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NEW REQUIREMENTS FOR TEXTS WHEN TEACHING READING IN ENGLISH LESSONS

Abstract: *As you know, the education system, as well as the teaching of academic subjects, including foreign languages, are sensitive to changes taking place in society. In this article highlights of new requirements for texts when teaching reading in English lessons.*

Key words: *text, foreign language, reading, learning, learning stage, personality-oriented approach, senior stage, student, type of texts, search reading.*

Language: *English*

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Introduction

The economic and social transformations that have taken place in our country in recent decades have led to significant changes in the field of education. Previously, there was an educational-disciplinary, authoritarian-informational approach with a focus on the "average" student. Now it has given way to the personality-oriented approach, which is a child-oriented approach aimed at the full development of each student, at his self-determination and self-realization. It is the change of value orientations in society that has led to the fact that a free, developed and educated person has become recognized as the greatest value. The transition to the information society requires the full development of the individual, including his communication skills. A school graduate must have the necessary knowledge, skills and abilities to carry out various types of activities — educational, labor, aesthetic, and research. They must also have critical thinking, creative experience, be able to use new information technologies, and be ready for interpersonal and intercultural cooperation both within their country and at the international level.

All this can be achieved only with a person-centered approach to education. In the last 10 years, in connection with the transition to a new paradigm of education and upbringing, there is a sharp reorientation from the concepts of "preparedness", "education", "general culture", "education" to the concepts of "competence", "competence". Accordingly, the competence approach in education is fixed. This approach involves a significant strengthening of the practical orientation of education, aimed at developing the personal qualities of students. Thus, the competence-based approach is correlated with the personality - oriented approach.

In this regard, all training is based on the development of the student's personality, his interests and inclinations. In relation to a foreign language, the meaning of this principle is that the student should strive for independent and creative participation in communication. It is necessary to increase the role and nature of independent work, the widespread use of new learning technologies that encourage the independent solution of practice-oriented tasks, for example, the project method. As you know, the goals of teaching are the central component of the entire system of teaching foreign languages, determining its content and principles, as well as the activities of teachers and students, that is,the methods and technologies of teaching in each specific historical period.

Foreign language as an activity subject is focused on the formation of five components of foreign language communicative competence:

- language (meaning the mastery of the basic units of the language: from sounds and letters to a complete text and the rules of operating them);

- speech (mastering the main types of foreign language speech activity-speaking, listening, reading and writing)

- socio-cultural (mastering background knowledge, regional and general cultural knowledge, skills and abilities);

- compensatory (mastering the ability to carry out activities, that is, communication, even with a limited amount of language tools, for example, the ability to use lexical substitutions in the absence of lexical tools or periphrasis in the presence of grammatical difficulties, etc. In addition, in a person-centered approach, it is important to take into account another component of the learning content - the feelings and emotions caused by the interaction of the selected components of the learning content. They contribute to the creation of a favorable learning and educational environment, the development of teaching motivation and value orientations of students.

The text acts in training as an object for recognition visually (reading) and by ear (listening) and as a product of speech generation (speaking, writing). It is structured on the basis of lexical, phonetic, grammatical, and graphic aspects of speech, correlates with the topic and sphere of communication, and also reflects and sets specific communication situations due to its extralinguistic content. Thus, the modern approach to teaching foreign languages is based on the importance of the role of the text, since it is the text that carries any information, including from all areas of knowledge, and thus gives the teaching of foreign languages the most diverse orientation. This makes the selection of texts extremely important. The text should correspond to the new approaches in education. The effectiveness of teaching reading largely depends on the correct selection and organization of reading material. To properly solve this problem, you should take into account a number of factors. Let's turn to the content side of the tests. The first requirement is the cognitive value of the text.

The text for reading should contribute to the replenishment of the actual knowledge of the student and the formation of the student's value orientations. A mandatory requirement at any stage is that the text corresponds to the interests of the students. The success of learning to read is directly related to how significant the texts offered to them are in the eyes of students. Only in this case, there is an interest, and then a motive for the activity. It is common for each age group to show interest in certain text content. For example, for primary school age, fairy tales are interesting; at the middle stage of training, students appreciate texts based on the entertaining plot (humorous, adventure, detective, jokes, science fiction); older students are interested in problematic texts that give a topic for reflection (about peers, moral norms, friendship, love). An important requirement for the content of texts should be considered their cultural value. The text is one of the main means of introducing students to the culture of another nation. It is quite obvious that even at the initial stage of training, texts should educate students in the field of culture of the country of the language being studied: children's games, school, family life, etc.

The socio-cultural content of reading texts should be clearly focused on the age capabilities of students. At the initial and secondary stages of education, cultural topics should be mainly focused on the peculiarities of the everyday life of schoolchildren, their age interests. This allows you to emotionally involve teenagers in the learning process. At the middle and senior stages of training, socio-cultural topics may be more focused around the cultural heritage of the country of the language being studied. Now let's turn to the language side of the texts. With regard to the lexical composition of the text, attention is drawn to the fact that the presence of unknown material in it does not have a negative impact on the reading process. Unfamiliar words included in the text may present varying degrees of difficulty to students. It all depends on the type and purpose of the reading, whether the reading is introductory, browsing, search, or it is a learning reading (with learning reading, the % of unfamiliar words should be minimized). As for grammatical phenomena in the text, at the initial and secondary stages of learning, one of the requirements for texts is teaching reading on the studied grammatical material and necessarily excluding unknown grammatical structures from the texts. However, at the senior stage, authentic texts are selected for training, i.e. texts that preserve all the characteristics of a natural speech product. Therefore, the modern methodology at the senior stage allows students to preserve unknown grammatical phenomena, the removal and replacement of which leads to the loss of authenticity by the test.

In general, when selecting texts for reading, the rule "from easy to difficult" applies. As students improve their analytical mechanisms and accumulate vocabulary, the material of the text becomes more complex. In terms of the selection of text material in recent years, the methodology of teaching reading in a foreign language considers the question of the types of texts acceptable at each stage of training. In the tradition, texts are distinguished: artistic, journalistic and popular science, epistolary, functional or pragmatic. The latter include a large number of types of texts created for real communication and having features that distinguish them from other types. In foreign language textbooks, these types of texts are increasingly included:

- instructions,
- recipes,

- brochures,
- advertisements,
- labels on packages and labels,
- tickets,
- questionnaires,
- reference books, etc.

So, there is a need to include various types of texts in the content of training. This position is related to the fact that the texts have different "learning potential":

a) in terms of learning to read;

b) in terms of developing speaking and writing skills. It is known, for example, that learning search reading is easier and more natural to conduct on the material of pragmatic texts. Pragmatic texts include graphs; diagrams; diagrams (clusters); tables; geographical maps and maps of the area; room plan, terrain, structures; entrance tickets; transport schedules; site maps, advertising texts. It is in the work with pragmatic texts that there is a gap.

Pragmatic texts are often not considered by teachers as a full-fledged material for the formation of reading skills and abilities, but serve as an illustration of the socio-cultural information contained in textbooks. The ability to operate with texts from the everyday household sphere is necessary for every modern person. Foreign language lessons contribute, in this case, not only to the formation of reading competence, but also to the socialization of students through the work on the formation of skills and abilities to read pragmatic texts. It is known, for example, that learning search reading is easier and more natural on the material of pragmatic texts. This ensures the "reality" of the situation. Learning to read by sight is naturally based on the material of newspaper and magazine publications, Internet texts. For the development of productive speaking and writing skills, it is important to know the principles of composition of various types of texts. For example, to learn the ability to reason, to argue in oral speech and in writing, the student must be able to observe how such texts are constructed, therefore be able to read journalism and understand the features of reasoning or argumentation.

Modern normative documents define that the reading material is excerpts from works of art and the text in the form of a postcard. The maximum variability of text types is achieved at the senior level of training.

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NEW COMPETENCIES FOR ASSESSING THE RELIABILITY OF THE RESULTS OF A SURVEY OF RESPONDENTS ON TOPICAL TOPICS

Abstract: *The article outlines new competencies developed by the authors to assess the competence of respondents - survey participants on pressing problems of science and technology. At the same time, the authors consider the results of a questionnaire to assess the competence of survey participants in comparison with the so-called reference answer, which is formed both on the basis of literature data and in a survey of highly qualified specialists on the problems that are offered to respondents. Thus, the competencies with the help of which it is possible to rank the level of qualifications of respondents participating in the survey and to make a more objective decision about the results of the survey.*

Key words: *competencies, professionalism, qualifications, respondent, concordance coefficient (W), weight, survey, questionnaire, reliability, competence, decision-making, demand, competitiveness, demand, profit, financial condition, reference answer.*

Language: *English*

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Introduction

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A scientific experiment has always been costly, and scientists are constantly looking for ways to reduce these costs through the so-called surveys of specialists in order to find out the most significant factors in order to conduct the experiment itself on the basis of the results of the survey. Today the authors of

the article have developed software, the use of which provokes a better-quality receipt of answers to the questions posed in the questionnaires. But it turned out to be not so simple, it was necessary to pay more attention to the choice of these respondents, whose competence on the problem under study should not cause the experimenter to doubt their professionalism. To create such a technique for assessing the competence of respondents, we proposed to use the coefficient of concordance (W), the value of which, as you know, varies within $0 \leq W \leq 1.0$. If the respondent, according to the results of the prior ranking, has the value of the concordance coefficient in comparison with the reference value of the competence of the leading specialist within $0 \leq W \leq 0.5$, then the opinion of such a respondent can be neglected, that is, his opinion can be excluded from the survey results. In this regard, in order to reduce the number of such incompetent respondents, the researchers involved in the survey should be highly qualified specialists in this field, employees of scientific schools, whose results on this issue have been recognized by scientists of other scientific schools, scientists - experimenters, graduate students, masters and bachelors studying in similar scientific directions. The number of survey participants is not limited by anything, but only by the desire of the experimenters to get answers to the questions posed to them. Wherein, participation in the survey of young researchers is preferred, as this will definitely provoke the expected effect and reliable result. At the same time, it is possible to hear another version of the solution to the problem, which means that the experimenter will be able to remove doubts by clarifying the list of factors that influence the achievement of effective results, and, if necessary, re-question all the participants dealing with this problem in order to confirm or refute their assumptions and doubts. The use of a survey in any case will be less costly, and the effectiveness of the results obtained and their reliability are quite high, which will make it possible to formulate the only correct solution to the problem in front of him, and in which the solution will be achieved with minimal costs, which is especially important today and, ultimately, tomorrow. This opinion is due today not only to limited funding for the implementation of research work, but with its obligatory solution - this discrepancy between the need and the possibilities will help the experimenter to ensure the implementation of the task set before him and help young researchers to master the new method of organizing research work at the lowest possible cost, which is always relevant.

Main part

Increasing the demand and competitiveness of the products of domestic enterprises is one of the most important areas of real economic growth, both in Russia and in the regions of the Southern Federal District and the North Caucasus Federal District. Therefore, the current situation presupposes the need to produce products of the original assortment, taking into account the national and climatic characteristics of these regions and to improve the metrological support for testing footwear and leather goods to improve the quality of manufactured products within the framework of import substitution.

It is not enough just to produce products on the territory of the Southern Federal District and the North Caucasus Federal District, but it is necessary to ensure the development and expansion of their production in the future, which is possible taking into account the interests of all participants in this process in the development of a competitive assortment, in the introduction of an innovative technological process using more productive, universal and multifunctional equipment, in the improvement of metrological assurance of the quality of the production of footwear and leather goods and haberdashery, in the interest and support of regional, municipal and federal branches of government.

What is most important today for the success in the market of many new and long existing small, medium and large enterprises is their ability to provide the consumer with shoes of higher quality than before, and at the same time for the same or less price.

Modern production or, as it is also called, world-class production must meet the following requirements:

– have greater flexibility, the ability to quickly change the range of products. The product life cycle has become as short as never before, the variety of product assortments is higher, and the seriality of products, the volume of batch of one-time production is less. Hence, production focused on the release of mass, standardized products (strictly corresponding to standards, specifications, technical conditions), unable to constantly adapt to the needs of real, often small groups of consumers, is now doomed to extinction;

– use new forms of control, organization and division of labor, taking into account the more complex production technology;

– rely on comprehensive quality management. Requirements for quality not only increased, but also changed the nature of decision-making: it is not enough to produce good products, it is also necessary to think about organizing after-sales services, about providing additional branded services to consumers who are highly individualized in their requests;

– simultaneously improve product quality and reduce costs. If earlier it was possible to offer the consumer a lower quality product at a lower price and, conversely, a high price always corresponded to high quality, today the situation has changed. Higher quality of the product should be provided at the expense of the same lower price [5-6].

Now in our country there is a situation where most of the population has a very modest income, and

it is she who is a potential buyer of mass-produced footwear.

Solving the problems of style, marketing, advertising will allow domestic footwear of mass production to be demanded by this wide sector of the population of Russia. Small and medium-sized shoe enterprises should provide footwear to a more profitable part of the population, however, as well as highly automated production complexes.

In recent years, the absolute increase in the production of leather footwear has been constantly increasing, the range of footwear is being updated at shoe enterprises, taking into account the demand of the population, the production of model and insulated footwear, footwear with a top made of white leather and genuine patent leather, smart shoes for children is increasing. The transition of the country's economy to market relations led to a sharp deterioration in the situation in the footwear industry in Russia due to a decrease in the effective demand of the population, deepening inflationary processes, a crisis of non-payments, which, in turn, caused an imbalance in production and circulation.

When organizing the sale of manufactured footwear, one should not forget that in the South and North Caucasian federal districts there have been and remain so-called "hot spots", which are territories with a crisis in the economic situation and a negative political situation.

Correct definition of quality, consistency and systematic quality management give the manufacturer a decisive advantage in the competition for the consumer. It would seem that everything is simple, but simplicity is equally brilliant and deceiving. The general plan for solving the problem determines the vector of movement, sets the factorial priorities of the activity - no more.

A product made by man is dual in nature, it combines the natural properties of raw materials and the characteristics brought into it by human labor. The product has a rental value and added value. In this context, it is not value that is important - it serves as a quantitative equivalent of the quality of a product in general, but the result of labor - in the form of a transformation of the natural state of an object. The product of human activity has a natural, basic, level and a superstructure, introduced. Hence the need for a dualistic perception of the quality of the product, which should not be interpreted primitively as a double quality. The quality of the product is one, but the production duality of the product is associated with it.

Such two-sidedness of the quality of the goods misleads those who, having not yet understood the art of dialectical thinking, strive to sort everything out “on the shelves”, forgetting about the structure of which these shelves are parts. The quality of a product is only determined by a natural basis, but it is built artificially.

The quality of the product has several creators. This is a fashion designer, constructor, technologist, manager; their qualifications, experience are measured without problems. Others are also within reach, only their measurement is difficult, especially when it comes to the consumer.

The economic situation affects both producers and consumers, shakes the market on the waves of its uneven movement, and together with purchasing power and perceptions of quality.

Outwardly, determining the quality of a product produced for sale on the market seems to be an impossible task, because for this it is necessary to combine not converging, but (mainly) diverging views. Krylov's Fish, Cancer and Pike are involuntarily recollected, who have undertaken to drag the cart. In our case, there are even more subjects.

The designer, technologist, manager develop their understanding of the quality of the goods (they can be combined), they are linked by the common interest of the manufacturer. The buyer has a special approach to quality. As a consumer, he is not sure about the integrity of the manufacturer. In addition, the buyer has his own tastes, reasons, conditioned by the real buying opportunity. There are also the interests of the market, which has become an independent subject of the economy. Speculation is legalized and attracts with its potential. By controlling the market, an intermediary - a speculator - is able to form an image of quality in his own interests, in particular, through advertising, giving priorities, etc. Finally, there is the quality of the product itself, expressed in the totality of properties of natural origin and added by the manufacturer. As a result, we came to the "quality square",

Anything common exists objectively, but only through a single one: at the end of the process, there is always a separate, concrete buyer Pyotr Stepanovich Sidorov and boots, which Pyotr Stepanovich chose from dozens of different ones. They seemed to him the best in quality and price. The sales assistant professionally explained to Petr Stepanovich that there are better quality boots in the same price range, but, being an independent person, he did not change his mind. This is why pre-sale preparation of products and the culture of the seller are important. The last word belongs to the buyer, his perception of the quality of the product. Everything else only plays up to him.

The most serious contradiction, apparently, remains the discrepancy in the images of product quality between the manufacturer and the consumer. The special importance of a different approach to the quality of the manufacturer and the consumer is natural. They are the main subjects of the system of economic relations, they have a common goal - a product. The former make it, the latter consume it, but they have different motives due to their different

position in the system and the culture of target perception.

The manufacturer creates the product, but not the product - the ultimate goal of the manufacturer, but the sale of the product. The direct connection between the producer and the consumer is local because it has a negative effect on the producer. The seller blocks the consumer from the manufacturer, and the manufacturer is forced to focus not on the market, but on the market situation, which is most often artificially formed by a speculator and advertising.

Money, perhaps, does not "smell", advertising policy frankly "stinks", it is so far from objectivity and free from professional honor. Being in a state of irresponsibility for information, advertising serves the market clearly and in any form.

The manufacturer, unlike the seller, is responsible for information both by law and by his professional reputation. The seller manipulates the information as he sees fit - the manufacturer is constrained by responsibility, moreover, the market often dictates the rules of relations to him.

What is the way out for the manufacturer? There is only one way out - a direct presence on the market and significant investments in education and education of consumers. It is difficult to overcome such a program alone, uniting is absolutely real. The domestic manufacturer has everything it needs to oust the speculator from the retail market. He has professional experience, qualified personnel, scientific and technical support, a certain trust of buyers returning to the old, pre-reform, priorities, which are actively exploited by unscrupulous manufacturers and to which the authorities shyly close their eyes, which does not want to return to the Soviet experience. Confectioners, meat-makers, wine-makers shamelessly use Soviet brands, replacing them with surrogates. Brands of Vyatka, Orenburg, Ivanovo are returning to the market, some Moscow and Leningrad enterprises. The tendency of the return of interest is gaining stability. Of course, clothes and shoes are not sausages and vodka or chocolate and confectionery products of natural origin.

Filling technological processes for the production of competitive and popular footwear for consumers in the regions of the Southern Federal District and the North Caucasus Federal District is costly. The use of universal and multifunctional equipment forms the technological process in such a way that it makes it possible to produce the entire assortment of high-quality footwear with different price niches.

But in this case, it is necessary to find a solution that would allow the manufacturer to have a tool for assessing the effectiveness of innovative processes. Such a solution is possible if, in each case, an efficiency factor is used for such an assessment, the value of which, as a concordance factor (W), will be applied within the range $0 \le K_{эф} \le 1$... If its value tends to one, then this means that the manufacturer has managed to find the most optimal solution, but if its value tends to zero, then an analysis of the reasons for such an unsatisfactory result and a search for errors that provoked such a result are required.

In the practice of expert assessment, the assessment of competence with the help of an expert's self-assessment has become widespread. There are various approaches to assessing this indicator. In accordance with one of the methods, the assessment of the competence of expert auditors is based on the calculation of the competence coefficient Kj, which is calculated on the basis of the expert auditor's judgment about the degree of awareness of the problem being solved and the indication of the sources of reasoning for his own opinion. Competence ratio, Kj , calculated by formula 1:

$$Kj = 1/2 \times (Kuj + Kaj), \quad (1)$$

where Kuj - coefficient of awareness of the problem; Kaj is the coefficient of argumentation on the same problem.

The expert's awareness coefficient is calculated based on the expert's self-assessment, namely:

- awareness of the state of the modern market economy (1);
- awareness of the state of affairs in the light industry (2);
- competence in the field of marketing communications (3);
- competence in advertising communications (4).

The experts gave preference to advertising and sales promotion as the main means of marketing communications for promoting light industry products in the sales market with unstable demand.

But if the customs commission (TC) needs to make sure that experts have professional competence, it is necessary to use the addition to the program for processing the results of a priori ranking developed by the authors, expanding its capabilities by giving it an evaluation function. This need arose due to a significant increase in the volume of customs work. Now the customs is forced to invite a wider and not always prepared group of specialists as experts to participate in assessing the quality of such a wide range of products without sufficient experience in a qualified assessment of their purpose and quality, which can provoke the entry of low-quality products into domestic markets.

To confirm the reliability of the proposed methodology in an objective assessment of the competence of experts, a survey was carried out of a group of experts and teachers of higher educational institutions of the Rostov region, who participate in the training of the specialists themselves involved in the examination by customs.

To do this, we will expand the list of the most preferred advertising communications used to promote light industry products using the assessments of expert auditors, namely: radio, television, print, Direct Mail, Public relations, telemarketing, sales promotion, special advertising, advertising facilities, other types of product promotion (flyers, posters, handouts, balloons).

The results of the expert questionnaire are shown in Table 1, and the university professors - in Table 9. We were pleasantly surprised that the preliminary designated competence of the invited specialists for the questionnaire was confirmed by the final results - their assessment of the importance of the proposed competencies (the effectiveness of marketing communications for promoting light industry products to the consumer) basically coincided (tables 1 and 2). But, given that the main task of the customs is to obtain an assessment of the competence of each expert during their work in customs and to make a decision on their possible participation in the examination in the future or their refusal to do so, we conducted a comparative assessment of the results of the questionnaire survey on these marketing communications for all participants in the experiment, that is, for experts and for university professors.

The results of the questionnaire are shown in Table 3. The sum of the ranks for each competence was compared among themselves both for experts and for teachers, and this made it possible, based on the value of the coefficient of concordance, to arrange them according to the degree of competence. The group of the most competent, whose concordance coefficient was 0.9 ÷ 0.97, included 9 teachers out of 10, and only one teacher had a concordance coefficient lower than the normative one, namely, 0.54; but for expert experts - the results of their participation in the examination are much worse, none of them received the value of the concordance coefficient, which the teachers showed - they have it equal to 0.5 - 0.87, therefore,

Dear respondent!

What factors would you give preference to when evaluating advertising communications for promoting light industry products to domestic sales markets? Taking advantage of the privileges - to assign them the appropriate rank from the arithmetic series - preferable starting from 1, and not preferable - a higher digit, ensuring that the requirements of the arithmetic series are met, namely, by not allowing missing digits in the arithmetic series. If you have difficulties in choosing preferences, you can use the "linked ranks", assigning the same rank to two or more factors, but even here it is necessary to comply with the requirements of the arithmetic series (Table 1).

Table 1 - Characteristics of the most preferred advertising communications

No.	Characteristics of the most preferred advertising communications for promoting light industry products on the market of the regions of the Southern Federal District and the North Caucasus Federal District	Rank
1.	Radio	
2.	A television	
3.	Printing	
4.	"Direct mail"	
5.	Public relations	
6.	Telemarketing	
7.	Sales promotion	
8.	Special advertising	
9.	Advertising constructions	
10.	Other Promotion: Product: Flyers, Posters, Handouts, Balloons	

Table 2 - The results of the questionnaire survey by student experts on the most effective advertising communications for promoting light industry products

Expert	Element of advertising communications									
	1	2	3	4	5	6	7	8	9	10
1	4	1	6	7	9	10	2	3	5	8
2	9	4	8	7	2	3	1	5	6	10
3	6	1	2	5	4	3	7	8	10	9
4	10	2	1	4	3	8	5	9	6	7
5	10	1	3	2	9	7	4	5	6	8
6	10	5	2	7	8	4	1	9	3	6
7	2	1	3	9	8	7	4	5	6	10

8	2	1	7	8	3	10	4	5	6	9
9	4	5	1	2	3	7	6	9	8	10
10	10	5	6	3	7	1	2	8	9	4
Total:										
Output										

Table 3 - The results of the questionnaire survey by experts - teachers about advertising communications for the promotion of light industry products in the presence of "related" ranks (after processing)

Expert	Element of advertising communications									
	1	2	3	4	5	6	7	8	9	10
1	10	1	2	3	5	4	6	7	8	9
2	8	1	3	2	4	5	6	7	9	10
3	10	1	3	4	5	6	2	7	8	9
4	10	5	1	2	3	4	6	7	9	8
5	10	1	3	4	5	6	2	7	8	9
6	10	1	3	4	5	6	2	7	8	9
7	4	1	6	7	9	10	2	3	5	8
8	10	1	6	3	4	5	2	7	8	9
9	10	1	3	4	5	6	2	7	9	8
10	10	1	2	5	3	6	4	7	9	8
Sum of ranks										
conclusions										

But at the same time, I would like to warn the heads of organizations that attract experts about their responsibility to provide concise, unambiguous information about goods, in the decoding of which the experts involved will participate. The advantages of this information are brevity, unambiguity, but the perception of symbols requires a certain professional training to decipher the information. The basic requirements for commodity information are the following basic requirements: availability, sufficiency, reliability.

These requirements became known as the "Three Ds".

– The first "D" - reliability - implies the truthfulness and objectivity of information about the product, the absence of misinformation. Unreliability of information is information falsification.

– The second "D" - availability - is associated with the principle of information openness of information about the product for all users. The Federal Law "On Protection of Consumer Rights" states that information about a product must be in Russian.

