presence of this effect.

Conclusion

Currently, the "Admission to the university online" service has passed the main testing stages, but so far we cannot say that it is operating smoothly and without obvious complaints on the part of its users. The Superservice will require another one and a half to two years to reach its full performance capacity. This is also due to the fact that the resource requires constant development. For example, there is currently no such highly demanded option in the Superservice as *transferring students between universities*. Many students transfer from university to university within the chosen specialty; for example, a student of the medical department of one of the medical universities in Russia can relatively easily transfer after the first year, without losing years of study, to another medical university in the country. After the second year of study, as a rule, the loss of one year is inevitable, but this can be avoided by timely informing students in the Superservice system about the inconsistency of programs in different universities, so that students can prepare for exams that they did not take in their current educational institution. In addition, the transfer option itself can also be more clearly regulated within the information arrays listed in the Superservice.

In addition to the above, it happens that the transfer of students occurs in cases of termination or suspension of the state accreditation of the university and the cancellation of the license to carry out educational activities. In this regard, a tool for dealing with this student's life situation may also be provided.

As part of the implementation of the principles of customer centricity in the activities of the Ministry of Science and Higher Education, such needs of customers as recognition of an academic degree or academic title obtained in a foreign country, admission to training programs within the framework of additional professional education, interaction of elements of the national innovation system within the competence of the Ministry of Science and Higher Education in the implementation of the National Technological Initiative, etc. can be studied and worked out. As a result of identifying and studying these customer needs, customers should be segmented, information about customer experience should be collected, customer path maps should be developed, new services should be designed or existing services should be reengineered.

In order to constantly monitor changes and further improve the process, register and correct existing (emerging) deviations, adjust approaches to the implementation of activities, it is advisable to form a feedback toolkit that is convenient for customers, which can be presented in the following form: direct interaction with the customer (surveys, call centers, a book of reviews and suggestions, panels for evaluating the quality of service, etc.); interaction through digital tools (social networks and messengers, chatbots, push notifications, online reviews, etc.); professional research (interviews, focus groups, sociological research, expert assessments, etc.).

Thus, further implementation of the principle of customer centricity in the activities of the Ministry of Science and Higher Education of Russia should be much more focused on building such a system of interaction that would provide a simple and personalized experience, proactivity on the part of the authorities, expressed in its focus on preventing potential problems instead of responding to failures that have already occurred.

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