– The third "D" - sufficiency - is interpreted as a rational information saturation, i.e. both incomplete and redundant information should be excluded. Incomplete information, for example, the expiration date of a dairy product is not specified, can lead to damage to the health of the consumer. Excessive information is useless information about a product; it can irritate the consumer and prompt them to abandon a purchase.

Table 4 - Transformed matrix of ranks based on the results of questioning by experts - students and expert - teachers on the influence of advertising communications on the promotion of lightweight products and the results of calculating the coefficient of concordance W

Factor / Survey participants		X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	W
Expert students, graduate students and representatives of enterprises	1	4	1	6	7	9	10	2	3	5	8	0.59
	2	9	4	8	7	2	3	1	5	6	10	0.71
	3	6	1	2	5	4	3	7	8	10	9	0.85
	4	10	2	1	4	3	8	5	9	6	7	0.87
	5	10	1	3	2	9	7	4	5	6	8	0.82
	6	10	5	2	7	8	4	1	9	3	6	0.68
	7	2	1	3	9	8	7	4	5	6	10	0.64
	8	2	1	7	8	3	10	4	5	6	9	0.51

	9	4	5	1	2	3	7	6	9	8	10	0.79
	10	10	5	6	3	7	1	2	8	9	4	0.75
Expert Teachers universities	**11**	10	1	2	3	5	4	6	7	8	9	0.87
	12	8	1	3	2	4	5	6	7	9	10	**0.92**
	13	10	1	3	4	5	6	2	7	8	9	**0.96**
	14	10	5	1	2	3	4	6	7	9	8	**0.90**
	15	10	1	3	4	5	6	2	7	8	9	**0.96**
	16	10	1	3	4	5	6	2	7	8	9	**0.96**
	17	4	1	6	7	9	10	2	3	5	8	**0.96**
	18	10	1	6	3	4	5	2	7	8	9	0.54
	19	10	1	3	4	5	6	2	7	9	8	**0.96**
	20	10	1	2	5	3	6	4	7	9	8	**0.96**
Places												
Expert opinions												
Teachers' opinions												
Rank sums												

The ideology of satisfying consumers of products and services of higher education will burst into the life of universities more and more energetically every year. Quality becomes a universal criterion in a competitive environment. Quality is the main measuring instrument by which comparisons will be made. The first steps have already been taken in Russia, an independent system of attestation and quality control of education is being formed on the basis of the concept of multidimensional quality management of an educational institution, and project competitions are being held on the problem of "Management of the quality of education". We are confident that universities that have declared quality as their main goal will live and fight for prosperity, while those that have abandoned the quality program face an unclear future.

The formation of a Common European educational space requires significant efforts from Russian universities to bring the educational process in line with the criteria in the field of higher education in order to facilitate independent recognition of degrees and the development of student mobility. For this, universities are recommended to undergo international certification. One of the most important ways to improve the educational process, taking into account the common European principles, is the introduction and improvement of the system for ensuring the quality of education.

The main conditions for the implementation and effective operation of the quality management system in the university is compliance with the standards GOST R ISO 9001: 2011 "Quality management systems. Requirements ", which define the requirements for the QMS and are aimed at customer satisfaction.

According to ISO standards, quality is the set of characteristics of an object related to its ability to meet the stated and anticipated needs of customers. An object can be an activity or a process, a product or a result of a service, an organization or a system.

In this context, one can say:

- about the quality of the results of educational processes;

- the quality of the processes themselves and - the quality of the system or organization of activities and their relationship

The quality of the educational services provided presupposes their ability to meet the needs and expectations of a particular consumer.

Naturally, the high quality of the results of educational activities, which is determined by the level of knowledge and skills of university graduates, can be achieved only with a good level of organization and control of the educational process.

This quality, in turn, is determined, on the one hand, by the content of training, and on the other, by the provision of resources: material and technical, educational, methodological, informational, and personnel.

The most important component can be considered the content side of education.

ISO standards are based on eight principles of quality management, one of which is the process approach. The introduction of a process approach allows you to more effectively manage activities and related resources to achieve a given result. In accordance with this principle, ISO standards require that the processes in the institution be defined, identified and described.

All these schemes are based on the well-known idea of product quality management through process quality management. Any area of university activity is represented as a set of processes. For each process, the parameters of the quality of resources, input data (raw materials) and output data (results) are identified, and "suppliers and consumers of input and output" are determined. For all elements of this typical scheme,

quality meters are installed, requirements for the quality of input data, processes, resources and output data are fixed.

Each of the training courses simultaneously acts as a "supplier" and "consumer", that is, each teacher puts forward requirements for the quality of teaching "foreign" disciplines and satisfies the needs of teachers for the quality of processes and results of their activities.

The transition to new management schemes and the involvement of the entire team in quality management processes involves continuous retraining of employees. This task of transforming the university into a continuously learning organization is the most difficult (there are few teachers-managers who know the basics of quality management).

A global computerization of all spheres of the university's activity will be required. At the university, the solution to this problem is complicated by the different paces of movement of the departments towards the creation of electronic teaching materials.

As a rule, each professional at the university, instead of paying more attention to coordinating work with his colleagues, focuses on his own person. In a relatively calm environment, this principle can be proud of. This kind of freedom is a defining moment in the creative process. However, autonomy comes with significant costs. These costs lie in the fact that the institution sometimes begins to function as a disorderly collection of elements moving in different directions without any unifying idea, or without clear goals of what the team members are doing and why. Of course, it's not news that universities are conservative institutions, indecisive in terms of making changes to established processes. In a stable environment with no competition, this lack of innovation has little impact. Universities can live quietly, solving problems as they arise. Today it is necessary to limit the autonomy of departments and staff, no matter how paradoxical it may sound. The time for brilliant personalities has passed. The era of brilliant organizations, teams working together is coming. A clear focus on working in teams, which is an integral part of the philosophy of strategic quality management, allows people to work towards common rather than independent goals.

The process approach involves the design of a quality management system as a set of interrelated processes, while for each process the main characteristics should be provided: inputs, outputs, consumers of each of the processes, their requirements should be identified, and their satisfaction with the results of the process should be studied in the course of the system's activity.

For the effective operation of a set of basic processes, it is necessary to establish ways of interaction between them, to clearly determine which material or information objects are the outputs of previous processes and, at the same time, the inputs of subsequent ones. Such a relationship should be determined primarily in order to be able to exercise effective control and measurement of educational processes in order to determine the degree of their compliance with the requirements of consumers.

In a university, the object of study is always a "student" and is at the entrance and exit of the educational process. The task of training: meeting the consistently growing needs of the student and other consumers of university graduates (employers, the state, etc.).

The release of specialists who meet the requirements of modern production, possessing advanced design tools and methods, is one of the main tasks of training modern highly qualified personnel.

The quality of training of specialists is largely determined by the perfection of the equipment used in training, the use of modern information and pedagogical technologies.

If the Ministry of Education and Science finances the training of specialists in full, then we can confidently expect that the goals and objectives formulated by the fourth generation Federal State Educational Standard of Higher Education will be achieved.

But the constant reorganization of higher education carried out by the Ministry of Education and Science of the Russian Federation has stumped the best forces of higher education not only in the so-called elite universities of the Russian Federation, as officials from the ministry like to call them, but also in those others, most of which are not baked. What did they want to have in the end? No sooner had the "pouring rain" for the funeral of the list of specialties, and the directions of masters and bachelors were born, as the ministry has already approved another new list, either retaining the methodological content for previously approved, prepared by universities, or prolonging them, or universities again it will be required feverishly and in a short time before the next September 1, they must be developed and approved, and such a fever is already what a year!?!?

Who needs it? Regrettably, there is no intelligible answer to all these questions from the ministry, and this is confirmed by the fact that universities have already begun to issue bachelors and masters, and there are no qualification requirements for them, as well as for specialists who will come to be hired at enterprises and institutions to work. , not…

Who will be responsible for such a situation? Again, it will be passed on to universities that they did not get through, did not decide, did not insist, did not approve, etc. etc. And this is how many times. You might think that the opinion of employees of universities and employers once wanted and someone else to hear ???

Why did it so easily, for the sake of the Bologna Agreements, we lost independence in assessing the results of our work, when our specialists were

reasonably considered the best and demanded by many enterprises, organizations and scientific institutions? Why break what was functioning? First, they destroyed the industry, and then, when there was only a place for specialists in the free labor market, universities were again to blame, that there was not enough engineering personnel, technicians disappeared, but the saddest thing and skilled workers and this whole chain collapsed when highly qualified workers who prepared the so-called SSTU and vocational schools became qualified middle-level specialists, and already middle-level specialists made up the elite of high school graduates. What about now? Some competencies,

But what is the use of the stalking??? And to the fact that none of us objects to reasonable and justified reforms that would have been tested and received universal support in society, but when this is shyness for the sake of only reducing the number of universities and funds for their maintenance. Prime Minister of the USSR A.N. Kosygin, when meeting with the student activists of Moscow universities about their small scholarships (22 - 26 rubles per month), confirmed that this is indeed insufficient amount. But at the same time, he noted that the scholarship can never be sufficient for their normal social protection. But what is now paid to students is, of course, completely insufficient and the Politburo of the CPSU Central Committee decided to increase it for 1-3-year students to 35 rubles a month, and for 4-5-year students, respectively, up to 40 rubles a month. Alexey Nikolaevich, to high school ?! The answer was immediate - the most positive. In Japan, everyone can get a higher education, and this is right, and we have made the same decision - we'll better prepare an "average" engineer than such a schoolchild will turn into a drug addict, a hooligan or a bandit - after all, the costs of his re-education will many times exceed the costs of his education in vocational schools, technical schools or higher education - we will never allow this!!!

But with regret today you cannot say that about modern leaders, and the negative consequences of such an unjustified policy are already making themselves felt. Therefore, it would be justified for all forms of training to exist and this would be the prerogative of the university - which is preferable for them, taking into account the demand for their graduates. But to monitor this demand, namely: who is better taken by the heads of organizations, industrial enterprises and scientific institutions - specialists, masters or bachelors and based on these results make decisions on adjusting the admission of applicants to the number of students.

But let's get back to the Federal Educational Standards of Higher Professional Education. Who and who called the qualifications "Academic Bachelor" and "Applied Bachelor" - we have no words at all - this is something that needs to be invented?

When it was said about the second stage of the master's degree and two years of study - everyone took heart - this is instead of five years in six, you can really prepare a specialist of the highest qualification. And the characteristics of professional activity seemed to confirm this intention, namely:

– area of professional activity of masters:
– rational;
– resource-saving, competitive technologies for the design and manufacture of products for the light industry and the fashion industry (leather, fur, clothing, footwear, accessories and other products from different materials).
– objects of professional activity of masters:
– methods and systems for designing garments, footwear, leather, fur, leather goods, technological processes and equipment for their production; normative and technical documentation and standardization systems, methods and means of testing, quality control of materials and products of light industry,
– types of professional activities of masters:
– research;
– production and technological;
– organizational and managerial;
– project and design;
– scientific and pedagogical.

The specific types of professional activities for which the master is mainly prepared are determined by the higher educational institution together with the students, scientific and pedagogical workers of the higher educational institution and associations of employers,

– tasks of professional activity of masters;
– management of the results of research activities and the commercialization of intellectual property rights;
– drawing up work plans and programs for scientific research and technical development, preparation of individual assignments for performers;
– collection, processing, analysis and systematization of scientific and technical information on the research topic, the choice of methods and means for solving the problem;
– conducting patent analysis;
– implementation of the results of research work, innovative technology and advanced technology;
– production and technological activities:
– ensuring the manufacturability of clothing, footwear, leather, fur, leather goods and their manufacturing processes;
– organization of technological preparation of production;
– assessment of the economic efficiency of products and technological processes;

– development of measures for the rational use and replacement of scarce materials for clothing, footwear and leather goods;

– introduction of new materials and technological processes into production for the release of products in accordance with market requirements and industry development trends; research of the causes of defects in production, development of proposals for its prevention and elimination, the choice of systems for ensuring the environmental safety of production;

– organizational and management activities:

– organization of marketing and sales structures for business development, increasing its stability and competitiveness, merchandising of fashion industry products;

– management in terms of a spectrum of opinions, determination of the order of work;

– preparation of applications for inventions and industrial designs of products;

– professional development and training of employees;

– development of plans and programs for organizing innovative activities at the enterprise;

– design and design activities:

– preparation of assignments for the development of project and design solutions;

– preparation of generalized options for solving emerging problems, from analysis,

– predicting the consequences, finding compromise solutions in conditions of multi-criteria;

– development of sketches, projects of technical specifications, standards, technical descriptions of new products, technological processes and business plans using information technology;

– study and implementation of domestic and foreign experience, development of rationalization and invention;

– assessment of the innovative potential of the project;

– scientific and pedagogical activity:

– performing pedagogical work in educational institutions of secondary vocational and higher vocational education as a teacher and assistant under the guidance of a leading teacher, professor or associate professor in the disciplines of the direction;

– development of teaching materials used by students in the educational process.

And if by this time the ruined branches of the national economy had risen from the ruins, and graduates with the qualification only "Academic Bachelor" could have recruited branches of departments, which, according to the order of the Ministry of Education and Science No. 958 of 08/14/2013, were to be created on the basis of organizations, carrying out activities in the profile of the relevant educational program, namely:

– the procedure for the creation of departments and other structural units by professional educational organizations and educational organizations of higher education, providing practical training of students, on the basis of other organizations carrying out activities in the profile of the corresponding educational program.

This procedure determines the rules for the creation by professional educational organizations and educational organizations of higher education (hereinafter referred to as educational organizations) departments and other structural units providing practical training of students (hereinafter referred to as structural units), on the basis of other organizations carrying out activities in the profile of the corresponding educational program (further - organization).

Structural units are created for the purpose of practical training of students in the corresponding educational program, through the implementation by the educational organization of a part of the educational program of the corresponding profile, aimed at the formation, consolidation and development of skills and competencies, and including the possibility of conducting all types of training sessions and carrying out scientific activities.

The structural unit in its activities is guided by the Federal Law of December 29 2012 year... No. 273-FZ "On Education in the Russian Federation", other federal laws, regulatory legal acts of the President of the Russian Federation and the Government of the Russian Federation, this Procedure, constituent documents of an educational organization, regulations on a structural unit.

The regulation on the structural unit is approved by agreement with the organization in the manner prescribed by the charter of the educational organization.

A structural unit is created subject to the following conditions:

– compliance of the educational program implemented by the educational organization with the profile of the organization's activities;

– availability of property necessary to achieve the goals of the structural unit;

– ensuring the conduct of practice, practical classes, seminars, laboratory workshops and other types of educational activities, provided for educational activities, provided for by the curriculum, in the structural unit;

– providing organizations with conditions for the preparation of graduate qualification works and other types of work stipulated by the educational program, including participation in the formation of topics of graduation qualification works and other works, provision of scientific guidance and reviewing of graduation qualification works and other works, free provision of access to information to students required for the preparation of final qualifying works;

– creating a safe learning environment;

– observance of special conditions for receiving education by students with disabilities.

Then one would expect that the bachelor will come to his university after 2-3 years of highly qualified work as a middle manager or a workplace requiring a high level of training, with the desire to continue his studies in the master's program with the corresponding basic educational program - agreed and with the university and with enterprises. Then it is not clear the role and significance of the competencies formed, which are listed in Table 4. We proposed to express their importance for the formation of the quality of training of specialists for schoolchildren - graduates of 11 grades of 2017, bachelors - graduates of the university in 2017, teachers of universities in the Rostov region and specialists - graduates of universities, working at light industry enterprises in the regions of the Southern Federal District and the North Caucasus Federal District.

The results of the questionnaire are shown in Table 2. They were obtained when processing the questionnaires according to the program developed by the authors for processing the results of a priori ranking.

Questionnaire

to assess the most significant competencies in the preparation of masters within the framework of their qualification characteristics formed in the Federal State Educational Standard of Higher Professional Education

Dear respondent!

You are invited to fill out a questionnaire - a questionnaire, which contains a list of competencies that form the level of training of specialists. We would like to ask you to rank the ranks according to the degree of their importance on the quality of training of these specialists. The peculiarity of the filling is that it is necessary to use the rule of the arithmetic series, namely: to assign ranks from 1 place to n (the number of competencies n = 19), without missing numbers, but at the same time they should be exactly n = 19, the sequence of ranking - any. In case of your doubt, it is allowed to assign the same rank-place (related ranks) to two or more competencies, but at the same time, the rule of the arithmetic series must be fulfilled, i.e. again - from 1st place, but with a smaller number n of the arithmetic series by the number of related ranks.

Example. No linked ranks

Rank	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	2	4	5	19	18	17	14	13	6	11	10	1	3	9	8	7	15	16	12

Example. With related ranks

Rank	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	3	3	3	3	2	2	5	5	4	7	6	1	1	9	10	10	1	8	8
	6.5	6.5	6.5	6.5	3.5	3.5	10.5	10.5	9	13	12	1.5	1.5	16	17.5	17.5	19	14.5	14.5

Since the number of related ranks is 8, then in the arithmetic series from 1 to 19 places will remain 19-8 = 11, i.e. there will be only 11 places in the new arithmetic series.

Table 5 - List of indicators for ranking

room	Competence	Rank
1	2	3
PC-1	— independently solve the tasks of their professional activities at a modern level	
PC-2	— the ability to professionally use modern equipment and assess the economic efficiency of technological processes (in accordance with the objectives of the master's program)	
PC-3	— use in-depth knowledge of legal and ethical norms in assessing the consequences of their professional activities, in the development and implementation of socially significant projects	
PC-4	— ability analyze the received production information, summarize, systematize the results of production works using modern equipment and technology	

PC-5	— readiness to study scientific, technical information, patent documentation and make practical recommendations for its use	
PC-6	— use the knowledge of fundamental sciences in research and the creation of new methods for the design of products and processes of light industry	
PC-7	— the ability to set research objectives, choose methods of experimental work, interpret and present the results of scientific research in the form of reports, abstracts, publications and in public discussions	
PC-8	— the ability to use modern information technologies for the organization and effective implementation of technological processes for the production of clothing, footwear, leather, fur, accessories and leather goods for various purposes	
PC-9	— to develop measures for the integrated use of materials and their replacement with promising ones in the production of light industry products	
PC-10	— carry out production control of the stage-by-stage production of parts of products, semi-finished products, conduct standard and certification tests of clothing, footwear, leather goods and materials for them, investigate the causes of defects in production and develop proposals for its prevention and elimination	
PC-11	— choose technical means and technologies taking into account the environmental consequences of their use	
PC-12	— analyze the technological process as a control object, develop regulatory methodological and production documents	
PC-13	— use elements of economic analysis when creating products, taking into account the requirements of quality, reliability and cost	
PC-14	— systematize, summarize information on the formation and use of enterprise resources	
PK-15	— make management and economic decisions based on a constructive dialogue, taking into account different approaches and opinions in small and large teams of performers on the principles of marketing	
PC-16	— to develop design and technological documentation and develop sketches of light industry products, taking into account the constructive and technological, aesthetic, economic, environmental and other parameters	
PC-17	— use information technology and computer-aided design systems in the development of new products for light industry	
PK-18	— to form students' professional qualities in the chosen direction of training, civic position, attitude to work and life in the conditions of modern civilization and democracy	
PK-19	— choose teaching methods and tools that ensure high quality of the educational process	

Table 6 - Results of the survey of bachelors - graduates of 2021

Factors / Experts	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16	X17	X18	X19
1	1	8	4	11	5	13	12	15	7	9	17	9	10	18	2	14	16	16	10
2	6	3	8	4	15	7	8	2	9	1	13	5	11	13	17	12	14	15	16
3	1	2	3	3	2	4	5	6	7	8	4	9	10	11	12	13	14	15	16
4	1	2	3	3	2	4	6	5	7	8	4	9	11	10	13	14	12	15	8
5	6	4	5	11	17	18	12	14	3	14	7	1	2	10	9	13	16	16	18
6	5	4	11	5	6	2	12	14	7	13	15	1	3	17	8	10	9	7	1
7	6	1	17	16	8	9	15	2	14	3	18	4	11	12	13	5	10	13	1
8	5	1	4	2	7	8	9	1	5	2	10	3	11	12	6	4	10	13	19
9	1	5	2	3	6	8	4	10	18	11	15	7	14	17	9	12	16	19	6
10	8	2	9	3	10	11	4	5	12	7	13	1	14	17	18	15	16	12	12
11	2	8	13	3	9	10	7	3	4	6	10	1	11	14	5	13	11	17	18
12	1	6	2	3	4	5	7	9	8	10	11	12	13	14	15	16	16	15	7

13	1	9	2	3	13	4	6	10	17	13	16	14	11	12	18	5	8	5	15
14	1	6	11	7	16	8	12	2	13	3	9	18	17	14	19	4	10	19	17
15	2	1	3	5	6	4	9	7	8	11	15	16	14	12	18	13	10	18	16
16	1	6	4	5	3	2	9	7	8	11	14	10	12	17	19	15	13	18	13
17	1	6	12	10	3	2	9	7	8	11	5	19	4	16	17	14	15	6	3

Table 7 - The results of processing the a priori ranking of bachelors - graduates of 2021 by assessing the importance of competencies that form the level of quality of training of future specialists

Factor / Expert	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16	X17	X18	X19	Tj	QC
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	1	8	4	12	5	14	13	16	7	9.5	18	9.5	11	19	2	15	17	6	3	6	0.49
2	6	3	19	4	16	7	8	2	9	1	13.5	5	11	13.5	18	12	15	17	10	6	0.63
3	1	2.5	4.5	4.5	2.5	6.5	8	9	10	11	6.5	12	13	14	15	16	17	18	19	18	0.91
4	1	2.5	4.5	4.5	2.5	6.5	9	8	10	11	6.5	12	14	13	16	17	15	18	19	18	0.91
5	6	4	5	11	18	19	12	14.5	3	14.5	7	1	2	10	9	13	17	16	8	6	0.40
6	5.5	4	12	5.5	7	2	13	15	8	14	16	1	3	18	9	11	10	17	19	6	0.73
7	7	1.5	18	17	9	10	16	3	15	4	19	5	12	13	14	6	1	8	1.5	6	0.44
8	9.5	2	7.5	4.5	12	13	14	2	9.5	4.5	15.5	6	17	18	11	7.5	15.5	19	2	48	0.55
9	1	5	2	3	6	8	4	10	18	11	15	7	14	17	9	12	16	13	19	0	0.91
10	8	2	9	3	10	11	4	55	12	7	13	1	14	17	18	15	16	19	6	0	0.80
11	2	9	17.5	3.5	10	11.5	8	3.5	5	7	11.5	1	13.5	19	6	17.5	13.5	15.5	15.5	30	0.67
12	1	6	2	3	4	5	7	9	8	10	11	12	13	14	15	16.5	16.5	18	19	6	0.91
13	1	9	2	3	13.5	4	6	10	18	13.5	17	15	11	12	19	5	8	16	7	6	0.59
14	1	6	11	7	16	8	12	2	13	3	9	18	17	14	19	3	10	5	15	0	0.52
15	2	1	3	5	6	4	9	7	8	11	15	16	14	12	18	13	10	19	17	0	0.91
16	1	6	4	5	3	2	9	7	8	11	14	10	12	17	19	15	13	18	16	0	0.91
17	1	6	12	10	3	2	9	7	8	11	5	19	4	16	17	14	15	18	13	0	0.86
																				156	
Rank sums	55	77.5	137	105.5	143.5	133.5	161	130	169.5	154	212.5	150.5	195.5	256.5	234	209.5	235.5	260.5	209		
Sum of ranks without heretics	6	18	18	22	18	24	42	40	44	54	53	62	66	70	83	77.5	71.5	91	90		
The importance of competence	1	2	6	3	7	5	10	4	1	9	15	8	12	18	16	14	17	19	13		
The Significance of Competence Without Heretics	1	2	3	5	4	6	8	7	9	11	10	12	13	14	17	16	15	19	18		
Coef. concordations		0.37		0.91																	
Crete. Pearson		113.42		24.31																	

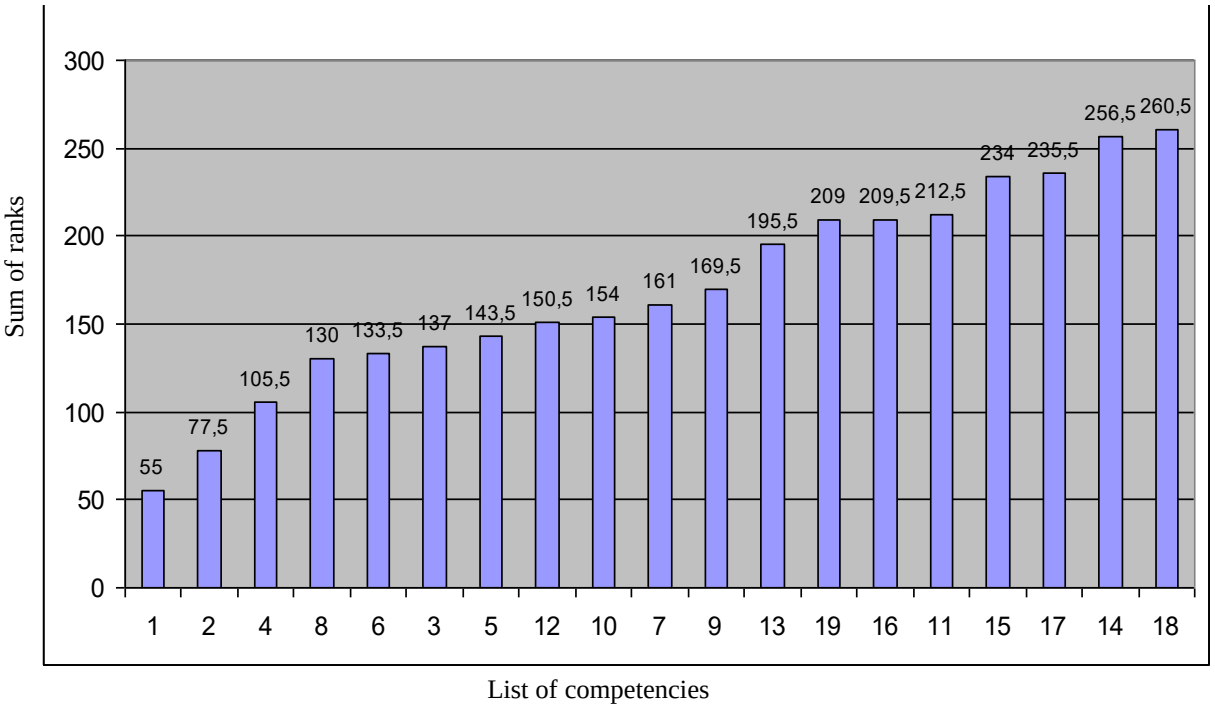


Figure 1 - Characteristics of the importance of competencies that form the level of quality of training of specialists, expressed by bachelors - graduates of 2021

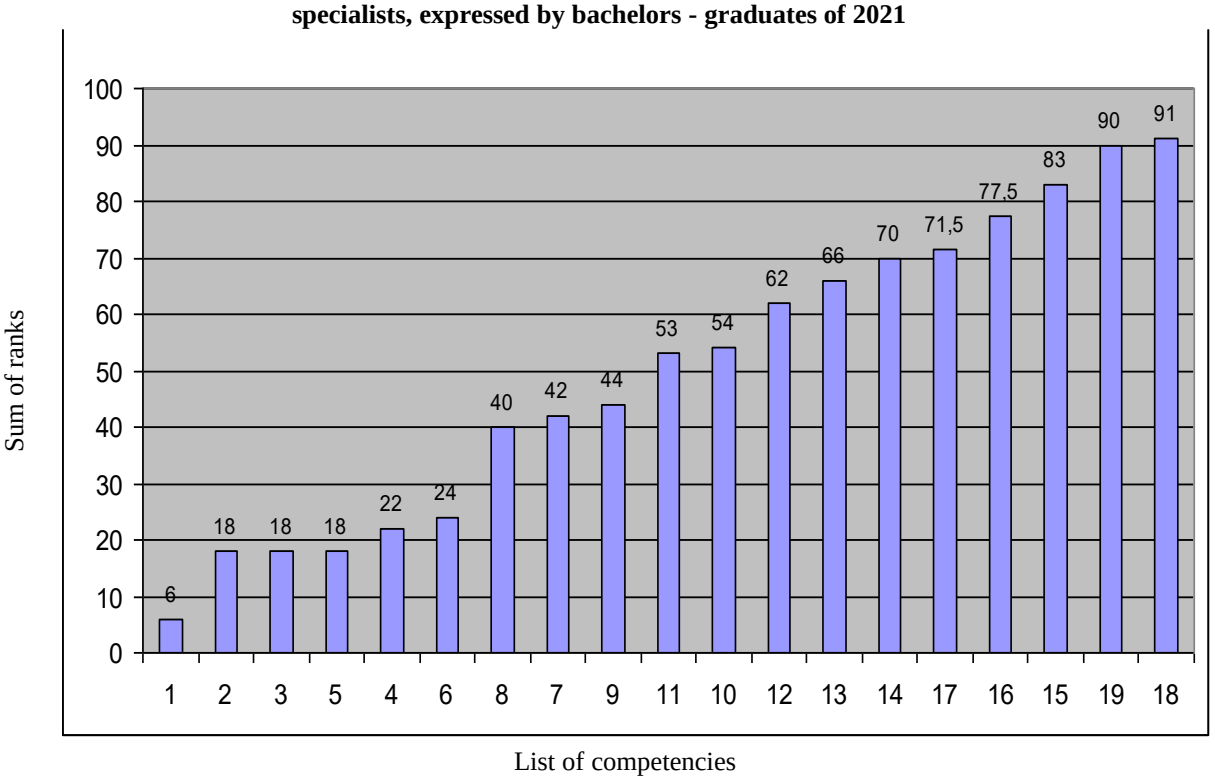


Figure 2 - Characteristics of the importance of competencies that form the level of quality of training of specialists, expressed by bachelors - graduates of 2021, but without heretics, i.e. whose opinion differs significantly from the larger number of respondents participating in the survey

Table 8 - The results of the survey of schoolchildren - graduates of 11 grades of 2021

Factors / Experts	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16	X17	X18	X19
1	11	13	15	1	10	2	8	5	9	7	12	4	17	16	19	14	3		
2	7	11	19	14	2	16	3	15	1	12	15	5	17	9	4	8	6	18	6
3	4	5	7	8	16	17	3	9	10	1	19	14	18	6	2	11	15	10	13
4	13	6	14	5	15	4	7	16	1	12	1	19	17	18	10	8	9	13	12
5	5	3	11	14	17	8	13	1	16	4	18	9	12	19	2	15	6	3	2
6	14	17	18	19	16	15	13	8	12	7	1	11	6	5	4	3	10	10	7
7	13	1	2	5	9	6	14	7	15	10	11	17	18	16	8	3	12	2	9
8	3	1	2	4	7	6	5	8	10	9	12	11	14	15	13	19	17	4	19
9	1	7	15	1	6	2	8	12	3	14	5	16	4	19	10	17	18	16	18
10	1	3	2	5	4	6	7	9	10	14	18	8	19	13	15	16	12	13	9
11	9	11	4	2	15	5	10	1	14	7	16	18	13	17	19	6	12	11	17
12	1	4	3	5	2	6	10	11	9	15	12	17	19	8	13	18	7	8	3
13	1	17	12	16	9	14	18	2	15	11	13	3	19	10	4	8	5	14	16
14	2	10	18	16	9	13	6	3	14	7	8	19	4	17	11	5	15	6	7
15	5	12	3	9	1	1	2	16	6	18	17	8	15	4	13	19	7	1	12

Table 9 - The results of processing the a priori ranking of schoolchildren - graduates of grade 11 in 2021

Factor / Expert	X 1	X 2	X 3	X 4	X 5	X 6	X 7	X 8	X 9	X 10	X 11	X 12	X 13	X 14	X 15	X 16	X 17	X 18	X 19	Tj	QC
1	11	13	15	1	10	2	8	5	9	7	12	4	17	16	19	14	3	18	6	0	0.43
2	7	11	19	14	2	16	3	15	1	12	18	5	17	9	4	8	6	10	13	0	0.19
3	4	5	7	8	16	17	3	9	10	1	19	14	18	6	2	11	15	13	12	0	0.59
4	13	6	14	5	15	4	7	16	1	12	1	19	17	18	10	8	9	3	2	0	0.30
5	5	3	11	14	17	8	13	1	16	4	18	9	12	19	2	15	6	10	7	0	0.38
6	14	17	18	19	16	15	13	8	12	7	1	11	6	5	4	3	10	2	9	0	0.17
7	13	1	2	5	9	6	14	7	15	10	1	17	18	16	8	3	12	4	19	0	0.59
8	3	1	2	4	7	6	5	8	10	9	12	11	14	15	13	19	17	16	18	0	0.59
9	1	7	15	11	6	2	8	12	3	14	5	16	4	19	10	17	18	13	9	0	0.34
10	1	3	2	5	4	6	7	9	10	14	18	8	19	13	15	16	12	11	17	0	0.59
11	9	11	4	2	15	5	10	1	14	7	16	18	13	17	19	6	12	8	3	0	0.50
12	1	4	3	5	2	6	10	11	9	15	12	17	19	8	13	18	7	14	16	0	0.59
13	1	17	12	16	9	14	18	2	15	11	13	3	19	10	4	8	5	6	7	0	0.22
14	2	10	18	16	9	13	6	3	14	7	8	19	4	17	1	5	15	1	12	0	0.26
15	5	12	3	9	11	1	2	16	6	18	17	8	15	4	13	19	7	14	10	0	0.59
																				0	
Rank sums	90	121	145	134	148	121	127	123	155	148	181	179	212	192	147	170	154	143	160		
Rank sums without heretics	14	25	17	31	40	36	27	53	45	57	78	58	85	46	65	83	58	68	73		
The importance of competence	1	2	8	6	10	3	5	4	13	11	17	16	19	18	9	15	12	7	15		
The Significance of Competence Without Heretics	1	3	2	5	7	6	4	10	8	12	17	13	19	9	11	18	14	15	16		

Coef. concordations		0.12		0.59																
Crete. Pearson		31.24		17.71																

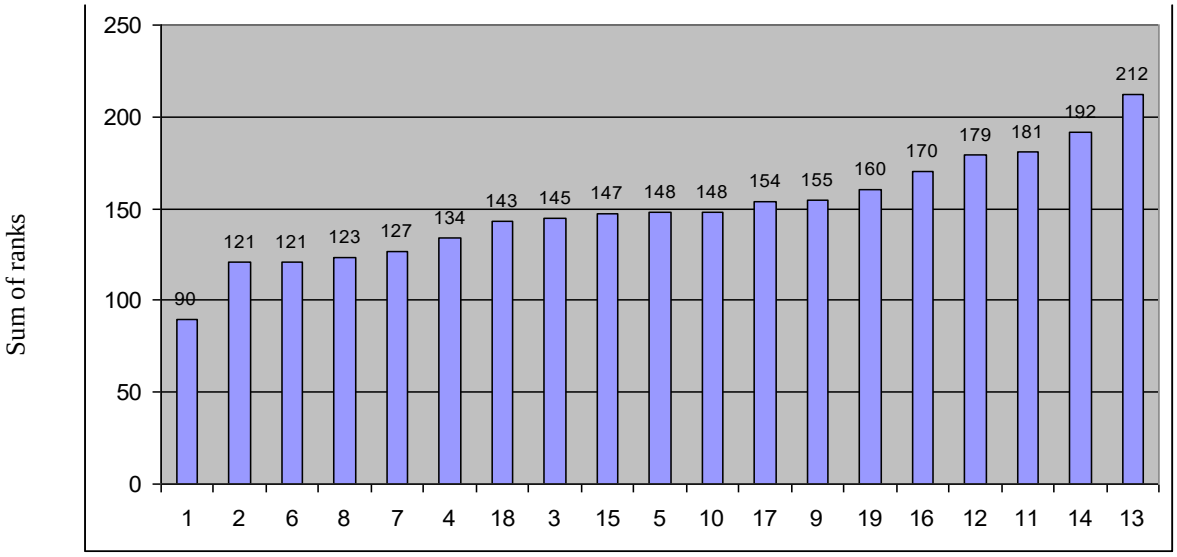


Figure 3 - Characteristics of the importance of competencies that form the level of quality of training of specialists, expressed by schoolchildren - graduates of 11 classes of 2021

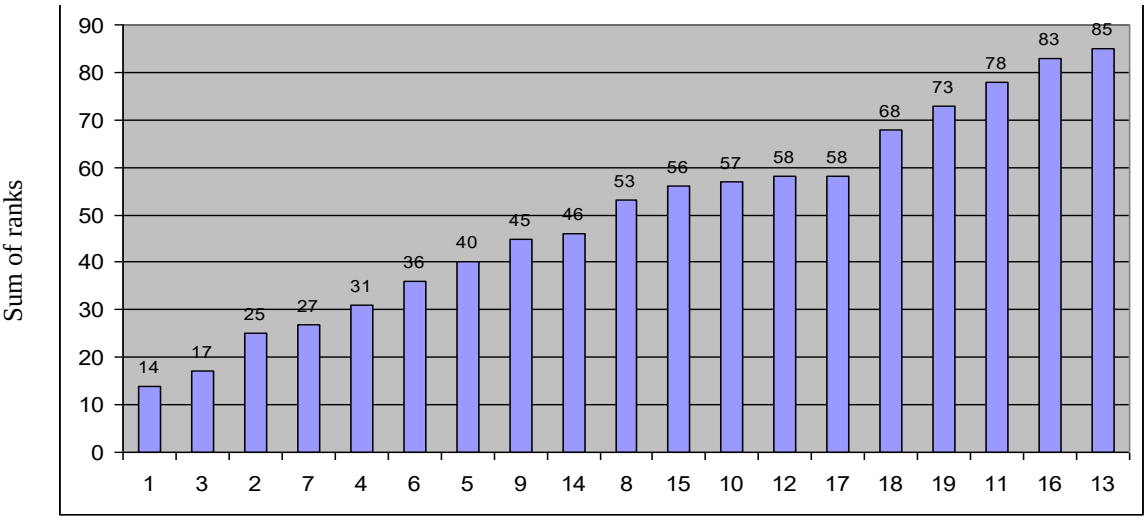


Figure 4 - Characteristics of the importance of competencies that form the level of quality of training of specialists, expressed by schoolchildren - graduates of the 11th grade of 2021, but without heretics, i.e. whose opinion differs significantly from the larger number of respondents participating in the survey

Table 10 - The results of the questionnaire survey of teachers of universities in the Rostov region

Factors / Experts	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16	X17	X18	X19
1	11	10	14	2	3	4	1	5	17	6	16	7	15	12	13	8	9	18	19
2	2	4	10	6	8	1	5	3	14	15	16	17	18	12	9	11	7	13	19

3	1	5	10	3	11	2	6	4	14	15	17	18	12	13	9	7	8	16	19
4	2	1	8	10	13	9	4	11	16	5	19	15	17	18	12	6	7	14	3
5	1	2	5	4	1	6	3	3	4	7	8	7	9	8	8	3	2	1	2
6	16	6	15	7	4	5	1	1	9	3	10	2	18	11	17	12	8	13	14
7	1	3	6	2	10	4	11	5	16	17	6	12	13	18	15	14	8	9	7
8	1	3	2	7	18	13	12	5	8	6	14	15	16	17	19	10	4	11	9
9	1	4	18	5	2	6	9	7	16	14	17	10	15	11	13	12	8	3	19
10	1	3	17	4	2	8	5	6	16	14	18	10	11	15	12	13	7	9	19
11	1	6	15	3	4	2	5	11	9	13	16	8	12	10	17	7	14	18	19
12	6	8	7	5	10	9	2	4	18	1	12	13	15	19	3	16	17	14	11
13	1	4	16	9	15	17	8	6	7	5	14	11	12	13	3	2	10	18	19
14	12	7	14	2	3	13	1	5	9	10	7	9	11	8	11	4	6	15	16
15	1	4	7	2	3	8	5	6	9	15	10	11	16	17	18	12	13	19	14

Table 11 - The results of processing the a priori ranking of teachers of higher educational institutions of the Rostov region

Factor / **Expert**	**X 1**	**X 2**	**X 3**	**X 4**	**X 5**	**X 6**	**X 7**	**X 8**	**X 9**	**X 10**	**X 11**	**X 12**	**X 13**	**X 14**	**X 15**	**X 16**	**X 17**	**X 18**	**X 19**	**Tj**	**QC**
1	11	10	14	2	3	4	1	5	17	6	16	7	15	12	13	8	9	18	19	0	0.73
2	2	4	10	6	8	1	5	3	14	15	16	17	18	12	9	11	7	13	19	0	0.77
3	1	5	10	3	11	2	6	4	14	15	17	18	12	13	9	7	8	16	19	0	0.77
4	2	1	8	10	13	9	4	11	16	5	19	15	17	18	12	6	7	14	3	0	0.53
5	2	5	12	10.5	2	13	8	8	10.5	14.5	17	14.5	19	17	17	8	5	2	5	108	0.56
6	17	7	16	8	5	6	1.5	1.5	10	4	11	3	19	12	18	13	9	14	15	6	0.65
7	1	3	6.5	2	11	4	12	5	17	18	6.5	13	14	19	16	15	9	10	8	6	0.60
8	1	3	2	7	18	13	12	5	8	6	14	15	16	17	19	10	4	11	9	0	0.47
9	1	4	18	5	2	6	9	7	16	14	17	10	15	11	13	12	8	3	19	0	0.77
10	1	3	17	4	2	8	5	6	16	14	18	10	11	15	12	13	7	9	19	0	0.77
11	1	6	15	3	4	2	5	11	9	13	16	8	12	10	17	7	14	18	19	0	0.77
12	6	8	7	5	10	9	2	4	18	1	12	13	15	19	3	16	17	14	11	0	0.50
13	1	4	16	9	15	17	8	6	7	5	14	11	12	13	3	2	10	18	19	0	0.45
14	15	7.5	17	2	3	16	1	5	10.5	12	7.5	10.5	13.5	9	13.5	4	6	18	19	18	0.71
15	1	4	7	2	3	8	5	6	9	15	10	11	16	17	18	12	13	19	14	0	0.77
16																				138	
Rank sums	63	74.5	175.5	78.5	110	118	84.5	87.5	192	157.5	211	176	224.5	214	192.5	144	133	197	217		
Rank sums without heretics	6	23	70	21	27	19	30	31	69	71	84	63	68	61	60	fifty	44	59	95		
The importance of competence	1	2	11	3	6	7	4	5	13	10	16	12	19	17	14	9	8	15	18		
The Significance of Competence Without Heretics	1	4	16	3	5	2	6	7	15	17	18	13	14	12	11	9	8	10	19		
Coef. concordations		0.43		0.77																	
Crete. Pearson		115.0		23.2																	

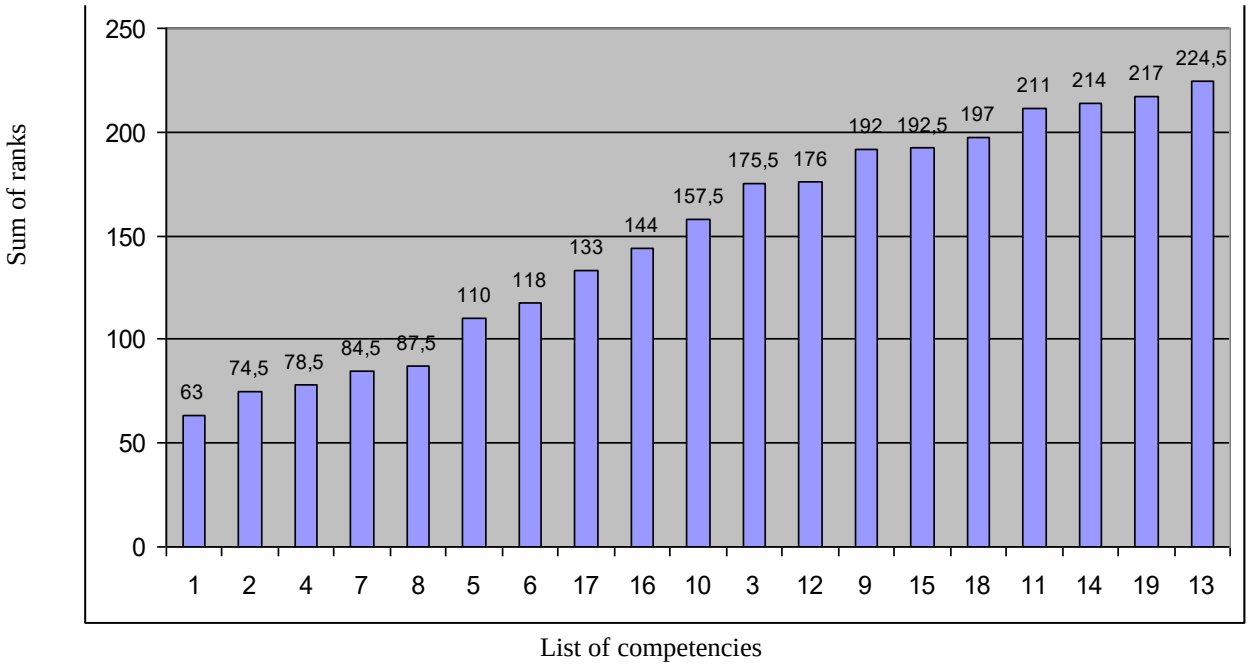


Figure 5 - Characteristics of the importance of competencies that form the level of quality of training of specialists, expressed by teachers of universities in the Rostov region

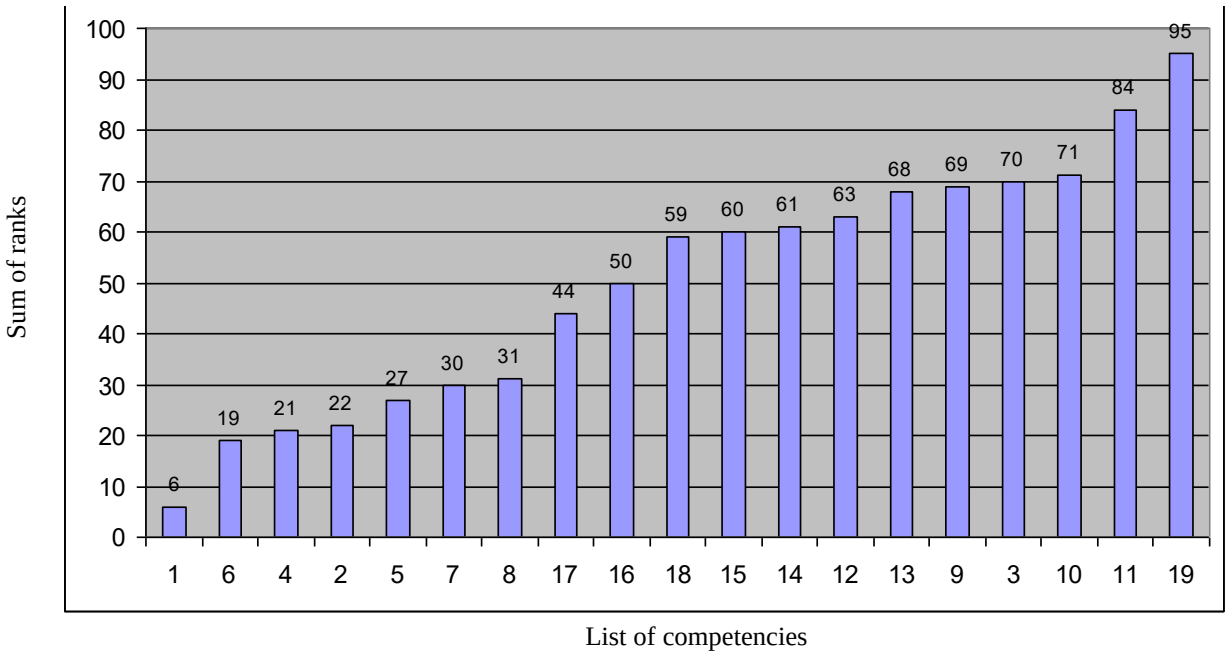


Figure 6 - Characteristics of the importance of competencies that form the level of quality of training of specialists, expressed by teachers of universities in the Rostov region, but without heretics, i.e. whose opinion differs significantly from the larger number of respondents participating in the survey

Table 12 - The results of the survey of specialists - university graduates working at light enterprises industry of the regions of the Southern Federal District and the North Caucasus Federal District

Factors / Experts	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16	X17	X18	X19
1	7	8	8	8	8	5	6	5	9	9	4	1	8	7	10	10	3	10	2
2	6	8	9	8	8	5	6	5	10	10	4	3	8	7	11	11	1	11	2
3	6	8	8	8	8	5	5	4	9	9	3	1	8	7	10	10	2	11	1

4	5	8	9	8	8	6	6	4	10	10	3	2	7	5	11	11	1	12	1
5	6	8	7	8	8	5	5	4	9	9	3	3	7	6	10	10	1	11	2
6	5	8	8	9	8	6	6	3	10	10	2	2	7	4	11	12	1	13	2
7	6	8	7	8	9	5	5	3	10	11	2	2	7	4	12	13	1	14	1
8	7	8	8	8	8	7	7	4	8	8	3	4	6	5	8	8	1	8	2
9	6	7	8	8	9	5	5	4	9	9	3	4	7	6	10	10	2	11	1
10	7	8	7	8	8	6	5	4	9	9	4	1	7	4	10	10	3	11	2
11	6	8	8	8	8	7	7	5	8	8	4	3	8	6	9	9	2	10	1
12	5	6	6	6	6	5	5	4	6	6	4	3	5	4	7	7	2	7	1
13	7	8	8	8	8	4	5	6	8	8	4	3	6	5	8	8	2	8	1
14	6	7	7	7	7	4	5	4	8	8	3	4	6	5	7	7	2	8	1
15	7	8	9	10	11	5	4	4	12	13	3	3	6	5	14	15	1	16	2
16	6	8	9	11	10	7	7	4	13	12	3	3	5	5	15	14	1	16	2
17	6	7	8	8	9	4	4	5	10	11	3	2	5	6	12	12	1	13	1
18	6	9	10	11	12	8	7	4	13	14	3	1	5		15	16	2	17	2
19	6	7	8	9	9	4	4	4	10	11	3	2	5	5	12	12	1	13	1
20	6	7	8	9	10	5	4	4	11	12	3	2	5	5	13	14	2	15	1
21	5	9	9	10	10	7	8	5	11	12	6	3	4	4	13	14	2	15	1
22	6	7	8	9	10	4	6	5	11	12	4	3	5	5	13	14	2	15	1
23	6	8	7	10	9		4	4	11	12	2	3	5	4	14	13	1	15	1
24	5	8	9	10	11	6	7	4	12	13	3	1	4	3	14	15	2	16	2
25	6	7	7	8	8	4	4	5	9	9	3	2	4	3	10	10	1	11	1
26	6	7	8	9	10	5	4	5	1	12	3	2	6	5	13	14	1	15	1
27	7	8	10	9	11	6	6	4	13	12	3	1	5	5	12	13	1	14	2
28	6	8	9	10	1	7	7	4	12	12	3	2	5	6	13	13	2	14	1
29	5	8	9	10	11	6	7	4	11	11	3	3	6	5	12	12	2	13	1
30	5	8	8	8	8	4	4	4	9	9	7	3	6	5	10	10	2	11	1
31	7	8	9	10	11	4	4	5	12	13	3	3	6	5	14	15	2	16	1
32	6	7	7	7	8	5	5	4	9	10	3	3	4	4	11	12	2	13	1
33	7	8	9	8	9	4	4	4	10	10	3	3	5	6	11	11	2	12	1
34	5	6	7	8	9	4	5	5	10	11	3	3	4	3	12	13	2	14	1
35	5	6	7	8	9	4	4	4	10	11	3	3	4	3	12	13	2	14	1

Table 13 - Characteristics of the results of the survey of schoolchildren-graduates of 2021, graduates - bachelors of the university, teachers of universities of the Rostov region and specialists - graduates of the university, working at light industry enterprises of the regions of the Southern Federal District and the North Caucasus Federal District by the importance of competencies that form the quality of education

Significant Competencies Considering Heretics							
Pupils	**1**	**2**	**6**	**8**	**7**	**4**	18
University graduates	**1**	**2**	**4**	**8**	**6**	3	**5**
Teachers	**1**	**2**	**4**	**7**	**8**	**5**	**6**
Specialists	**19**	**17**	**12**	**11**	**8**	**14**	**6**
Significant competences without heretics							
Pupils	**1**	**3**	**2**	**7**	**4**	**6**	**5**
University graduates	**1**	**2**	**3**	**5**	**4**	**6**	**8**
Teachers	**1**	**6**	**4**	**2**	**5**	**7**	**8**
Specialists	**17**	**19**	**12**	**11**	**7**	**6**	**8**
Insignificant competences without heretics							
Pupils	**12**	**17**	**18**	**19**	**11**	16	**13**
University graduates	**13**	14	**17**	**15**	**15**	**19**	**18**
Teachers	**12**	**13**	9	3	10	**11**	**19**

Specialists	**18**	**16**	**15**	**10**	**9**	**5**	**4**
Insignificant competences considering heretics							
Pupils	**9**	**19**	**16**	**12**	**1**	**14**	**13**
University graduates	**19**	**16**	**11**	**15**	17	**14**	**18**
Teachers	**12**	**9**	**15**	**18**	**11**	**19**	**13**
Specialists	**18**	**16**	**15**	**10**	**9**	**5**	**4**

Table 14 - The results of processing the a priori ranking of specialists - university graduates working at light industry enterprises in the regions of the Southern Federal District and the North Caucasus Federal District

Factor / Expert	X 1	X 2	X 3	X 4	X 5	X 6	X 7	X 8	X 9	X 10	X 11	X 12	X 13	X 14	X 15	X 16	X 17	X 18	X 19	Tj	QC
1	8.5	12	12	12	12	5.5	7	5.5	15.5	15.5	4	1	12	8.5	18	18	3	18	2	162	0.97
2	7.5	11.5	14	11.5	11.5	5.5	7.5	5.5	15.5	15.5	4	3	11.5	9	18	18	1	18	2	102	0.97
3	8	12	12	12	12	6.5	6.5	5	15.5	15.5	4	1.5	12	9	17.5	17.5	3	19	1.5	144	0.97
4	6.5	12	14	12	12	8.5	8.5	5	15.5	15.5	4	3	10	6.5	17.5	17.5	1.5	19	1.5	54	0.97
5	8.5	13	10.5	13	13	6.5	6.5	5	15.5	15.5	3.5	3.5	10.5	8.5	17.5	17.5	1	19	2	60	0.99
6	7	12	12	14	12	8.5	8.5	5	15.5	15.5	3	3	10	6	17	18	1	19	3	60	0.98
7	9	12.5	10.5	12.5	14	7.5	7.5	5	15	16	3.5	3.5	10.5	6	17	18	1.5	19	1.5	30	0.99
8	9	15	15	15	15	9	9	4.5	15	15	3	4.5	7	6	15	15	1	15	2	750	0.96
9	8.5	10.5	12.5	12.5	15	6.5	6.5	4.5	15	15	3	4.5	10.5	8.5	17.5	17.5	2	19	1	60	0.99
10	10	13	10	13	13	8	7	5	15.5	15.5	5	1	10	5	17.5	17.5	3	19	2	84	0.97
11	6.5	13	13	13	13	8.5	8.5	5	13	13	4	3	13	6.5	17.5	17.5	2	19	1	354	0.97
12	8.5	13.5	13.5	13.5	13.5	8.5	8.5	5	13.5	13.5	5	3	8.5	5	18	18	2	18	1	318	0.97
13	10	15	15	15	15	4.5	6.5	8.5	15	15	4.5	3	8.5	6.5	15	15	2	15	1	738	0.96
14	9.5	13.5	13.5	13.5	13.5	5	7.5	5	18	18	3	5	9.5	7.5	13.5	13.5	2	18	1	270	0.96
15	10	11	12	13	14	7.5	5.5	5.5	15	16	3.5	3.5	9	7.5	17	18	1	19	2	18	0.995
16	8	11	12	14	13	9.5	9.5	5	16	15	3.5	3.5	6.5	6.5	18	17	1	19	2	18	0.98
17	9.5	11	12.5	12.5	14	5.5	5.5	7.5	15	16	4	3	7.5	9.5	17.5	17.5	1.5	19	1.5	36	0.995
18	8	11	12	13	14	10	9	5	15	16	4	1	6.5	6.5	17	18	2.5	19	2.5	12	0.97
19	10	11	12	13.5	13.5	6	6	6	15	16	4	3	8.5	8.5	17.5	17.5	1.5	19	1.5	48	0.995
20	10	1	12	13	14	8.5	6	6	15	16	4	2.5	6	8.5	17	18	2.5	19	1	36	0.99
21	6.5	11.5	11.5	13.5	13.5	9	10	6.5	15	16	8	3	4.5	4.5	17	18	2	19	1	24	0.96
22	9.5	1	12	13	14	4.5	9.5	7	15	16	4.5	3	7	7	17	18	2	19	1	36	0.98
23	10	12	11	14	13	6.5	6.5	6.5	15	16	3	4	9	6.5	18	17	1.5	19	1.5	66	0.99
24	8	11	12	13	14	9	10	6.5	15	16	4.5	1	6.5	4.5	17	18	2.5	19	2.5	18	0.97
25	10	11.5	11.5	13.5	13.5	7	7	9	15.5	15.5	4.5	3	7	4.5	17.5	17.5	1.5	19	1.5	60	0.98
26	9.5	11	12	13	14	7	5	7	15	16	4	3	9.5	7	17	18	1.5	19	1.5	36	0.995

27	10	11	13	12	14	8.5	8.5	5	17.5	15.5	4	1.5	6.5	6.5	15.5	17.5	1.5	19	3	30	0.97
28	7.5	11	12	13	14	9.5	9.5	5	15.5	15.5	4	2.5	6	7.5	17.5	17.5	2.5	19	1	30	0.98
29	6.5	11	12	13	15	8.5	10	5	15	15	3.5	3.5	8.5	6.5	17.5	17.5	2	19	1	48	0.98
30	7.5	12.5	12.5	12.5	12.5	5	5	5	15.5	15.5	10	3	9	7.5	17.5	17.5	2	19	1	102	0.97
31	10	11	12	13	14	5.5	5.5	7.5	15	16	3.5	3.5	9	7.5	17	18	2	19	1	18	0.995
32	10	12	12	12	14	8.5	8.5	6	15	16	3.5	3.5	6	6	17	18	2	19	1	60	0.99
33	10	11.5	13.5	11.5	13.5	6	6	6	15.5	15.5	3.5	3.5	8	9	17.5	17.5	2	19	1	54	0.99
34	9	11	12	13	14	6.5	9	9	15	16	4	4	6.5	4	17	18	2	19	1	54	0.97
35	10	11	12	13	14	7.5	7.5	7.5	15	16	4	4	7.5	4	17	18	2	19	1	84	0.98
Rank sums	306.5	414.5	431	454.5	474	254	264.5	207	533.5	545.5	145	105	298	238	597.5	610.5	65	653	53		
Sum of ranks without heretics	49	55	60.5	65	69.5	31.5	27.5	33.5	75	80	19	16	43.5	40	86	89	7.5	95	7.5		
The importance of competence	10	11	12	13	14	7	8	5	14	16	4	3	9	6	17	18	2	18	1		
The importance of competence without heretics.	10	11	12	13	14	6	5	7	15	16	4	3	9	8	17	18	1	18	2		
Concordance factor		0.95		0.995																	
Crete. Pearson		601.61		12.73																	

Table 15 - The sums of the ranks formed for the competencies, which were obtained according to the results of a survey of schoolchildren - graduates of the 11th grade of 2021, bachelors - graduates of the university in 2021, teachers of universities in the Rostov region and specialists - graduates of the university working at light industry enterprises in the regions of the Southern Federal District and the North Caucasus Federal District

Factors	Competence of professional activity																			**W1**	**W2**
	1	2	3	4	5	6	7	8	9	10	1	12	13	14	15	16	17	18	19		
Sums of ranks of high school graduates	55	77.5	137	105.5	143.5	133.5	161	130	169.5	154	212.5	150.5	195.5	256.5	234	209.5	235.5	260.5	209	0.12	0.59
Rank sums for university graduates	90	121	145	134	148	121	123	127	123	155	148	181	179	212	192	147	170	154	143	0.37	0.91
Sums of ranks of university professors	63	74.5	175.5	78.5	110	118	84.5	87.5	192	157.5	211	176	224.5	214	192.5	144	133	197	217	0.43	0.77

The sum of the ranks of specialists working at light industry enterprises	306.5	414.5	431	454.5	474	254	264.5	207	533.5	545.5	145	105	298	238	597.5	610.5	65	653	53	0.95	0.995

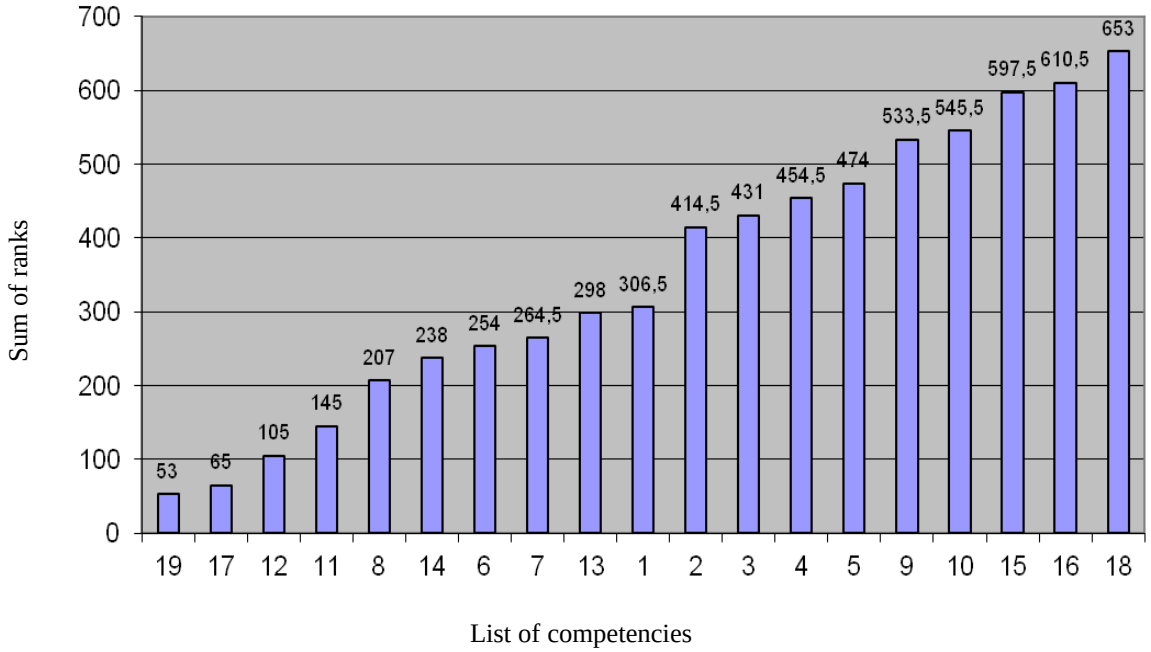


Figure 7 - Characteristics of the importance of competencies that form the level of quality of training of specialists, expressed by specialists - graduates of universities working at light industry enterprises of the regions of the Southern Federal District and the North Caucasus Federal District

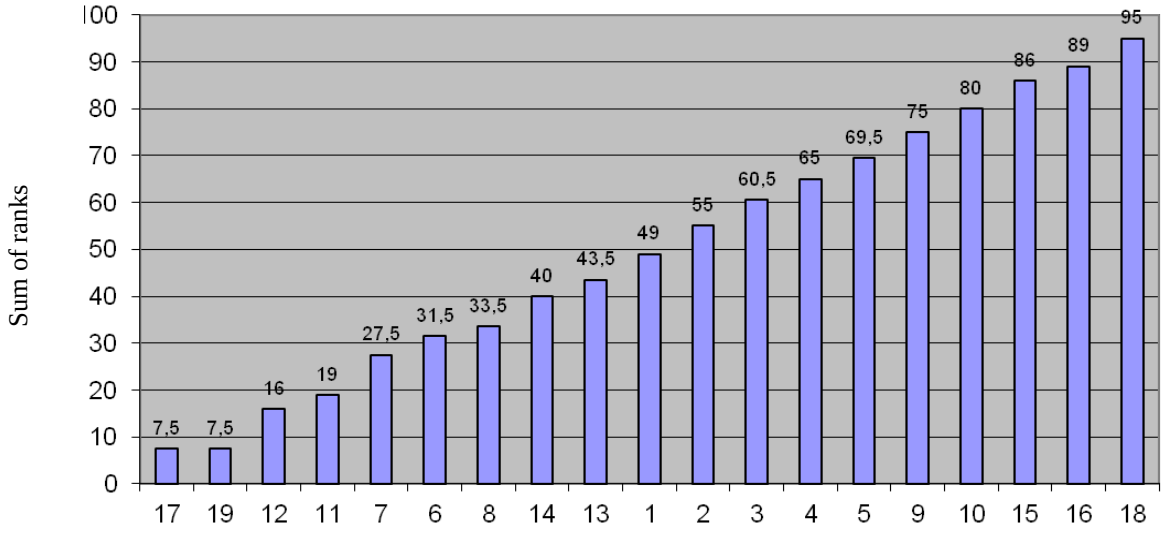


Figure 8 - Characteristics of the importance of competencies that form the level of quality of training of specialists, expressed by specialists graduates of universities working at light industry enterprises of the Southern Federal District and the North Caucasus Federal District, but without heretics, that is, whose opinion differs significantly from a larger number of respondents participating in the survey

If you look at the results of the survey of schoolchildren - graduates, university graduates and teachers, an interesting pattern can be traced, namely:

- there is no consistency between the survey participants, about the degree of importance of the presented competencies on the formation of the quality of training (the coefficient of concordance does not exceed 0.5, and for schoolchildren-graduates, in general, it is 0.2, which indicates a lack of consistency between them on the problem under study);

- the list of competencies assigned by them to the category of significant and insignificant coincide, their choice was made randomly, depending on the place he occupied in the questionnaire, if they were mixed and rearranged, then the result of the questionnaire would be completely different;

- the lack of profound knowledge of the survey participants about the state of affairs in the sectors of the national economy of Russia, about their level of equipment with modern innovative equipment, provoked the respondents to be indifferent to those competencies that, in the opinion of the developers, should have been significant for the formation of highly qualified specialists, and this Did not work out. The efforts of the media that light industry is not needed at all for modern Russia has further exacerbated their negative attitude to these competencies. Yes, most of these problems are provoked by the depressing state of these very light industry enterprises, the low culture of advertising itself about the advantages of production activities at these enterprises in comparison with other types of offered labor activities, and if we take into account,

Of course, the family can be blamed for the fact that children are incorrectly oriented about the realities of life, but society itself is largely responsible for a biased assessment of the real state of affairs in the education system, does not take an objectively active, offensive life position, which led to a lack of information and the knowledge of schoolchildren about the real state of affairs and the possibility of an informed choice of their future profession.

Today, all this is still provoked by the incorrectness of the decision of the Ministry of Education and Science on the introduction of compulsory USE in disciplines, among which for technical specialties the exam in physics is approved as a mandatory exam, the teaching of which today in secondary schools is humiliating at a low level, or is absent altogether. The only fault in this is secondary schools and teacher training colleges, whose graduates do not want to work in schools. A similar situation is with doctors, educators in child care facilities, communications workers and other industries due to their low demand and low wages. Unwillingness to see, and even more so to solve these problems by the government has already provoked an engineering crisis, and inviting foreign specialists to our living conditions is an even greater crime, because they do not and cannot have the desire to make a significant contribution to the development of our sectors of the national economy. And this is already being confirmed that there is no one to work at the most advanced enterprises equipped with the most modern multifunctional and universal equipment, and this is at such a level of unemployment in the country. And it is sad that no one is responsible for such a state of affairs, but on the contrary, everything is being done to destroy the higher school with such an abundance of PLOs that do not carry anything but harm to education, squeezing out the most talented part of the teaching staff from the higher school that and provokes a low level of training of specialists for the most socially significant industries - teachers, doctors, engineers, highly qualified workers and middle managers who know and want to work at home, and not to be outcasts and flee abroad in search of means of subsistence, agreeing to any and most often not qualified work. In Portugal, Spain, Italy, France, Switzerland, Austria, there are already whole towns of Russians who clean the streets, wash and lick the local population, take care of the sick, work as governesses only because there is a demand for these species and you can earn the minimum that allows them to live, not exist. But we cannot do it at home, and the saddest thing is that we do not want to do it, assuming that all this is not about us. It is so convenient, but to whom and who will be responsible for this and will it be - a big question? Or it will again be a “voice in the desert”, which is a pity - this is the fate of our children and grandchildren, and by and large, the fate of our country. agreeing to any and most often not qualified work. In Portugal, Spain, Italy, France, Switzerland, Austria, there are already whole towns of Russians who clean the streets, wash and lick the local population, take care of the sick, work as governesses only because there is a demand for these species and you can earn the minimum that allows them to live, not exist. But we cannot do it at home, and the saddest thing is that we do not want to do it, assuming that all this is not about us. It is so convenient, but to whom and who will be responsible for this and will it be - a big question? Or it will again be a “voice in the desert”, which is a pity - this is the fate of our children and grandchildren, and by and large, the fate of our country. agreeing to any and most often not qualified work. In Portugal, Spain, Italy, France, Switzerland, Austria, there are already whole towns of Russians who clean the streets, wash and lick the local population, take care of the sick, work as governesses only because there is a demand for these types and you can earn the minimum that allows them to live and not exist. But we cannot do it at home, and the saddest thing is that we do not want to do it, assuming that all this is not about us. It is so convenient, but to whom and who will be responsible for this and will it be - a big question? Or it will again

be a “voice in the desert”, which is a pity - this is the fate of our children and grandchildren, and by and large, the fate of our country. they wash and lick the local population, take care of the sick, work as governesses only because there is a demand for these species and it is possible to earn the minimum that allows them to live and not exist. But we cannot do it at home, and the saddest thing is that we do not want to do it, assuming that all this is not about us. It is so convenient, but to whom and who will be responsible for this and will it be - a big question? Or it will again be a “voice in the desert”, which is a pity - this is the fate of our children and grandchildren, and by and large, the fate of our country. they wash and lick the local population, take care of the sick, work as governesses only because there is a demand for these species and it is possible to earn the minimum that allows them to live and not exist. But we cannot at home, and the saddest thing is that we do not want to do it, assuming that all this is not about us. It is so convenient, but to whom and who will be responsible for this and will it be - a big question? Or it will again be a “voice in the desert”, which is a pity - this is the fate of our children and grandchildren, and by and large, the fate of our country. but to whom and who will be responsible for this, and will it be - a big question? Or it will again be a “voice in the desert”, which is a pity - this is the fate of our children and grandchildren, and by and large, the fate of our country. but to whom and who will be responsible for this, and will it be - a big question? Or it will again be a “voice in the desert”, which is a pity - this is the fate of our children and grandchildren, and by and large, the fate of our country.

And yet, hope dies last: “Colleagues, let's wake up, stop being afraid of everything, and be indifferent for the fate of our own children, rise and fight and we will be able to alter and reorganize a lot in ourselves, in colleagues, and in the country as a whole ...

If the state of higher education in Russia is more or less clear, then the attitude to the learning process itself is ambiguous. This is alarming, which can provoke indifference and unwillingness to spend efforts to turn these very competencies into knowledge, which would be for them evaluative criteria for making a decision when hiring them. Such anxiety is due to the fact that when communicating with schoolchildren-graduates and students-graduates to prepare them for filling out the questionnaires, indifference was frankly traced, and the question - Why? More often than not, the answer was the same. There is no certainty that their efforts will be needed. Realizing that this is passing, we took a chance on an experiment, the essence of which was that we mixed the sequence of competencies using random numbers and included them in the questionnaire with new numbers.

Our presence when filling out the questionnaires convinced us that the prevailing stereotype worked on the questionnaires, namely, if the factors are listed in a certain sequence, then their significance corresponds to this sequence and they assign places taking into account this stereotype. This conclusion is confirmed by the low results of the questionnaire - the concardia coefficient does not exceed 0.15, which indicates a lack of agreement between schoolchildren - graduates and bachelors - graduates. Of course, this is not an absolute conclusion, since today, due to the shortage of applicants and the lack of competition, this situation has provoked a decline in interest in higher education itself. Since today's enterprises are family clans, where the heads of the main positions are relatives of the owners of the enterprises, sometimes even without an educational base, therefore, both schoolchildren and their parents go to the least resistance to help their child get a specialty that will be in demand at all times: an economist, a lawyer, an accountant. If this is not possible, or the child has a desire to get an engineering education, then the parents provide him with the opportunity to acquire knowledge of a foreign language, computer technology with the confidence that it will be useful abroad, and, unfortunately, this practice is becoming ever larger. And the conversations of our leaders of the country that we will invite foreigners to leading directions in science only worsens the interest of their homegrown Russians to receive this very education. And this is confirmed by the results of the questionnaire, given in the tables and figures of this message. Out of this picture, the results of the questionnaire survey of teachers, since their high professionalism and work experience did not allow them to be misled, which was confirmed by the results of the first and second polls, they are identical, more consistent, although the attitude towards the competencies themselves is negative, considering that it is more important for assessing the quality of training of specialists - its ability independently solve the tasks assigned to them. And with confidence that the results of their work will be assessed not only by their salary, but also by the solution of their social problems: housing, authority, promotion and simply respectful attitude towards him as a specialist. what is more important for assessing the quality of training of specialists is their ability to independently solve the tasks assigned to them. And with confidence that the results of their work will be assessed not only by their salary, but also by the solution of their social problems: housing, authority, promotion and simply respectful attitude towards him as a specialist. what is more important for assessing the quality of training of specialists is their ability to independently solve the tasks assigned to them. And with confidence that the results of their work will be assessed not only by their salary, but also by the solution of their social problems: housing, authority, promotion and simply respectful attitude towards him as a specialist.

When communicating with them, the respondents, who were teachers, graduate students, bachelors and masters of the department, expressed their regret about the lack of engineering training, considering this form more effective and in demand - and we agree with it. We believe that all the best that was in the higher education of the USSR and Russia will be reanimated and will take its rightful place.

One of the conditions for the competitiveness of an enterprise is the organization of effective interaction with parties interested in the successful functioning of this enterprise. Each enterprise, even small ones, has several groups of subjects with different interests, with which it can be in temporary or permanent cooperation. The research of the authors is devoted to the issues of studying these interests, ways of solving emerging problems between external and internal participants, establishing relationships between partners, in order to guarantee to all interested parties the implementation of the main principle - the interests of all parties are legitimate and require their satisfaction and respect.

Partnerships can be divided into two groups: external and internal. External include: buyers, suppliers, competitors, government agencies and organizations, regional governments, financial intermediaries.

Buyers. Strategies and tactics for working with important customers include joint meetings to identify the drivers of business change, mutual efforts to develop products and the market, increase communication, use common space, and joint training and service programs. Strengthening customer relationships often provides significant benefits.

Internal partners include managers, employees, owners, and a board of directors or board, which represents managers and owners. One of the most significant internal partners is a senior executive.

Thus, the success of an organization is determined by the degree of satisfaction of the interests of interested parties, therefore, in order to increase the competitiveness and efficiency of activities, an enterprise must take into account not only its own interests, but also the interests of interested parties.

Therefore, taking into account the considered methodological foundations of the competitiveness of an enterprise, a methodology for assessing and analyzing the competitiveness of an enterprise based on the theory of stakeholders is proposed.

Stage 1. Selection indicators for assessing competitiveness factors enterprises. For each factor, a system of indicators can be determined based on the analysis of scientific literature (Table 16).

So, taking into account the analysis of the system of indicators for assessing the competitive potential of an enterprise, the following system of indicators for assessing internal factors of competitiveness can be proposed enterprises (table 16).

Table 16 – The system of indicators for assessing the competitive potential of shoe enterprises

Competitive potential factors	Assessment indicators
1	2
1. Marketing Effectiveness	The ratio of the quality of the product and the costs of its production and marketing
	Growth rate of marketable products
	Growth in sales and profits
	Profitability
	Market share, image
	The quality of partnerships
2. Quality of management	Return on total assets, return on equity; return on investment
	Net profit for 1 rub. sales volume; profit from product sales per 1 rub. sales volume; profit ex. period for 1 rub. sales volume
3. The financial condition of the enterprise	Equity ratio; current liquidity ratio; coverage ratio, autonomy ratio, fixed asset index, total profitability of the enterprise, return on equity, profitability of products
4. The level of organization of production	Production capacity utilization rate; production and sales facilities; volume and directions of investments
	The share of certified products in accordance with international standards of the ISO 9000 series
	Depreciation of OPF, growth of labor productivity

5. Efficiency of MTO	The quality and prices of the supplied materials. Material return, turnover, allowing direct connections; the coefficient of uniformity of the receipt of goods; profitability of transaction costs; profitability of purchasing goods
6. Activity of innovation activity	Annual expenditure on R&D, number of patents for inventions
	The share of innovative products, the share of product exports, the number of advanced technologies created
	The volume of shipped innovative products (services), the number of patented technologies, the number of patented technologies, the cost of innovation, the number of acquired and transferred new technologies, software
7. staff competitiveness	Personnel turnover rate, coefficient of advance of labor productivity in relation to wages, educational level of the labor force, level of professional qualifications of workers

Stage 2. Determination of the importance of indicators in the overall assessment of competitiveness. The significance of indicators for assessing each factor of competitive potential are presented in Table 17.

Table 17 - Recommended system of indicators for assessing the competitiveness of an enterprise and their significance

Enterprise competitiveness factors	Indicators	Significance,%
1	2	3
1. Competitiveness of goods	Weighted average for the product range of competitiveness of the goods	40
2. Marketing Effectiveness	Exceeding the permissible level of stocks of finished goods	3
	Market share of the enterprise	3
	Sales growth rate	3
	Assessment of the level of partnerships with stakeholders of the enterprise	10
	Total	19
3. Quality management	Return on investment	3
	Return on Total Assets	3
	Total	6
4. Financial condition of the enterprise	Coefficient of provision with own circulating assets	3
	Current liquidity ratio	3
	Costs per 1 rub. products sold	3
	Total	9
5.The level of organization of production	Capacity utilization rate	2
	Labor productivity	2
	Depreciation of fixed assets	2
	Total	6
6. Efficiency of MTO	Reducing the level of material consumption	3
	Material efficiency	3
	Total	6
7. Activity of innovation activity	Share of innovative products	4
	Cost of innovation	4
	Total	8
8. Competitiveness of staff	Coefficient of advancing labor productivity growth in relation to wage growth	3
	Employee turnover rate	3

	Total	6
	Total importance of competitive potential	60
	Total maximum significance score	100

Stage 3. Calculation of dimensionless estimates indicators of the competitiveness of the enterprise.

To convert the dimensional estimates of indicators into dimensionless, it is proposed to use the index method. Indices of dimensionless indicators are determined by formula (2) for positive indicators that have a positive trend - growth (for example, profitability of sold products, labor productivity) and according to formula (3) for negative indicators that have a positive trend - decrease (for example, depreciation of fixed assets, excess of balances of finished products in the warehouse in comparison with the norm, staff turnover rate), taken mainly from the indicators that form the cost of production:

$$O_i = X_i / X_i^{\max}, \qquad (2)$$

$$O_i = X_i^{\min} / X_i, \qquad (3)$$

where Oi is a dimensionless (index) estimate of the i-th indicator of enterprise competitiveness,

Xi - the value of the i-th dimensional indicator for assessing the competitiveness of the enterprise,

Ximax - the maximum value of the i-th dimensional indicator for assessing the competitiveness of an enterprise,

Ximin- the minimum value of the i-th dimensional indicator for assessing the competitiveness of the enterprise.

Stage 4. Assessment of the competitiveness of the product. It is carried out for light industry goods according to their demand in the domestic market.

Stage 5. Calculation of the generalizing indicator of the competitiveness of the enterprise. It is proposed to determine a quantitative assessment of the competitiveness of an enterprise according to the following formula (4).

$$K_{\Pi} = \sum_{i=1}^{m} \alpha_i \times O_i, \qquad (4)$$

where KP is an assessment of the competitiveness of the enterprise in percent,

α_i - the significance of the i-th indicator of competitiveness in percentage,

Oi- index (dimensionless) assessment of the i-th indicator of competitiveness,

m - the number of indicators for assessing the competitiveness of the enterprise.

The values of assessing the competitiveness of an enterprise can theoretically vary from 0 to 100 (ratio 5).

$$Kp = 0 \div 100 \qquad (5)$$

For the qualitative characteristics of the obtained assessments of competitiveness, a scale for assessing the quality level is required. In economic practice, they use the principle of constructing scales with an equal step, progressive and regressive scales. Progressive and regressive scales are most often used for material incentives. We believe that the most appropriate is a scale with an equal step, since it, firstly, corresponds to solving a practical problem (specification of the qualitative level of competitiveness), and secondly, it is easy to build and use. The scale step is defined as 100 (maximum estimate): 4 (number of levels) = 25. A choice of another step value is also possible, which is determined by the goals and objectives that the enterprise itself forms.

Table 18 - The scale for assessing the qualitative level of competitiveness of the enterprise

Percentage score	Quality level
from 0 to 24.9	very low
from 25.0 to 49.9	low
from 50.0 to 74.9	middle
from 75.0 to 100	tall

The economic meaning of the obtained generalized assessment of competitiveness is that, on the one hand, it shows the degree of satisfaction with the product, and on the other hand, the degree of use of the competitive potential of the enterprise itself.

The proposed methodology for assessing and analyzing the competitiveness of an enterprise, in contrast to the existing ones, firstly, takes into account the specifics of the shoe industry, secondly, reduces the subjective factor in the assessment, and thirdly, allows for an in-depth analysis, thanks to the proposed directions and indicators of analysis competitiveness of enterprises.

Dear respondent!

What factors would you give preference to when assessing the competitive potential of enterprises in the regions of the Southern Federal District and the North Caucasus Federal District, taking advantage of the privileges - to assign them an appropriate rank from the arithmetic series - preferable starting from 1, and not preferable - a higher figure, ensuring that the requirements of the arithmetic series are met, namely, not allowing missing digits in the arithmetic series. If you have difficulties in choosing your preferences, you can use "linked ranks" by assigning two or more factors to the same rank, but here, too, the requirements of the arithmetic series must be observed.

Table 19 - Criteria for assessing the competitiveness of light industry enterprises located in the regions of the Southern Federal District and the North Caucasus Federal District

No.	List of factors for assessing the competitive potential of enterprises in the regions of the Southern Federal District and the North Caucasus Federal District	Rank
1	The ratio of the quality of the product and the costs of its production and marketing	
2	Sales growth rate	
3	Exceeding the permissible level of stocks of finished goods	
4	Assessment of the level of partnerships with stakeholders of the enterprise	
5	Market share of the enterprise	
6	Return on investment	
7	Return on Total Assets	
8	Cost of innovation	
9	Equity ratio	
10	Capacity utilization rate	
11	Labor productivity	
12	Material efficiency	
13	The share of certified products in accordance with international standards of the ISO series	
14	Reducing the level of material consumption	
15	Share of innovative products	
16	Commodity turnover allowing direct links	
17	Coefficient of advancing labor productivity in relation to wage growth	
18	Coefficient of uniform supply of goods to sales markets	
19	Depreciation of fixed assets	
20	Employee turnover rate	
21	Costs per 1 ruble of products sold	
22	Weighted average for the product range of competitiveness of the goods	

Table 20 - The results of the questionnaire survey of bachelors, masters, teachers and specialists - university graduates working at light industry enterprises, on the impact of competitive potential on the performance of light industry enterprises in the Southern Federal District and the North Caucasus Federal District

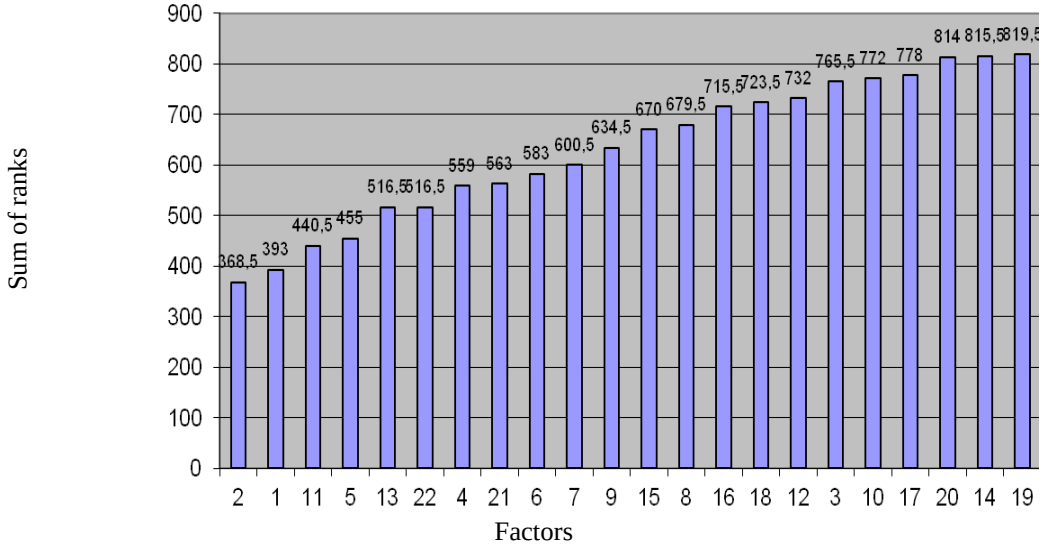
Factors / Experts	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16	X17	X18	X19	X20	X21	X22
1	5	8	6	2	7	9	10	4	11	15	17	12	14	13	3	18	19	20	16	12	20	1
2	3	2	14	13	8	9	15	5	16	10	12	17	1	18	4	19	6	10	20	21	11	7
3	8	16	21	5	2	10	6	7	11	17	12	14	1	20	3	13	15	17	19	18	4	9
4	10	13	21	14	2	6	11	4	5	7	9	19	1	18	3	15	16	7	17	20	8	12
5	15	2	16	14	17	3	2	5	6	13	7	10	1	8	18	21	9	20	19	11	4	12
6	1	2	10	12	7	13	11	3	14	15	8	16	17	21	4	9	20	22	5	6	19	18
7	12	11	14	16	10	9	2	20	8	19	7	18	1	13	22	15	17	6	21	5	3	4
8	2	19	9	12	8	3	11	20	4	22	7	13	5	17	21	10	14	18	16	1	6	15
9	10	4	18	3	8	19	9	14	21	15	5	17	1	12	11	16	20	22	13	6	2	7
10	6	7	17	18	16	14	5	19	13	8	4	9	10	11	22	3	21	12	20	15	1	2
11	10	5	4	9	3	12	11	8	1	22	2	13	14	16	17	6	20	18	21	7	19	15
12	8	3	9	13	2	22	14	11	15	19	4	17	6	16	20	10	18	21	12	1	5	7

13	4	1	9	6	13	15	3	19	14	8	18	20	17	21	5	16	10	2	22	12	7	11
14	13	14	10	3	1	2	16	15	20	5	21	17	4	11	19	7	18	6	22	9	12	8
15	7	14	3	11	17	19	4	12	9	21	1	18	5	20	22	15	8	16	2	13	6	10
16	2	3	5	6	8	4	10	15	7	11	18	16	1	12	21	19	13	14	17	22	20	9
17	6	15	7	8	11	10	9	1	21	20	16	17	2	12	3	22	19	13	4	18	14	5
18	3	1	22	6	19	13	14	11	17	18	2	21	12	16	4	5	10	15	20	7	8	9
19	2	3	6	7	12	11	17	13	18	16	1	20	5	14	19	8	15	9	10	22	21	4
20	2	12	8	11	14	7	15	10	17	9	16	18	1	20	5	19	4	13	22	6	21	3
21	1	14	21	9	8	15	16	7	5	6	4	18	19	17	10	20	22	11	12	13	2	3
22	10	1	18	11	5	12	20	19	6	15	7	8	2	9	4	13	17	15	16	21	3	14
23	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
24	9	1	10	11	3	2	13	12	15	19	8	7	14	18	20	4	17	22	16	21	5	6
25	20	4	11	18	5	6	2	17	15	16	1	8	10	14	13	7	12	22	9	21	3	19
26	3	1	10	14	4	5	12	7	19	17	6	21	13	22	8	16	9	20	18	15	2	11
27	7	2	19	8	1	15	6	20	17	16	3	9	14	13	18	5	22	11	12	21	10	4
28	8	3	16	9	1	17	6	7	19	18	2	10	15	20	14	4	22	12	13	21	11	5
29	4	11	7	10	1	9	2	17	14	21	8	19	6	20	13	22	3	18	12	16	5	15
30	1	3	21	10	8	9	7	14	12	13	11	22	15	17	6	18	19	16	5	20	2	4
31	13	4	14	16	3	22	7	21	8	17	5	15	6	12	11	18	10	9	20	1	2	19
32	9	2	10	14	1	16	15	19	17	20	3	4	11	13	12	18	5	21	7	22	6	8
33	1	9	10	12	11	7	6	5	15	14	13	17	16	18	19	8	21	4	22	20	3	2
34	12	2	13	11	10	1	18	8	19	17	9	7	14	20	6	3	21	16	22	15	4	5
35	4	3	15	5	6	7	14	16	8	11	1	20	17	21	12	9	10	2	22	13	18	19
36	2	4	11	12	1	14	19	20	21	5	18	17	6	22	7	8	10	3	9	13	15	16
37	10	9	17	11	4	5	15	14	16	13	1	2	19	22	3	18	6	7	8	12	20	21
38	1	6	7	5	4	13	10	9	12	11	4	8	2	14	16	4	15	18	17	19	3	20
39	2	5	16	10	9	15	19	11	8	7	1	18	6	21	14	22	12	17	4	20	3	13
40	1	2	15	12	13	14	6	16	3	3	4	7	5	4	8	9	10	11	18	17	20	19
41	1	3	22	4	2	5	6	13	15	16	17	18	7	19	20	8	9	10	11	12	21	14
42	1	18	10	17	9	13	16	19	6	7	15	2	14	5	4	20	11	8	21	12	22	3
43	10	8	3	6	7	9	10	10	1	4	1	3	1	5	3	3	2	1	2	8	5	5
44	10	2	4	10	6	7	8	2	1	9	1	1	1	4	1	1	5	1	3	5	5	4
45	11	4	18	5	1	2	3	16	17	20	6	19	10	9	15	14	21	12	13	22	7	8
46	4	2	21	7	18	17	12	6	11	10	5	1	19	9	8	15	22	14	16	20	13	3
47	3	11	16	8	12	1	2	4	6	19	9	5	13	9	7	19	6	14	18	17	15	10
48	7	4	15	5	3	16	8	8	6	10	9	12	2	11	3	20	19	13	14	18	17	1
49	6	5	15	6	18	7	19	3	8	19	9	14	2	13	16	18	4	10	12	17	11	1
50	17	14	21	1	22	8	9	20	5	7	6	10	12	13	11	15	2	16	18	19	3	4
51	13	1	22	15	9	8	21	6	10	7	12	11	16	14	17	2	20	18	19	5	4	3
52	3	1	22	12	4	9	8	10	5	15	6	13	16	14	11	17	20	7	18	19	21	2
53	14	17	18	12	5	6	2	19	7	16	1	11	15	10	20	4	19	3	8	13	9	1
54	8	1	21	2	10	4	13	12	5	20	19	6	18	7	22	9	17	16	15	14	3	11
55	7	8	13	14	9	18	11	19	10	1	1	12	15	2	16	17	2	5	4	3	5	6

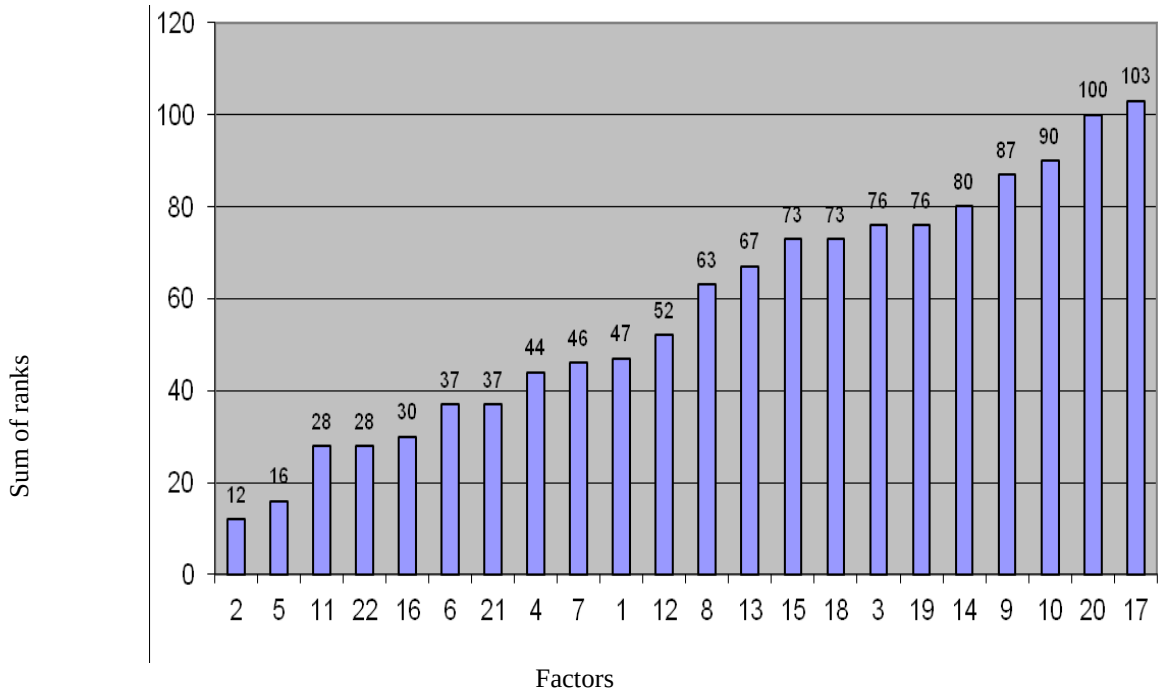
Table 21 - The results of processing the a priori ranking of bachelors, masters, teachers and specialists - university graduates, on the impact of competitive potential on the performance of light industry enterprises in the Southern Federal District and the North Caucasus Federal District

Factors / Experts	*X 1*	*X 2*	*X 3*	*X 4*	*X 5*	*X 6*	*X 7*	*X 8*	*X 9*	*X 10*	*X 11*	*X 12*	*X 13*	*X 14*	*X 15*	*X 16*	*X 17*	*X 18*	*X 19*	*X 20*	*X 21*	*X 22*	*K K*
1	5	8	6	2	7	9	10	4	11	16	18	12,5	15	14	3	19	20	21,5	17	12,5	21,5	1	0,33
2	3	2	15	14	8	9	16	5	17	10,5	13	18	1	19	4	20	6	10,5	21	22	12	7	0,44
3	8	16	22	5	2	10	6	7	11	17,5	12	14	1	21	3	13	15	17,5	20	19	4	9	0,57
4	11	14	22	15	2	6	12	4	5	7,5	10	20	1	19	3	16	17	7,5	18	21	9	13	0,35
5	16	2,5	17	15	18	4	2,5	6	7	14	8	11	1	9	19	22	10	21	20	12	5	13	0,28
6	1	2	10	12	7	13	11	3	14	15	8	16	17	21	4	9	20	22	5	6	19	18	0,34
7	12	11	14	16	10	9	2	20	8	19	7	18	1	13	22	15	17	6	21	5	3	4	0,29
8	2	19	9	12	8	3	11	20	4	22	7	13	5	17	21	10	14	18	16	1	6	15	0,26
9	10	4	18	3	8	19	9	14	21	15	5	17	1	12	11	16	20	22	13	6	2	7	0,49
10	6	7	17	18	16	14	5	19	13	8	4	9	10	11	22	3	21	12	20	15	1	2	0,30
11	10	5	4	9	3	12	11	8	1	22	2	13	14	16	17	6	20	18	21	7	19	15	0,33
12	8	3	9	13	2	22	14	11	15	19	4	17	6	16	20	10	18	21	12	1	5	7	0,37
13	4	1	9	6	13	15	3	19	14	8	18	20	17	21	5	16	10	2	22	12	7	11	0,27
14	13	14	10	3	1	2	16	15	20	5	21	17	4	11	19	7	18	6	22	9	12	8	0,21
15	7	14	3	11	17	19	4	12	9	21	1	18	5	20	22	15	8	16	2	13	6	10	0,24
16	2	3	5	6	8	4	10	15	7	11	18	16	1	12	21	19	13	14	17	22	20	9	0,39
17	6	15	7	8	11	10	9	1	21	20	16	17	2	12	3	22	19	13	4	18	14	5	0,24
18	3	1	22	6	19	13	14	11	17	18	2	21	12	16	4	5	10	15	20	7	8	9	0,37
19	2	3	6	7	12	11	17	13	18	16	1	20	5	14	19	8	15	9	10	22	21	4	0,43
20	2	12	8	11	14	7	15	10	17	9	16	18	1	20	5	19	4	13	22	6	21	3	0,23
21	1	14	21	9	8	15	16	7	5	6	4	18	19	17	10	20	22	11	12	13	2	3	0,35
22	10	1	19	11	5	12	21	20	6	15,5	7	8	2	9	4	13	18	15,5	17	22	3	14	0,54
23	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	0,38
24	9	1	10	11	3	2	13	12	15	19	8	7	14	18	20	4	17	22	16	21	5	6	0.69
25	20	4	11	18	5	6	2	17	15	16	1	8	10	14	13	7	12	22	9	21	3	19	0,28
26	3	1	10	14	4	5	12	7	19	17	6	21	13	22	8	16	9	20	18	15	2	11	0,69
27	7	2	19	8	1	15	6	20	17	16	3	9	14	13	18	5	22	11	12	21	10	4	0,69
28	8	3	16	9	1	17	6	7	19	18	2	10	15	20	14	4	22	12	13	21	11	5	0,69
29	4	11	7	10	1	9	2	17	14	21	8	19	6	20	13	22	3	18	12	16	5	15	0,41
30	1	3	21	10	8	9	7	14	12	13	11	22	15	17	6	18	19	16	5	20	2	4	0,63
31	13	4	14	16	3	22	7	21	8	17	5	15	6	12	11	18	10	9	20	1	2	19	0,26
32	9	2	10	14	1	16	15	19	17	20	3	4	11	13	12	18	5	21	7	22	6	8	0,46
33	1	9	10	12	11	7	6	5	15	14	13	17	16	18	19	8	21	4	22	20	3	2	0,42
34	12	2	13	11	10	1	18	8	19	17	9	7	14	20	6	3	21	16	22	15	4	5	0,69
35	4	3	15	5	6	7	14	16	8	11	1	20	17	21	12	9	10	2	22	13	18	19	0,36
36	2	4	11	12	1	14	19	20	21	5	18	17	6	22	7	8	10	3	9	13	15	16	0,23

37	10	9	17	11	4	5	15	14	16	13	1	2	19	22	3	18	6	7	8	12	20	21	0,20
38	1	8	9	7	5	15	12	11	14	13	5	10	2	16	18	5	17	20	19	21	3	22	0,48
39	2	5	16	10	9	15	19	11	8	7	1	18	6	21	14	22	12	17	4	20	3	13	0,45
40	1	2	17	14	15	16	8	18	3,5	3,5	5,5	9	7	5,5	10	11	12	13	20	19	22	21	0,25
41	1	3	22	4	2	5	6	13	15	16	17	18	7	19	20	8	9	10	11	12	21	14	0,40
42	1	18	10	17	9	13	16	19	6	7	15	2	14	5	4	20	11	8	21	12	22	3	0,20
43	21	17,5	8,5	15	16	19	21	21	2,5	11	2,5	8,5	2,5	13	8,5	8,5	5,5	2,5	5,5	17,5	13	13	0,17
44	21,5	8,5	12	21,5	17	18	19	8,5	4	20	4	4	4	12	4	4	15	4	10	15	15	12	0,19
45	11	4	18	5	1	2	3	16	17	20	6	19	10	9	15	14	21	12	13	22	7	8	0,69
46	4	2	21	7	18	17	12	6	11	10	5	1	19	9	8	15	22	14	16	20	13	3	0,32
47	3	13	18	9	14	1	2	4	6,5	21,5	10,5	5	15	10,5	8	21,5	6,5	16	20	19	17	12	0,27
48	8	5	17	6	3,5	18	9,5	9,5	7	12	11	14	2	13	3,5	22	21	15	16	20	19	1	0,51
49	6,5	5	16	6,5	19,5	8	21,5	3	9	21,5	10	15	2	14	17	19,5	4	11	13	18	12	1	0,32
50	17	14	21	1	22	8	9	20	5	7	6	10	12	13	11	15	2	16	18	19	3	4	0,21
51	13	1	22	15	9	8	21	6	10	7	12	11	16	14	17	2	20	18	19	5	4	3	0,30
52	3	1	22	12	4	9	8	10	5	15	6	13	16	14	11	17	20	7	18	19	21	2	0,60
53	15	18	19	13	6	7	3	20,5	8	17	1,5	12	16	11	22	5	20,5	4	9	14	10	1,5	0,22
54	8	1	21	2	10	4	13	12	5	20	19	6	18	7	22	9	17	16	15	14	3	11	0,31
55	10	11	16	17	12	21	14	22	13	1,5	1,5	15	18	3,5	19	20	3,5	7,5	6	5	7,5	9	0,18
Rank Totals	393	368,5	765,5	559	455	583	600,5	634,5	631,5	772	440,5	732	516,5	815,5	670	715,5	778	723,5	819,5	814	563	516,5	
The sum of the ranks without heretics.	47	12	76	44	16	37	46	63	87	90	28	52	67	80	73	30	103	73	76	100	37	28	
Concord Coef.		0,16		0,69																			
Pearson's criterion.		183,2		6,55																			



Picture. 7 -The results of the questionnaire survey of bachelors, masters, teachers and specialists - university graduates working at light industry enterprises, on the impact of competitive potential on the performance of light industry enterprises in the regions of the Southern Federal District and the North Caucasus Federal District



Picture. 8 -The results of a survey of bachelors, masters, teachers and specialists - university graduates working at light industry enterprises, on the impact of competitive potential on the performance of a light industry enterprise in the regions of the Southern Federal District and the North Caucasus Federal District, without heretics, that is, the opinion of those respondents that does not agree with most of the participants poll

Dear respondent!

What priorities would you give preference in assessing the high performance properties and quality of fur products, taking advantage of the privileges - to assign them the appropriate rank from the arithmetic series - preferable starting from 1, and not non-preferred - a higher figure, ensuring that the requirements of the arithmetic series are met, namely, not allowing missing numbers. If you have difficulties in choosing preferences, you can use the "linked ranks", but even here it is necessary to satisfy the requirements of the arithmetic series. (table 22).

Table 22 - Criteria for assessing the impact on the quality of domestic fur products, formed according to the results of a survey of leading experts

No.	The list of high performance indicators and quality of fur products	Rank
1	Lightfastness to fur dyeing	
2	Fur resistance to moisture	
3	Dry cleaning resistance	
4	Lack of color variation in the product	
5	Absence of lifetime diseases and injuries, confirmation by sanitary and ecological certificates	
6	Fur type	
7	Resistance to low temperatures, heat-shielding properties	
8	Price	
9	Duration of the warranty period	
10	Weight (product weight)	
11	Wrinkle resistance of the product	
12	Shine of the hairline of a fur product	
13	Hairline height (length)	
14	Hair density	
15	Hair softness	
16	The elasticity of the hairline in a wet and hot state (ensuring the product is given the desired shape)	
17	The strength of the bond of the hairline with the skin tissue	

18	The size of the dressed skins	
19	Dry friction fastness of the hairline	
20	Skin grade	
21	Compliance of fittings and other accessories in the manufacture of fur products with the requirements that apply to them	
22	The presence of a "chip"	

If the number of related ranks is 8, then in the arithmetic row from 1 to 22 places will remain 22-8 = 14, i.e. there will be only 14 places in the new arithmetic series.

Table 23 - Results of the questionnaire survey of bachelors, masters, teachers and specialists working at light industry enterprises, on the criteria for assessing the impact on the quality of domestic fur products

Factors Experts	X 1	X 2	X 3	X 4	X 5	X 6	X 7	X 8	X 9	X 10	X 11	X 12	X 13	X 14	X 15	X 16	X 17	X 18	X 19	X 20	X 21	X 22
1	1	3	2	6	7	8	4	10	20	15	18	21	11	14	16	17	12	13	19	5	19	9
2	16	3	2	17	1	18	19	6	4	7	8	20	9	10	11	12	20	13	5	14	15	20
3	8	7	6	9	15	1	16	2	10	3	11	20	17	12	21	18	19	5	14	4	13	22
4	8	9	4	11	13	1	7	3	12	10	20	14	15	6	5	19	16	17	18	2	21	22
5	15	14	16	13	12	1	3	2	5	4	9	6	7	8	17	18	19	10	21	11	20	21
6	7	13	8	4	1	20	18	2	10	6	21	5	3	9	11	14	12	22	19	17	16	15
7	11	13	12	21	14	15	17	1	2	3	4	16	7	5	6	19	21	8	18	9	20	10
8	12	13	14	11	10	1	4	2	9	3	20	8	7	6	5	18	21	22	16	15	17	19
9	3	2	6	7	10	1	12	5	13	11	22	4	8	17	15	14	9	19	18	21	16	20
10	7	13	14	14	2	6	5	1	20	12	19	16	22	17	18	4	8	21	3	11	9	10
11	10	2	9	8	22	11	1	19	13	7	18	6	5	4	3	17	14	15	16	12	20	21
12	10	9	11	12	13	19	8	1	22	6	7	5	4	3	2	14	15	21	18	16	17	20
13	3	7	4	1	17	5	6	16	9	10	11	12	12	13	14	15	19	18	8	2	20	20
14	10	4	14	5	20	1	11	2	9	15	21	12	17	16	6	18	7	19	13	3	8	22
15	12	15	14	13	2	3	16	11	17	4	19	20	22	18	5	6	7	1	9	8	10	21
16	14	16	15	3	21	2	5	17	18	1	19	6	8	7	9	11	10	12	20	4	13	22
17	5	6	17	2	1	7	3	14	18	10	12	15	16	11	20	19	4	13	9	8	21	22
18	3	21	13	14	15	22	4	20	19	5	6	8	18	17	16	7	10	9	12	11	2	1
19	4	11	12	7	2	1	8	3	6	5	15	13	14	9	10	17	16	20	19	18	21	22
20	19	3	18	21	22	16	5	10	15	17	14	13	12	1	2	6	7	9	9	11	20	4
21	15	10	16	9	8	17	14	6	7	13	2	4	3	1	5	12	11	20	18	19	21	22
22	3	5	1	7	2	8	6	21	13	22	15	4	17	19	18	9	12	11	14	20	10	16
23	2	1	3	6	11	14	7	16	4	17	12	20	13	15	5	21	8	22	18	9	19	10
24	15	16	14	13	1	12	2	4	3	18	17	19	20	10	9	8	7	6	11	5	21	22

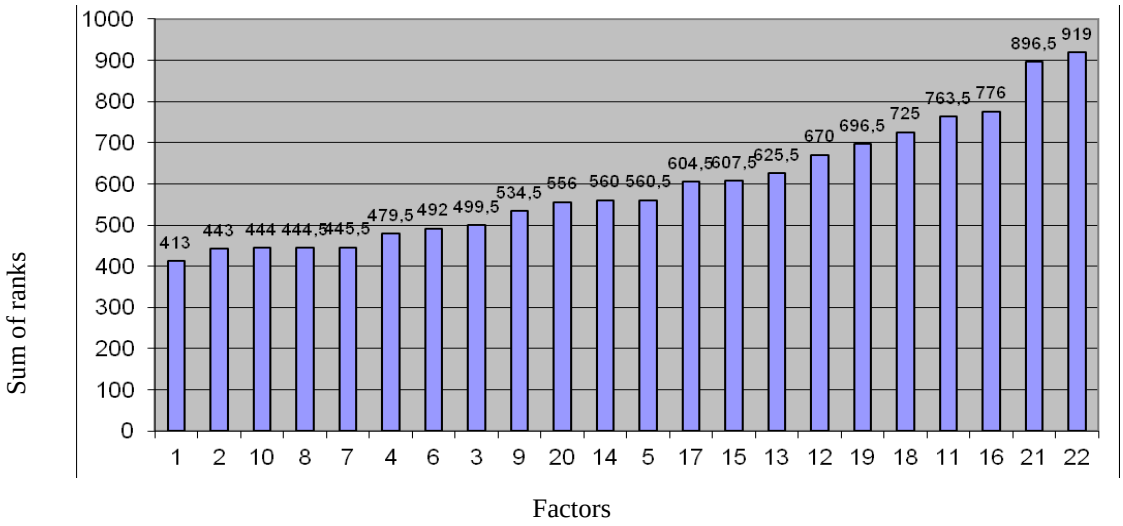
25	17	15	16	14	4	18	13	2	1	3	19	20	6	7	8	10	9	12	11	21	5	22
26	5	4	15	6	14	7	1	2	2	3	18	9	16	17	8	11	12	10	13	19	20	21
27	3	6	2	11	4	20	1	9	12	10	5	15	13	14	19	16	17	18	7	8	22	21
28	2	4	11	13	1	10	14	3	18	8	15	17	16	9	19	20	6	7	21	5	22	12
29	5	2	3	4	6	22	9	1	8	7	15	10	21	11	12	16	18	20	13	14	17	19
30	5	20	2	11	8	17	3	7	6	9	10	15	13	14	12	18	1	19	22	4	21	16
31	6	1	5	12	13	17	7	20	18	3	4	21	11	9	10	14	15	16	2	8	22	19
32	1	9	2	10	11	16	8	12	17	3	13	18	21	19	4	5	6	14	7	15	20	22
33	6	4	5	21	20	1	19	7	2	3	16	8	9	10	11	13	14	12	15	17	18	22
34	9	7	8	10	14	1	6	2	16	11	17	15	5	4	3	18	13	21	20	12	19	22
35	2	8	9	10	11	4	5	12	3	13	14	16	15	18	17	19	1	22	6	7	21	20
36	3	2	4	5	11	12	1	10	6	6	7	15	14	17	19	9	8	8	13	16	18	20
37	8	12	13	4	14	5	6	11	15	7	16	17	1	2	18	19	20	6	21	3	10	9
38	3	1	5	8	11	15	6	12	16	9	21	2	20	7	14	19	10	17	13	4	18	22
39	15	13	16	5	17	1	18	2	3	4	22	19	8	6	7	14	9	10	11	12	20	21
40	4	10	18	5	21	11	12	3	1	2	22	13	14	6	15	16	8	7	17	9	19	20
41	7	8	9	10	20	11	12	3	2	1	13	14	15	16	17	18	4	19	6	5	21	22
42	6	9	8	7	20	4	5	3	1	2	15	10	14	11	13	12	16	17	18	19	21	22
43	17	1	2	3	4	5	6	9	7	8	13	12	11	10	10	18	14	14	15	16	19	20
44	10	11	12	9	1	13	8	14	20	15	16	17	2	3	4	19	5	6	6	7	18	19
45	6	6	8	3	15	1	2	1	5	7	14	7	9	3	10	10	4	12	11	4	13	16
46	6	6	6	5	1	15	3	16	7	9	15	8	3	13	14	10	4	3	11	12	17	2
47	5	7	8	6	9	2	10	4	22	3	15	14	11	13	12	17	20	21	18	1	19	16
48	17	16	15	12	18	1	13	14	2	2	11	5	6	3	4	19	7	4	9	8	20	10
49	6	7	6	5	2	1	8	2	1	1	9	10	11	12	14	13	10	3	4	4	5	1
50	3	4	8	7	9	21	6	18	17	18	10	13	14	11	12	5	1	2	2	15	16	20
51	1	3	4	2	7	3	12	11	10	15	14	10	13	19	20	16	18	17	6	5	8	9
52	1	11	12	13	14	16	15	20	2	21	17	4	3	6	5	18	7	22	8	10	9	19

Table 24 - The results of processing the a priori ranking of bachelors, masters, teachers and specialists working at light industry enterprises, on the criteria for assessing the impact on the quality of domestic fur products

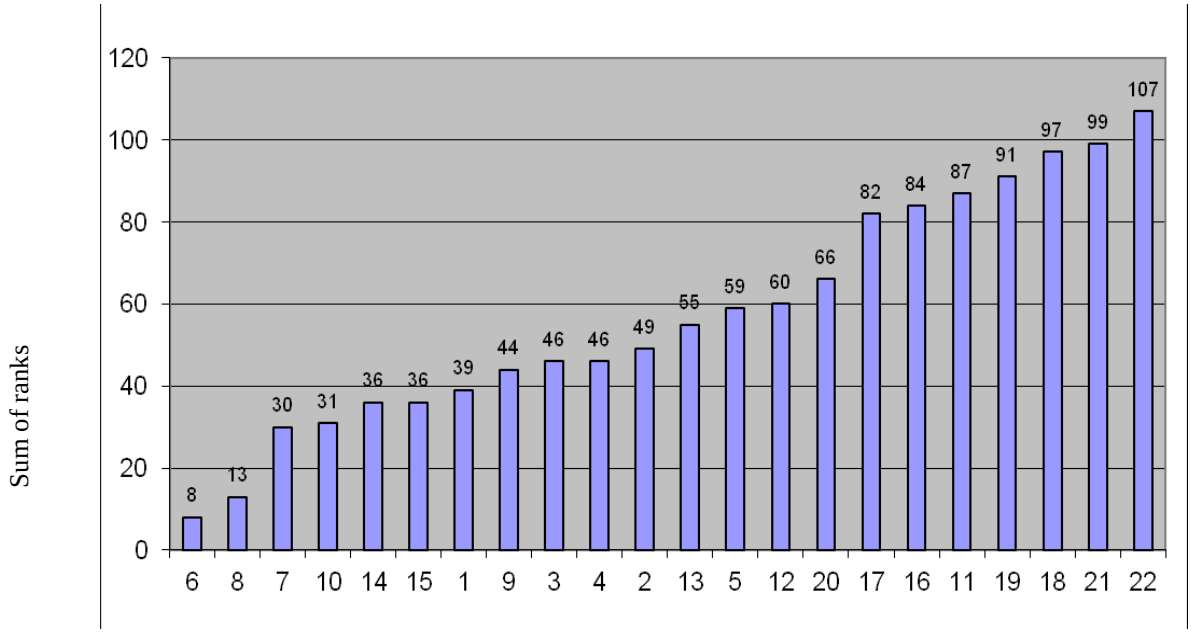
Factor / Expert	X 1	X 2	X 3	X 4	X 5	X 6	X 7	X 8	X 9	X 10	X 11	X 12	X 13	X 14	X 15	X 16	X 17	X 18	X 19	X 20	X 21	X 22	Q C
1	1	3	2	6	7	8	4	10	21	15	18	22	11	14	16	17	12	13	19.5	5	19.5	9	0.45
2	16	3	2	17	1	18	19	6	4	7	8	21	9	10	11	12	21	13	5	14	15	21	0.33
3	8	7	6	9	15	1	16	2	10	3	11	20	17	12	21	18	19	5	14	4	13	22	0.54

4	8	9	4	11	13	1	7	3	12	10	20	14	15	6	5	19	16	17	18	2	21	22	0.76
5	15	14	16	13	12	1	3	2	5	4	9	6	7	8	17	18	19	10	21.5	11	20	21.5	0.74
6	7	13	8	4	1	20	18	2	10	6	21	5	3	9	11	14	12	22	19	17	16	15	0.40
7	11	13	12	21.5	14	15	17	1	2	3	4	16	7	5	6	19	21.5	8	18	9	20	10	0.31
8	12	13	14	11	10	1	4	2	9	3	20	8	7	6	5	18	21	22	16	15	17	19	0.76
9	3	2	6	7	10	1	12	5	13	11	22	4	8	17	15	14	9	19	18	21	16	20	0.62
10	7	13	15	14	2	6	5	1	20	12	19	16	22	17	18	4	8	21	3	11	9	10	0.24
11	10	2	9	8	22	11	1	19	13	7	18	6	5	4	3	17	14	15	16	12	20	21	0.49
12	10	9	11	12	13	19	8	1	22	6	7	5	4	3	2	14	15	21	18	16	17	20	0.39
13	3	7	4	1	18	5	6	17	9	10	11	12.5	12.5	14	15	16	20	19	8	2	21.5	21.5	0.53
14	10	4	14	5	20	1	11	2	9	15	21	12	17	16	6	18	7	19	13	3	8	22	0.57
15	12	15	14	13	2	3	16	11	17	4	19	20	22	18	5	6	7	1	9	8	10	21	0.25
16	14	16	15	3	21	2	5	17	18	1	19	6	8	7	9	11	10	12	20	4	13	22	0.40
17	5	6	17	2	1	7	3	14	18	10	12	15	16	11	20	19	4	13	9	8	21	22	0.47
18	3	21	13	14	15	22	4	20	19	5	6	8	18	17	16	7	10	9	12	11	2	1	0.21
19	4	11	12	7	2	1	8	3	6	5	15	13	14	9	10	17	16	20	19	18	21	22	0.76
20	19	3	18	21	22	16	5	10	15	17	14	13	12	1	2	6	7	8	9	11	20	4	0.22
21	15	10	16	9	8	17	14	6	7	13	2	4	3	1	5	12	11	20	18	19	21	22	0.34
22	3	5	1	7	2	8	6	21	13	22	15	4	17	19	18	9	12	11	14	20	10	16	0.26
23	2	1	3	6	11	14	7	16	4	17	12	20	13	15	5	21	8	22	18	9	19	10	0.44
24	15	16	14	13	1	12	2	4	3	18	17	19	20	10	9	8	7	6	11	5	21	22	0.35
25	17	15	16	14	4	18	13	2	1	3	19	20	6	7	8	10	9	12	11	21	5	22	0.29
26	6	5	16	7	15	8	1	2.5	2.5	4	19	10	17	18	9	12	13	11	14	20	21	22	0.71
27	3	6	2	11	4	20	1	9	12	10	5	15	13	14	19	16	17	18	7	8	22	21	0.46
28	2	4	11	13	1	10	14	3	18	8	15	17	16	9	19	20	6	7	21	5	22	12	0.42
29	5	2	3	4	6	22	9	1	8	7	15	10	21	11	12	16	18	20	13	14	17	19	0.50
30	5	20	2	11	8	17	3	7	6	9	10	15	13	14	12	18	1	19	22	4	21	16	0.43
31	6	1	5	12	13	17	7	20	18	3	4	21	11	9	10	14	15	16	2	8	22	19	0.38
32	1	9	2	10	11	16	8	12	17	3	13	18	21	19	4	5	6	14	7	15	20	22	0.41
33	6	4	5	21	20	1	19	7	2	3	16	8	9	10	11	13	14	12	15	17	18	22	0.60
34	9	7	8	10	14	1	6	2	16	11	17	15	5	4	3	18	13	21	20	12	19	22	0.76
35	2	8	9	10	11	4	5	12	3	13	14	16	15	18	17	19	1	22	6	7	21	20	0.52
36	3	2	4	5	13	14	1	12	6.5	6.5	8	17	16	19	21	11	9.5	9.5	15	18	20	22	0.50
37	9	13	14	4	15	5	6.5	12	16	8	17	18	1	2	19	20	21	6.5	22	3	11	10	0.36
38	3	1	5	8	11	15	6	12	16	9	21	2	20	7	14	19	10	17	13	4	18	22	0.51
39	15	13	16	5	17	1	18	2	3	4	22	19	8	6	7	14	9	10	11	12	20	21	0.68

40	4	10	18	5	21	11	12	3	1	2	22	13	14	6	15	16	8	7	17	9	19	20	0.65
41	7	8	9	10	20	11	12	3	2	1	13	14	15	16	17	18	4	19	6	5	21	22	0.56
42	6	9	8	7	20	4	5	3	1	2	15	10	14	11	13	12	16	17	18	19	21	22	0.76
43	19	1	2	3	4	5	6	9	7	8	14	13	12	10.5	10.5	20	15.5	15.5	17	18	21	22	0.64
44	11	12	13	10	1	14	9	15	22	16	17	18	2	3	4	20.5	5	6.5	6.5	8	19	20.5	0.32
45	9.5	9.5	13	4.5	21	1.5	3	1.5	8	11.5	20	11.5	14	4.5	15.5	15.5	6.5	18	17	6.5	19	22	0.76
46	9	9	9	7	1	19.5	4	21	11	13	19.5	12	4	17	18	14	6	4	15	16	22	2	0.24
47	5	7	8	6	9	2	10	4	22	3	15	14	11	13	12	17	20	21	18	1	19	16	0.59
48	19	18	17	14	20	1	15	16	2.5	2.5	13	7	8	4	5.5	21	9	5.5	11	10	22	12	0.30
49	12.5	14	12.5	10.5	5.5	2.5	15	5.5	2.5	2.5	16	17.5	19	20	22	21	17.5	7	8.5	8.5	10.5	2.5	0.27
50	4	5	9	8	10	22	7	20	18	19	11	14	15	12	13	6	1	2.5	2.5	16	17	21	0.25
51	1	3.5	5	2	8	3.5	14	13	11.5	17	16	11.5	15	21	22	18	20	19	7	6	9	10	0.37
52	1	11	12	13	14	16	15	20	2	21	17	4	3	6	5	18	7	22	8	10	9	19	0.28
Rank sums	413	443	499.5	479.5	560.5	492	445.5	444.5	534.5	444	763.5	670	625.5	560	607.5	776	604.5	725	696.5	556	896.5	919	
Sums of ranks without eritics	39	49	46	46	59	8	30	13	44	31	87	60	55	36	36	84	82	97	91	66	99	107	
Coef. concord.		0.19		0.76																			
Crete. Pearson		207.9		7.66																			



Picture. 9 -The results of the questionnaire survey of bachelors, masters, teachers and specialists - university graduates working at light industry enterprises, on the criteria for assessing the impact on the quality of domestic fur products



Picture. 10 -The results of the questionnaire survey of bachelors, masters, teachers and specialists - university graduates working at light industry enterprises, on the criteria for assessing the impact on the quality of domestic fur products without heretics, i.e. opinions of those respondents who do not agree with the majority of survey participants

Dear respondent!

What factors would you prefer when assessing the competitive potential of enterprises in the regions of the Southern Federal District and the North Caucasus Federal District through the eyes of children, taking advantage of the privileges - to assign them the appropriate rank from the arithmetic series - preferable starting from 1, and not preferable - a higher figure, ensuring that the requirements of the arithmetic series are met, namely without skipping digits in the arithmetic series. If you have difficulties in choosing your preferences, you can use “linked ranks” by assigning two or more factors to the same rank, but here, too, the requirements of the arithmetic series must be observed.

Table 25 - Criteria for assessing the competitiveness and relevance of children's shoes through the eyes of the child

No.	List of factors for assessing the competitive potential of enterprises in the regions of the Southern Federal District and the North Caucasus Federal District	Rank
1	Toe shape	
2	Quality of children's shoes	
3	The flexibility of children's shoes	
4	Price of children's shoes	
5	Comfort	
6	Service level for parents and children in shops and shopping centers	
7	Color	
8	Warranty period for children's shoes	
9	The height of the heel is up to 40 mm	
10	The height of the heel of the shoe is over 40 mm	
11	Weight	
12	Repairability of children's shoes, its expediency	
13	Materials for the bottom of shoes	
14	Upper materials	
15	The place of sale of shoes for children is the interior of a store or a shopping center	
16	What types of children's shoes are preferred: winter	

17	Autumn	
18	Spring	
19	Summer	
20	Bottom fastening strength	
21	Variety of assortment of shoes for children in shops and shopping centers	
22	Compliance with the direction of fashion	

Table 26 - The results of the questionnaire survey of children on their assessment of their competitive potential on the criteria for ensuring competitiveness and the demand for children's shoes made for them

Factors Experts	X 1	X 2	X 3	X 4	X 5	X 6	X 7	X 8	X 9	X 10	X 11	X 12	X 13	X 14	X 15	X 16	X 17	X 18	X 19	X 20	X 21	X 22
1	5	8	6	2	7	9	10	4	11	15	17	12	14	13	3	18	19	20	16	12	20	1
2	3	2	14	13	8	9	15	5	16	10	12	17	1	18	4	19	6	10	20	21	11	7
3	8	16	21	5	2	10	6	7	11	17	12	14	1	20	3	13	15	17	19	18	4	9
4	10	13	21	14	2	6	11	4	5	7	9	19	1	18	3	15	16	7	17	20	8	12
5	15	2	16	14	17	3	2	5	6	13	7	10	1	8	18	21	9	20	19	11	4	12
6	1	2	10	12	7	13	11	3	14	15	8	16	17	21	4	9	20	22	5	6	19	18
7	12	11	14	16	10	9	2	20	8	19	7	18	1	13	22	15	17	6	21	5	3	4
8	2	19	9	12	8	3	1	20	4	22	7	13	5	17	21	10	14	18	16	1	6	15
9	10	4	18	3	8	19	9	14	21	15	5	17	1	12	11	16	20	22	13	6	2	7
10	6	7	17	18	16	14	5	19	13	8	4	9	10	11	22	3	21	12	20	15	1	2
11	10	5	4	9	3	12	11	8	1	22	2	13	14	16	17	6	20	18	21	7	19	15
12	8	3	9	13	2	22	14	11	15	19	4	17	6	16	20	10	18	21	12	1	5	7
13	4	1	9	6	13	15	3	19	14	8	18	20	17	21	5	16	10	2	22	12	7	11
14	13	14	10	3	1	2	16	15	20	5	21	17	4	11	19	7	18	6	22	9	12	8
15	7	14	3	11	17	19	4	12	9	21	1	18	5	20	22	15	8	16	2	13	6	10
16	2	3	5	6	8	4	10	15	7	11	18	16	1	12	21	19	13	14	17	22	20	9
17	6	15	7	8	11	10	8	1	21	20	16	17	2	12	3	22	19	13	4	18	14	5
18	3	1	22	6	19	13	14	11	17	18	2	21	12	16	4	5	10	15	20	7	8	9
19	2	3	6	7	12	11	17	13	18	16	1	20	5	14	19	8	15	9	10	22	21	4
20	2	12	8	11	14	7	15	10	17	9	16	18	1	20	5	19	4	13	22	6	21	3
21	1	14	21	9	8	15	16	7	5	6	4	18	19	17	10	20	22	11	12	13	2	3
22	10	1	18	11	5	12	20	19	6	15	7	8	2	9	4	13	17	15	16	21	3	14
23	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
24	9	1	10	11	3	2	13	12	15	19	8	7	14	18	20	4	17	22	16	21	5	6
25	20	4	11	18	5	6	2	17	15	16	1	8	10	14	13	7	12	22	9	21	3	19
26	3	1	10	14	4	5	12	7	19	17	6	21	13	22	8	16	9	20	18	15	2	11
27	7	2	19	8	1	15	6	20	17	16	3	9	14	13	18	5	22	11	12	21	10	4

28	8	3	16	9	1	17	6	7	19	18	2	10	15	20	14	4	22	12	13	21	11	5
29	4	11	7	10	1	9	2	17	14	21	8	19	6	20	13	22	3	18	12	16	5	15
30	1	3	21	10	8	9	7	14	12	13	11	22	15	17	6	18	19	16	5	20	2	4
31	13	4	14	16	3	22	7	21	8	17	5	15	6	12	11	18	10	9	20	1	2	19
32	9	2	10	14	1	16	15	19	17	20	3	4	11	13	12	18	5	21	7	22	6	8
33	1	9	10	12	11	7	6	5	15	14	13	17	16	18	19	8	21	4	22	20	3	2
34	12	2	13	11	10	1	18	8	19	17	9	7	14	20	6	3	21	16	22	15	4	5
35	4	3	15	5	6	7	14	16	8	11	1	20	17	21	12	9	10	2	22	13	18	19
36	2	4	11	12	1	14	19	20	21	5	18	17	6	22	7	8	10	3	9	13	15	16
37	10	9	17	11	4	5	15	14	16	13	1	2	19	22	3	18	6	7	8	12	20	21
38	1	6	7	5	4	13	10	9	12	11	4	8	2	14	16	4	15	18	17	19	3	20
39	2	5	16	10	9	15	19	11	8	7	1	18	6	21	14	22	12	17	4	20	3	13
40	1	2	15	12	13	14	6	16	3	3	4	7	5	4	8	8	10	11	18	17	20	19
41	1	3	22	4	2	5	6	13	15	16	17	18	7	19	20	8	9	10	11	12	21	14
42	1	18	10	17	9	13	16	19	6	7	15	2	14	5	4	20	11	8	21	12	22	3
43	10	8	3	6	7	9	10	10	1	4	1	3	1	5	3	3	2	1	2	8	5	5
44	10	2	4	10	6	7	8	2	1	9	1	1	1	4	1	1	5	1	3	5	5	4
45	11	4	18	5	1	2	3	16	17	20	6	19	10	9	15	14	21	12	13	22	7	8
46	4	2	21	7	18	17	12	6	11	10	5	1	19	9	8	15	22	14	16	20	13	3
47	3	11	16	8	12	1	2	4	6	19	9	5	13	9	7	19	6	14	18	17	15	10
48	7	4	15	5	3	16	8	8	6	10	9	12	2	11	3	20	19	13	14	18	17	1
49	6	5	15	6	18	7	19	3	8	19	9	14	2	13	16	18	4	10	12	17	11	1
50	17	14	21	1	22	8	9	20	5	7	6	10	12	13	11	15	2	16	18	19	3	4
51	13	1	22	15	19		21	6	10	7	12	11	16	14	17	2	20	18	19	5	4	3
52	3	1	22	12	4	9	8	10	5	15	6	13	16	14	11	17	20	7	18	19	21	2
53	14	17	18	12	5	6	2	19	7	16	1	11	15	10	20	4	19	3	8	13	9	1
54	8	1	21	2	10	4	13	12	5	20	19	6	18	7	22	9	17	16	15	14	3	11
55	7	8	13	14	9	18	11	19	10	1	1	12	15	2	16	17	2	5	4	3	5	6

Table 27 - The results of processing the a priori ranking of children-respondents according to their assessment of their competitive potential on the criteria for ensuring competitiveness and the demand for children's shoes made for them

Factor / *Expert*	*X 1*	*X 2*	*X 3*	*X 4*	*X 5*	*X 6*	*X 7*	*X 8*	*X 9*	*X 10*	*X 11*	*X 12*	*X 13*	*X 14*	*X 15*	*X 16*	*X 17*	*X 18*	*X 19*	*X 20*	*X 21*	*X 22*	*Q C*
1	*5*	*8*	*6*	*2*	*7*	*9*	*10*	*4*	*11*	*16*	*18*	*12,5*	*15*	*14*	*3*	*19*	*20*	*21,5*	*17*	*12,5*	*21,5*	*1*	*0,33*
2	*3*	*2*	*15*	*14*	*8*	*9*	*16*	*5*	*17*	*10,5*	*13*	*18*	*1*	*19*	*4*	*20*	*6*	*10,5*	*21*	*22*	*12*	*7*	*0,44*

3	8	16	22	5	2	10	6	7	11	17,5	12	14	1	21	3	13	15	17,5	20	19	4	9	0,57
4	11	14	22	15	2	6	12	4	5	7,5	10	20	1	19	3	16	17	7,5	18	21	9	13	0,35
5	16	2,5	17	15	18	4	2,5	6	7	14	8	11	1	9	19	22	10	21	20	12	5	13	0,28
6	1	2	10	12	7	13	11	3	14	15	8	16	17	21	4	9	20	22	5	6	19	18	0,34
7	12	11	14	16	10	9	2	20	8	19	7	18	1	13	22	15	17	6	21	5	3	4	0,29
8	2	19	9	12	8	3	11	20	4	22	7	13	5	17	21	10	14	18	16	1	6	15	0,26
9	10	4	18	3	8	19	9	14	21	15	5	17	1	12	11	16	20	22	13	6	2	7	0,49
10	6	7	17	18	16	14	5	19	13	8	4	9	10	11	22	3	21	12	20	15	1	2	0,30
11	10	5	4	9	3	12	11	8	1	22	2	13	14	16	17	6	20	18	21	7	19	15	0,33
12	8	3	9	13	2	22	14	11	15	19	4	17	6	16	20	10	18	21	12	1	5	7	0,37
13	4	1	9	6	13	15	3	19	14	8	18	20	17	21	5	16	10	2	22	12	7	11	0,27
14	13	14	10	3	1	2	16	15	20	5	21	17	4	11	19	7	18	6	22	9	12	8	0,21
15	7	14	3	11	17	19	4	12	9	21	1	18	5	20	22	15	8	16	2	13	6	10	0,24
16	2	3	5	6	8	4	10	15	7	11	18	16	1	12	21	19	13	14	17	22	20	9	0,39
17	6	15	7	8	11	10	9	1	21	20	16	17	2	12	3	22	19	13	4	18	14	5	0,24
18	3	1	22	6	19	13	14	11	17	18	2	21	12	16	4	5	10	15	20	7	8	9	0,37
19	2	3	6	7	12	11	17	13	18	16	1	20	5	14	19	8	15	9	10	22	21	4	0,43
20	2	12	8	11	14	7	15	10	17	9	16	18	1	20	5	19	4	13	22	6	21	3	0,23
21	1	14	21	9	8	15	16	7	5	6	4	18	19	17	10	20	22	11	12	13	2	3	0,35
22	10	1	19	11	5	12	21	20	6	15,5	7	8	2	9	4	13	18	15,5	17	22	3	14	0,54
23	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	0,38
24	9	1	10	11	3	2	13	12	15	19	8	7	14	18	20	4	17	22	16	21	5	6	0.69
25	20	4	11	18	5	6	2	17	15	16	1	8	10	14	13	7	12	22	9	21	3	19	0,28
26	3	1	10	14	4	5	12	7	19	17	6	21	13	22	8	16	9	20	18	15	2	11	0,69
27	7	2	19	8	1	15	6	20	17	16	3	9	14	13	18	5	22	11	12	21	10	4	0,69
28	8	3	16	9	1	17	6	7	19	18	2	10	15	20	14	4	22	12	13	21	11	5	0,69
29	4	11	7	10	1	9	2	17	14	21	8	19	6	20	13	22	3	18	12	16	5	15	0,41
30	1	3	21	10	8	9	7	14	12	13	11	22	15	17	6	18	19	16	5	20	2	4	0,63
31	13	4	14	16	3	22	7	21	8	17	5	15	6	12	11	18	10	9	20	1	2	19	0,26
32	9	2	10	14	1	16	15	19	17	20	3	4	11	13	12	18	5	21	7	22	6	8	0,46
33	1	9	10	12	11	7	6	5	15	14	13	17	16	18	19	8	21	4	22	20	3	2	0,42
34	12	2	13	11	10	1	18	8	19	17	9	7	14	20	6	3	21	16	22	15	4	5	0,69
35	4	3	15	5	6	7	14	16	8	11	1	20	17	21	12	9	10	2	22	13	18	19	0,36
36	2	4	11	12	1	14	19	20	21	5	18	17	6	22	7	8	10	3	9	13	15	16	0,23
37	10	9	17	11	4	5	15	14	16	13	1	2	19	22	3	18	6	7	8	12	20	21	0,20
38	1	8	9	7	5	15	12	11	14	13	5	10	2	16	18	5	17	20	19	21	3	22	0,48

39	2	5	16	10	9	15	19	11	8	7	1	18	6	21	14	22	12	17	4	20	3	13	0,45
40	1	2	17	14	15	16	8	18	3,5	3,5	5,5	9	7	5,5	10	11	12	13	20	19	22	21	0,25
41	1	3	22	4	2	5	6	13	15	16	17	18	7	19	20	8	9	10	11	12	21	14	0,40
42	1	18	10	17	9	13	16	19	6	7	15	2	14	5	4	20	11	8	21	12	22	3	0,20
43	21	17,5	8,5	15	16	19	21	21	2,5	11	2,5	8,5	2,5	13	8,5	8,5	5,5	2,5	5,5	17,5	13	13	0,17
44	21,5	8,5	12	21,5	17	18	19	8,5	4	20	4	4	4	12	4	4	15	4	10	15	15	12	0,19
45	11	4	18	5	1	2	3	16	17	20	6	19	10	9	15	14	21	12	13	22	7	8	
46	4	2	21	7	18	17	12	6	11	10	5	1	19	9	8	15	22	14	16	20	13	3	0,32
47	3	13	18	9	14	1	2	4	6,5	21,5	10,5	5	15	10,5	8	21,5	6,5	16	20	19	17	12	0,27
48	8	5	17	6	3,5	18	9,5	9,5	7	12	11	14	2	13	3,5	22	21	15	16	20	19	1	0,51
49	6,5	5	16	6,5	19,5	8	21,5	3	9	21,5	10	15	2	14	17	19,5	4	11	13	18	12	1	0,32
50	17	14	21	1	22	8	9	20	5	7	6	10	12	13	11	15	2	16	18	19	3	4	0,21
51	13	1	22	15	9	8	21	6	10	7	12	11	16	14	17	2	20	18	19	5	4	3	0,30
52	3	1	22	12	4	9	8	10	5	15	6	13	16	14	11	17	20	7	18	19	21	2	0,60
53	15	18	19	13	6	7	3	20,5	8	17	1,5	12	16	11	22	5	20,5	4	9	14	10	1,5	0,22
54	8	1	21	2	10	4	13	12	5	20	19	6	18	7	22	9	17	16	15	14	3	11	0,31
55	10	11	16	17	12	21	14	22	13	1,5	1,5	15	18	3,5	19	20	3,5	7,5	6	5	7,5	9	0,18
Rank sums	393	368,5	765,5	559	455	583	600,5	679,5	634,5	772	440,5	723,5	516,5	670	679,5	715,5	723,5	732	765,5	772	778	563	516,5	
No heretics.	47	12	76	44	16	37	46	63	87	90	28	52	67	80	73	30	103	73	76	100	37	28	
Coef. concord.		0,16		0,69																			
Pearson's criterion.		183,2		6,55																			

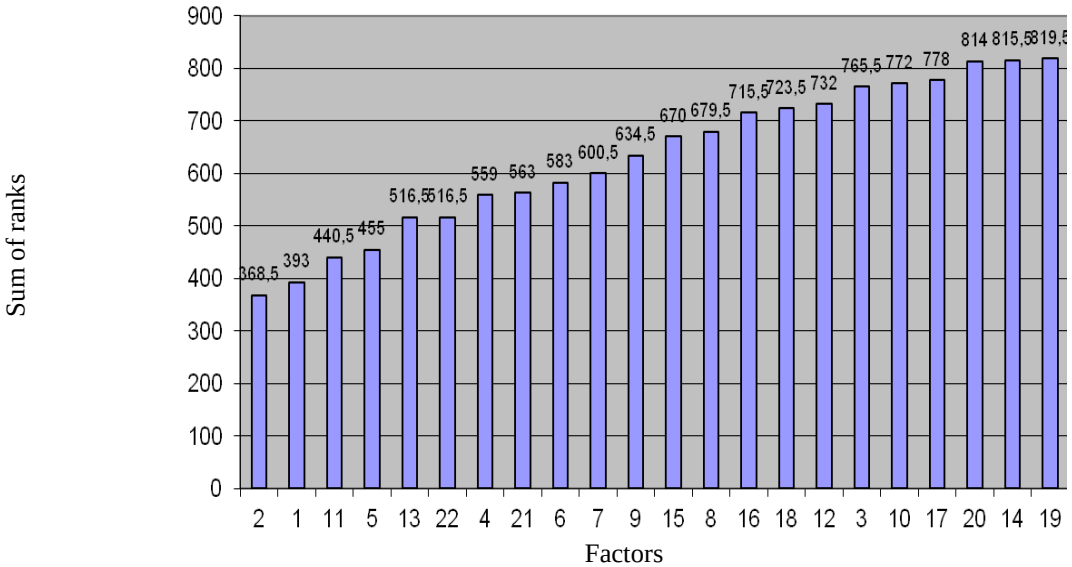


Figure 11 - - The results of processing the a priori ranking of children-respondents according to their assessment of their competitive potential on the criteria for ensuring competitiveness and the demand for children's shoes made for them

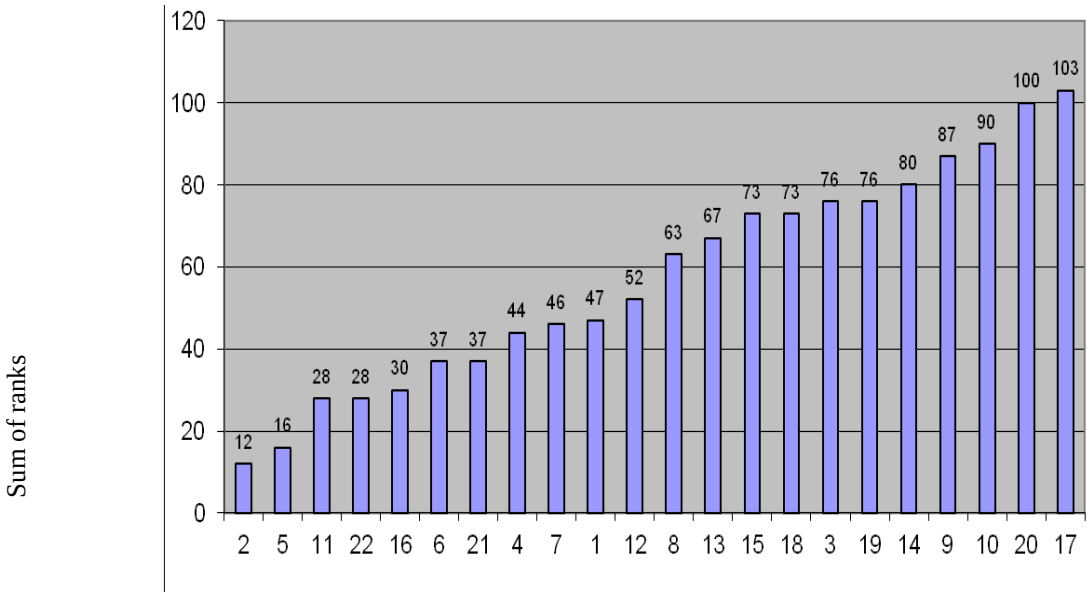


Figure 12 - - The results of processing the a priori ranking of children-respondents according to their assessment of their competitive potential on the criteria for ensuring competitiveness and the demand for children's shoes made for them without heretics, i.e. without those respondents whose opinion does not coincide with the majority of survey participants

Dear respondent!

What factors would you, as a buyer, give preference to when assessing the competitive potential of enterprises in the regions of the Southern Federal District and the North Caucasus Federal District that produce footwear for children, taking advantage of the privileges - to assign them an appropriate rank from the arithmetic series - preferable starting from 1, and not preferable - a higher figure, ensuring the fulfillment requirements of the arithmetic series, namely, avoiding missing numbers in the arithmetic series. If you have difficulties in choosing your preferences, you can use “linked ranks” by assigning two or more factors to the same rank, but here, too, the requirements of the arithmetic series must be observed.

Table 29 - Criteria for assessing the competitiveness and relevance of children's shoes through the eyes of ordinary buyers

No.	List of factors for assessing the competitive potential of enterprises in the regions of the Southern Federal District and the North Caucasus Federal District	Rank
1	Weight	
2	Color	
3	Quality of children's shoes	
4	Functionality of children's shoes	
5	Characteristics of materials for the upper shoes	
6	Compliance with the direction of fashion	
7	Price	
8	Characteristics of materials for the bottom of shoes	
9	Comfort	
10	The height of the heel of the shoe - up to 40 mm	
11	The height of the heel of the shoe is over 40 mm	
12	Maintainability	
13	Warranty period for children's shoes	
14	What types of children's shoes are preferred: winter	
15	Autumn	
16	Spring	
17	Summer	
18	Bottom fastening strength	

Table 30 - The results of a survey of random buyers according to their assessment of the competitive potential of the criteria for ensuring the competitiveness and demand for manufactured children's shoes

Factors / Experts	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16	X17	X18
1	13	11	9	1	2	6	3	5	7	4	12	14	8	17	15	18	16	10
2	4	18	5	17	1	16	3	13	2	12	11	15	14	8	7	9	10	6
3	3	2	4	9	10	1	5	6	8	11	17	12	7	13	16	15	14	18
4	8	13	4	3	9	1	10	12	2	5	14	6	7	15	16	17	18	11
5	4	3	5	7	2	1	6	12	8	9	10	13	15	14	18	17	16	11
6	5	13	1	3	4	2	11	12	6	7	18	9	8	14	15	16	17	10
7	1	9	4	3	8	10	5	6	2	11	13	12	15	14	16	18	17	7
8	11	12	3	2	9	10	4	5	1	13	15	6	7	14	16	17	18	8
9	18	17	1	2	5	3	4	6	7	10	11	8	12	16	14	13	15	9
10	4	3	16	5	7	1	2	8	9	10	11	12	14	13	18	17	6	15
11	11	4	3	10	12	13	2	1	9	8	15	14	17	16	6	5	7	18
12	5	11	1	4	9	10	3	7	2	12	13	6	14	8	16	17	18	15
13	2	4	1	5	7	3	8	11	6	12	9	10	13	15	14	17	16	18
14	6	9	8	2	3	5	7	11	4	10	13	1	12	14	16	17	15	18
15	3	2	4	5	7	9	11	10	12	6	13	1	14	8	15	16	18	17
16	4	11	3	10	16	1	9	15	2	17	5	14	18	7	6	12	13	8
17	5	13	1	6	11	2	3	12	4	18	9	10	16	15	7	14	17	8
18	6	7	8	11	12	5	2	13	1	14	4	17	18	9	3	15	16	10
19	10	9	5	4	8	1	7	11	3	14	6	17	18	13	2	15	16	12
20	15	14	6	5	3	1	7	4	2	8	13	16	17	10	9	11	18	12
21	10	15	1	2	5	6	8	16	3	4	17	18	12	9	7	14	13	11
22	7	12	2	6	4	1	11	5	3	18	8	13	17	10	9	14	15	16
23	7	10	2	6	4	3	9	5	1	11	14	15	18	12	13	16	17	8
24	7	9	6	8	10	1	2	11	3	12	13	17	18	5	4	14	15	16
25	5	13	6	12	4	2	1	11	3	10	18	14	17	8	15	16	9	7
26	5	3	4	11	13	1	2	12	6	15	7	14	18	10	8	9	17	16
27	8	16	2	3	5	7	1	6	4	10	17	9	18	11	14	13	15	12
28	13	6	1	5	17	2	3	14	4	15	18	7	16	9	8	11	10	12
29	8	17	1	5	9	3	2	7	4	10	18	6	12	14	13	15	16	11
30	5	13	2	10	9	3	4	12	1	11	8	17	18	7	6	14	15	16
31	6	9	8	2	3	5	7	11	4	10	13	1	12	14	16	17	15	18
32	2	4	1	5	7	3	8	11	6	12	9	10	13	15	14	17	16	18
33	11	4	3	10	12	13	2	1	9	8	15	14	17	16	6	5	7	18
34	18	17	1	2	5	3	4	6	7	10	11	8	12	16	14	13	15	9
35	1	9	4	3	8	10	5	6	2	11	13	12	15	14	16	18	17	7
36	4	3	5	7	2	1	6	12	8	9	10	13	15	14	18	17	16	11
37	8	13	4	3	9	1	10	12	2	5	14	6	7	15	16	17	18	11
38	13	11	9	1	2	6	3	5	7	4	12	14	8	17	15	18	16	10
39	4	18	5	17	1	16	3	13	2	12	11	15	14	8	7	9	10	6
40	5	13	2	10	9	3	4	12	1	11	8	17	18	7	6	14	15	16

41	13	6	1	5	17	2	3	14	4	15	7	16	9	8	11	10	12	18
42	8	16	2	3	5	7	1	6	4	10	17	9	18	11	14	13	15	12
43	5	3	4	11	13	1	2	12	6	15	7	14	18	10	8	9	17	16
44	5	13	6	12	4	2	1	11	3	10	18	14	17	8	15	16	9	7
45	7	9	6	8	10	1	2	11	3	12	13	17	18	5	4	14	15	16
46	7	10	2	6	4	3	9	5	1	11	14	15	18	12	13	16	17	8
47	7	12	2	6	4	1	11	5	3	18	8	13	17	10	9	14	15	16
48	10	15	1	2	5	6	8	16	3	4	17	18	12	9	7	14	13	11
49	15	14	6	5	3	1	7	4	2	8	13	16	17	10	9	11	18	12
50	10	9	5	4	8	1	7	11	3	14	6	17	18	13	2	15	16	12
51	6	7	8	11	12	5	2	13	1	14	4	17	18	9	3	15	16	10
52	5	13	1	6	11	2	3	12	4	18	9	10	16	15	7	14	17	8
53	4	11	3	10	16	1	9	15	2	17	5	14	18	7	6	12	13	8

Table 31 - The results of processing the a priori ranking of random buyers according to their assessment of the competitive potential on the criteria for ensuring the competitiveness and demand for shoes made by children

Factor / Expert	X 1	X2	X 3	X4	X 5	X 6	X 7	X 8	X 9	X1 0	X1 1	X1 2	X1 3	X1 4	X1 5	X1 6	X1 7	X1 8	Kk
1	13	11	9	1	2	6	3	5	7	4	12	14	8	17	15	18	16	10	0,60
2	4	18	5	17	1	16	3	13	2	12	11	15	14	8	7	9	10	6	0,52
3	3	2	4	9	10	1	5	6	8	11	17	12	7	13	16	15	14	18	0,59
4	8	13	4	3	9	1	10	12	2	5	14	6	7	15	16	17	18	11	0,64
5	4	3	5	7	2	1	6	12	8	9	10	13	15	14	18	17	16	11	0,68
6	5	13	1	3	4	2	11	12	6	7	18	9	8	14	15	16	17	10	0,66
7	1	9	4	3	8	10	5	6	2	11	13	12	15	14	16	18	17	7	0,71
8	11	12	3	2	9	10	4	5	1	13	15	6	7	14	16	17	18	8	0,60
9	18	17	1	2	5	3	4	6	7	10	11	8	12	16	14	13	15	9	0,61
10	4	3	16	5	7	1	2	8	9	10	11	12	14	13	18	17	6	15	0,54
11	11	4	3	10	12	13	2	1	9	8	15	14	17	16	6	5	7	18	0,50
12	5	11	1	4	9	10	3	7	2	12	13	6	14	8	16	17	18	15	0,72
13	2	4	1	5	7	3	8	11	6	12	9	10	13	15	14	17	16	18	0,69
14	6	9	8	2	3	5	7	11	4	10	13	1	12	14	16	17	15	18	0,63
15	3	2	4	5	7	9	11	10	12	6	13	1	14	8	15	16	18	17	0,53
16	4	11	3	10	16	1	9	15	2	17	5	14	18	7	6	12	13	8	0,56
17	5	13	1	6	11	2	3	12	4	18	9	10	16	15	7	14	17	8	0,84
18	6	7	8	11	12	5	2	13	1	14	4	17	18	9	3	15	16	10	0,57
19	10	9	5	4	8	1	7	11	3	14	6	17	18	13	2	15	16	12	0,91
20	15	14	6	5	3	1	7	4	2	8	13	16	17	10	9	11	18	12	0,78

21	10	15	1	2	5	6	8	16	3	4	17	18	12	9	7	14	13	11	0,65
22	7	12	2	6	4	1	11	5	3	18	8	13	17	10	9	14	15	16	0,89
23	7	10	2	6	4	3	9	5	1	11	14	15	18	12	13	16	17	8	0,81
24	7	9	6	8	10	1	2	11	3	12	13	17	18	5	4	14	15	16	0,91
25	5	13	6	12	4	2	1	11	3	10	18	14	17	8	15	16	9	7	0,67
26	5	3	4	11	13	1	2	12	6	15	7	14	18	10	8	9	17	16	0,59
27	8	16	2	3	5	7	1	6	4	10	17	9	18	11	14	13	15	12	0,76
28	13	6	1	5	17	2	3	14	4	15	18	7	16	9	8	11	10	12	0,56
29	8	17	1	5	9	3	2	7	4	10	18	6	12	14	13	15	16	11	0,73
30	5	13	2	10	9	3	4	12	1	11	8	17	18	7	6	14	15	16	0,91
31	6	9	8	2	3	5	7	11	4	10	13	1	12	14	16	17	15	18	0,62
32	2	4	1	5	7	3	8	11	6	12	9	10	13	15	14	17	16	18	0,69
33	11	4	3	10	12	13	2	1	9	8	15	14	17	16	6	5	7	18	0,49
34	18	17	1	2	5	3	4	6	7	10	11	8	12	16	14	13	15	9	0,61
35	1	9	4	3	8	10	5	6	2	11	13	12	15	14	16	18	17	7	0,70
36	4	3	5	7	2	1	6	12	8	9	10	13	15	14	18	17	16	11	0,67
37	8	13	4	3	9	1	10	12	2	5	14	6	7	15	16	17	18	11	0,63
38	13	11	9	1	2	6	3	5	7	4	12	14	8	17	15	18	16	10	0,60
39	4	18	5	17	1	16	3	13	2	12	11	15	14	8	7	9	10	6	0,53
40	5	13	2	10	9	3	4	12	1	11	8	17	18	7	6	14	15	16	0,91
41	13	6	1	5	17	2	3	14	4	15	7	16	9	8	11	10	12	18	0,55
42	8	16	2	3	5	7	1	6	4	10	17	9	18	11	14	13	15	12	0,74
43	5	3	4	11	13	1	2	12	6	15	7	14	18	10	8	9	17	16	0,58
44	5	13	6	12	4	2	1	11	3	10	18	14	17	8	15	16	9	7	0,66
45	7	9	6	8	10	1	2	11	3	12	13	17	18	5	4	14	15	16	0,91
46	7	10	2	6	4	3	9	5	1	11	14	15	18	12	13	16	17	8	0,79
47	7	12	2	6	4	1	11	5	3	18	8	13	17	10	9	14	15	16	0,86
48	10	15	1	2	5	6	8	16	3	4	17	18	12	9	7	14	13	11	0,64
49	15	14	6	5	3	1	7	4	2	8	13	16	17	10	9	11	18	12	0,77
50	10	9	5	4	8	1	7	11	3	14	6	17	18	13	2	15	16	12	0,91
51	6	7	8	11	12	5	2	13	1	14	4	17	18	9	3	15	16	10	0,57
52	5	13	1	6	11	2	3	12	4	18	9	10	16	15	7	14	17	8	0,82
53	4	11	3	10	16	1	9	15	2	17	5	14	18	7	6	12	13	8	0,55
Rank sums	387	538	208	331	395	224	272	503	216	585	624	643	773	611	578	750	781	644	
Sum of ranks without heretics	34	53	21	40	46	9	16	57	11	60	48	85	90	37	22	71	76	76	,

Coef. concord.		0,474		0,907															
Crete. Pearson		427,6		7,3															

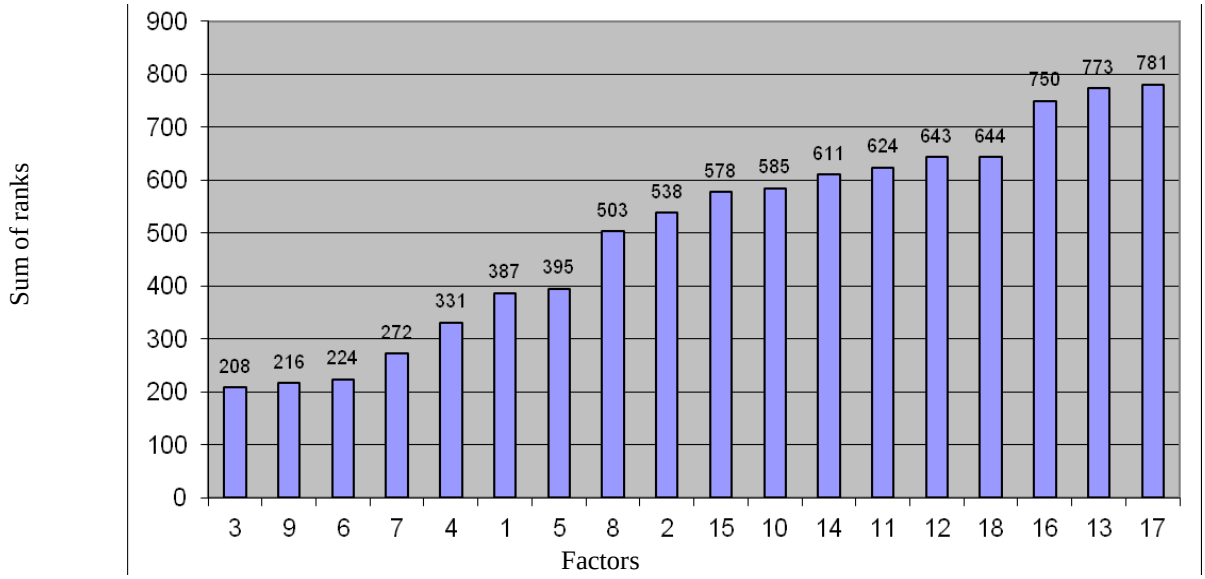


Figure 13 - The results of processing a priori ranking of random buyers according to their assessment of the competitive potential of the criteria for ensuring competitiveness and the demand for shoes made by children

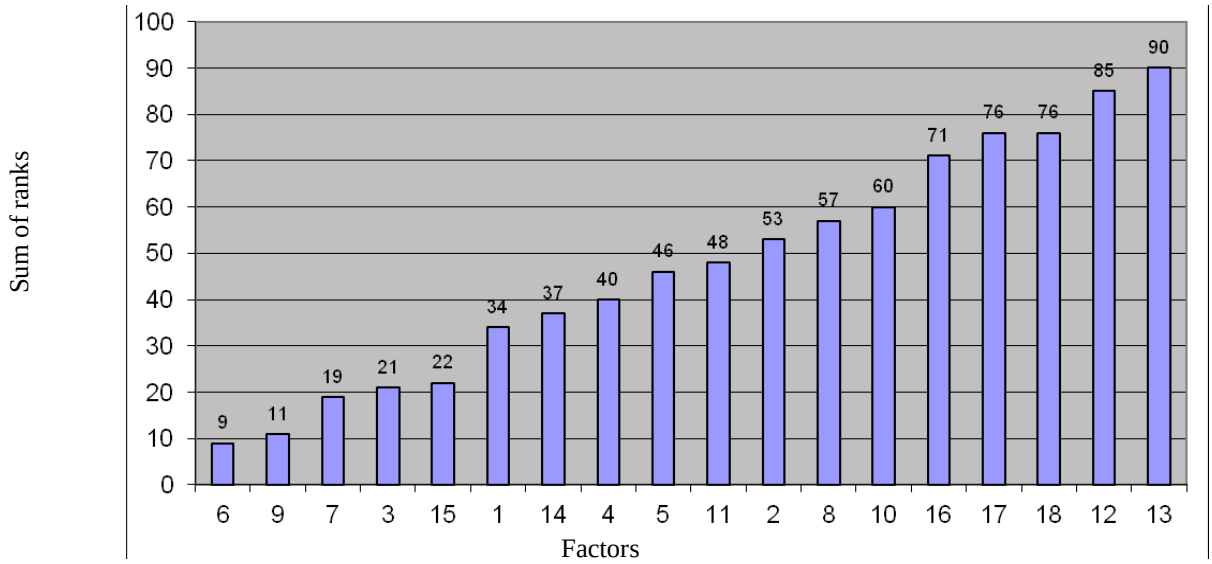


Figure 14 - The results of processing a priori ranking of random buyers according to their assessment of the competitive potential on the criteria for ensuring the competitiveness and demand for shoes made by a child without heretics, i.e. without those respondents whose opinion does not coincide with the majority of survey participants

Table 32 - Assessment of the competence of buyers about the demand for the assortment of footwear for children

АНАЛИЗ	Исключить	СТАРТ																			
Experts	**Factors**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	W_i

1		13	11	9	1	2	6	3	5	7	4	12	14	8	17	15	18	16	10			0,62
2		4	18	5	17	1	16	3	13	2	12	11	15	14	8	7	9	10	6			0,68
3		3	2	4	9	10	1	5	6	8	11	17	12	7	13	16	15	14	18			0,72
4		8	13	4	3	9	1	10	12	2	5	14	6	7	15	16	17	18	11			0,64
5		4	3	5	7	2	1	6	12	8	9	10	13	15	14	18	17	16	11			0,72
6		5	13	1	3	4	2	11	12	6	7	18	9	8	14	15	16	17	10			0,65
7		1	9	4	3	8	10	5	6	2	11	13	12	15	14	16	18	17	7			0,73
8		11	12	3	2	9	10	4	5	1	13	15	6	7	14	16	17	18	8			0,63
9		18	17	1	2	5	3	4	6	7	10	11	8	12	16	14	13	15	9			0,62
10		4	3	16	5	7	1	2	8	9	10	11	12	14	13	18	17	6	15			0,67
11		11	4	3	10	12	13	2	1	9	8	15	14	17	16	6	5	7	18			0,68
12		5	11	1	4	9	10	3	7	2	12	13	6	14	8	16	17	18	15			0,78
13		2	4	1	5	7	3	8	11	6	12	9	10	13	15	14	17	16	18			0,76
14		6	9	8	2	3	5	7	11	4	10	13	1	12	14	16	17	15	18			0,66
15		3	2	4	5	7	9	11	10	12	6	13	1	14	8	15	16	18	17			0,60
16		4	11	3	10	16	1	9	15	2	17	5	14	18	7	6	12	13	8			0,84
17		5	13	1	6	11	2	3	12	4	18	9	10	16	15	7	14	17	8			0,82
18		6	7	8	11	12	5	2	13	1	14	4	17	18	9	3	15	16	10			0,91
19		10	9	5	4	8	1	7	11	3	14	6	17	18	13	2	15	16	12			0,90
20		15	14	6	5	3	1	7	4	2	8	13	16	17	10	9	11	18	12			0,83
21		10	15	1	2	5	6	8	16	3	4	17	18	12	9	7	14	13	11			0,81
22		7	12	2	6	4	1	11	5	3	18	8	13	17	10	9	14	15	16			0,84
23		7	10	2	6	4	3	9	5	1	11	14	15	18	12	13	16	17	8			0,82
24		7	9	6	8	10	1	2	11	3	12	13	17	18	5	4	14	15	16			1,00
25		5	13	6	12	4	2	1	11	3	10	18	14	17	8	15	16	9	7			0,81
26		5	3	4	11	13	1	2	12	6	15	7	14	18	10	8	9	17	16			0,89
27		8	16	2	3	5	7	1	6	4	10	17	9	18	11	14	13	15	12			0,79
28		13	6	1	5	17	2	3	14	4	15	18	7	16	9	8	11	10	12			0,81
29		8	17	1	5	9	3	2	7	4	10	18	6	12	14	13	15	16	11			0,74
30		5	13	2	10	9	3	4	12	1	11	8	17	18	7	6	14	15	16			0,96
31		6	9	8	2	3	5	7	11	4	10	13	1	12	14	16	17	15	18			0,66
32		2	4	1	5	7	3	8	11	6	12	9	10	13	15	14	17	16	18			0,76
33		11	4	3	10	12	13	2	1	9	8	15	14	17	16	6	5	7	18			0,68
34		18	17	1	2	5	3	4	6	7	10	11	8	12	16	14	13	15	9			0,62
35		1	9	4	3	8	10	5	6	2	11	13	12	15	14	16	18	17	7			0,73

36		4	3	5	7	2	1	6	12	8	9	10	13	15	14	18	17	16	11			0,72
37		8	13	4	3	9	1	10	12	2	5	14	6	7	15	16	17	18	11			0,64
38		13	11	9	1	2	6	3	5	7	4	12	14	8	17	15	18	16	10			0,62
39		4	18	5	17	1	16	3	13	2	12	11	15	14	8	7	9	10	6			0,68
40		5	13	2	10	9	3	4	12	1	11	8	17	18	7	6	14	15	16			0,96
41		13	6	1	5	17	2	3	14	4	15	7	16	9	8	11	10	12	18			0,81
42		8	16	2	3	5	7	1	6	4	10	17	9	18	11	14	13	15	12			0,79
43		5	3	4	11	13	1	2	12	6	15	7	14	18	10	8	9	17	16			0,89
44		5	13	6	12	4	2	1	11	3	10	18	14	17	8	15	16	9	7			0,81
45		7	9	6	8	10	1	2	11	3	12	13	17	18	5	4	14	15	16			1,00
46		7	10	2	6	4	3	9	5	1	11	14	15	18	12	13	16	17	8			0,82
47		7	12	2	6	4	1	11	5	3	18	8	13	17	10	9	14	15	16			0,84
48		10	15	1	2	5	6	8	16	3	4	17	18	12	9	7	14	13	11			0,81
49		15	14	6	5	3	1	7	4	2	8	13	16	17	10	9	11	18	12			0,83
50		10	9	5	4	8	1	7	11	3	14	6	17	18	13	2	15	16	12			0,90
51		6	7	8	11	12	5	2	13	1	14	4	17	18	9	3	15	16	10			0,91
52		5	13	1	6	11	2	3	12	4	18	9	10	16	15	7	14	17	8			0,82
53		4	11	3	10	16	1	9	15	2	17	5	14	18	7	6	12	13	8			0,84
54		7	9	6	8	10	3	2	11	1	12	13	17	18	5	4	14	15	16			0,91

Dear respondent!

What factors would you, as manufacturers of children's shoes, give preference to when assessing the competitive potential of enterprises in the regions of the Southern Federal District and the North Caucasus Federal District, taking advantage of the privileges - to assign them the appropriate rank from the arithmetic series - preferable starting from 1, and not preferred - a higher figure, ensuring that the requirements of the arithmetic series namely, avoiding missing digits in the arithmetic series. If you have difficulties in choosing your preferences, you can use "linked ranks" by assigning two or more factors to the same rank, but here, too, the requirements of the arithmetic series must be observed.

Table 33 - Criteria for assessing the competitiveness and demand for children's shoes through the eyes of shoe manufacturers by enterprises in the regions of the Southern Federal District and the North Caucasus Federal District

No.	List of factors for assessing the competitive potential of enterprises in the regions of the Southern Federal District and the North Caucasus Federal District	Rank
1	Weight	
2	Color	
3	Quality of children's shoes	
4	Functionality of children's shoes	
5	Characteristics of materials for the upper shoes	
6	Compliance with the direction of fashion	
7	Price	
8	Characteristics of materials for the bottom of shoes	
9	Comfort	

10	The height of the heel of the shoe - up to 40 mm	
11	The height of the heel of the shoe is over 40 mm	
12	Maintainability	
13	Warranty period for children's shoes	

Table 34 - The results of the questionnaire survey of manufacturers to assess their competitive potential on the criteria for ensuring the competitiveness and demand for manufactured children's shoes

Factors / Experts	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13
1	7	10	1	2	8	6	4	9	3	11	13	5	12
2	9	7	1	4	8	6	2	10	3	11	13	5	12
3	1	3	5	2	8	7	4	9	12	6	13	11	10
4	2	3	1	5	4	8	9	6	10	7	11	13	12
5	9	10	6	7	8	2	1	4	3	5	11	12	13
6	10	9	1	4	3	2	5	6	7	11	12	8	13
7	5	6	1	9	10	13	7	8	2	12	11	4	3
8	5	11	4	1	10	2	3	12	6	9	13	8	7
9	2	7	4	5	6	1	9	3	8	12	13	11	10
10	7	13	2	11	1	6	12	10	3	4	9	8	5
11	9	13	5	1	2	4	3	6	7	8	12	10	11
12	12	13	1	6	7	3	2	8	5	4	9	10	11
13	5	8	2	4	7	10	1	12	11	13	3	9	6
14	5	2	11	4	7	13	8	12	1	6	9	3	10
15	10	13	2	4	6	5	3	11	1	7	12	8	9
16	5	3	1	2	7	6	4	10	8	11	12	9	13
17	3	4	1	7	9	8	5	10	2	11	13	12	6
18	5	6	1	2	6	8	7	3	4	11	12	10	9
19	9	13	2	4	7	5	6	3	1	8	10	12	11
20	10	11	1	2	5	7	3	6	4	12	13	9	8
21	3	8	4	6	10	5	12	7	1	13	9	2	11
22	9	8	2	7	5	6	1	10	3	11	12	13	4
23	2	10	13	11	9	6	8	12	7	5	1	3	4
24	12	4	1	2	8	9	3	7	5	10	13	11	6
25	10	9	1	2	12	3	4	6	5	11	13	7	8
26	5	6	1	7	11	13	2	10	3	9	12	4	8
27	11	10	5	4	1	3	9	2	7	12	13	8	6
28	7	6	5	2	1	8	9	3	4	12	13	11	10
29	9	10	2	3	6	11	8	7	4	12	13	5	1
30	8	10	4	5	1	3	9	2	11	12	13	7	6

Table 35 - The results of processing the a priori ranking of manufacturers according to their assessment of their competitive potential on the criteria for ensuring the competitiveness and demand for footwear made by children

Factor / Expert	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	QC
1	7	10	1	2	8	6	4	9	3	11	13	5	12	0,84
2	9	7	1	4	8	6	2	10	3	11	13	5	12	0,84
3	1	3	5	2	8	7	4	9	12	6	13	11	10	0,5
4	2	3	1	5	4	8	9	6	10	7	11	13	12	0,52
5	9	10	6	7	8	2	1	4	3	5	11	12	13	0,65
6	10	9	1	4	3	2	5	6	7	11	12	8	13	0,84
7	5	6	1	9	10	13	7	8	2	12	11	4	3	0,46
8	5	11	4	1	10	2	3	12	6	9	13	8	7	0,74
9	2	7	4	5	6	1	9	3	8	12	13	11	10	0,60
10	7	13	2	11	1	6	12	10	3	4	9	8	5	0,43
11	9	13	5	1	2	4	3	6	7	8	12	10	11	0,81
12	12	13	1	6	7	3	2	8	5	4	9	10	11	0,76
13	5	8	2	4	7	10	1	12	11	13	3	9	6	0,45
14	5	2	11	4	7	13	8	12	1	6	9	3	10	0,41
15	10	13	2	4	6	5	3	11	1	7	12	8	9	0,84
16	5	3	1	2	7	6	4	10	8	11	12	9	13	0,68
17	3	4	1	7	9	8	5	10	2	11	13	12	6	0,62
18	5	6,5	1	2	6,5	9	8	3	4	12	13	11	10	0,66
19	9	13	2	4	7	5	6	3	1	8	10	12	11	0,78
20	10	11	1	2	5	7	3	6	4	12	13	9	8	0,84
21	3	8	4	6	10	5	12	7	1	13	9	2	11	0,48
22	9	8	2	7	5	6	1	10	3	11	12	13	4	0,72
23	2	10	13	11	9	6	8	12	7	5	1	3	4	0,38
24	12	4	1	2	8	9	3	7	5	10	13	11	6	0,70
25	10	9	1	2	12	3	4	6	5	11	13	7	8	0,84
26	5	6	1	7	11	13	2	10	3	9	12	4	8	0,54
27	11	10	5	4	1	3	9	2	7	12	13	8	6	0,58
28	7	6	5	2	1	8	9	3	4	12	13	11	10	0,63
29	9	10	2	3	6	11	8	7	4	12	13	5	1	0,55
30	8	10	4	5	1	3	9	2	11	12	13	7	6	0,57
Rank sums	206	246,5	91	135	193,5	190	164	224	151	287	337	249	256	
Sum of ranks without heretics	46	50	6	14	39	27	16	42	16	42	64	34	49	
Quad. off	16	1332,25	14161	5625	272,25	400	2116	196	3481	5929	16129	1521	2116	
Coef. concord.		0,33		0,84										
Crete. Pearson		117,14		8,37										

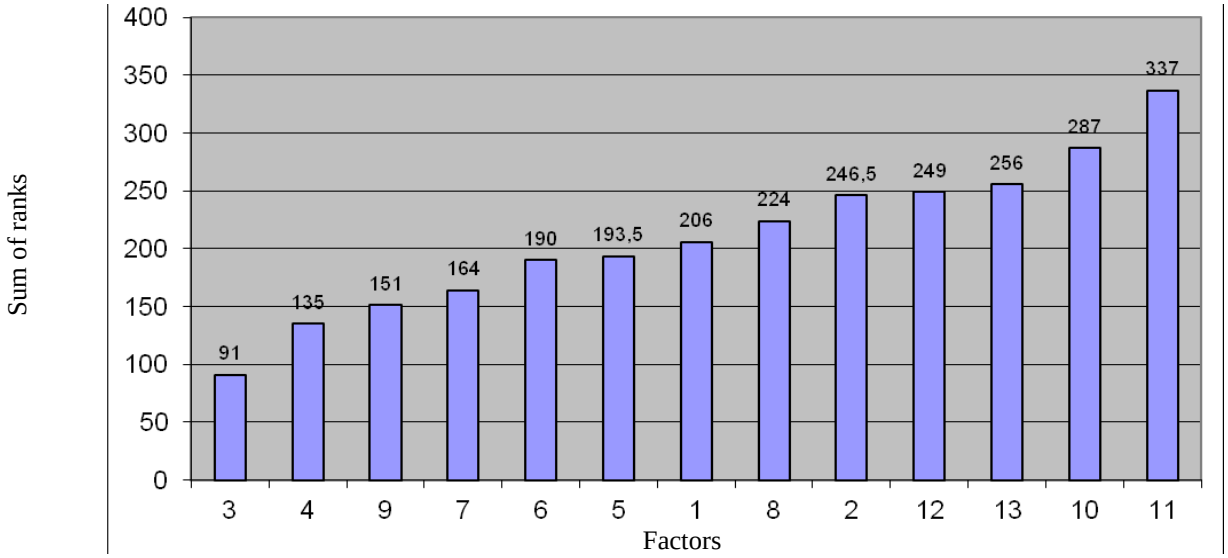


Figure 15 - The results of processing a priori ranking of manufacturers according to their assessment of their competitive potential on the criteria for ensuring the competitiveness and demand for footwear made by children

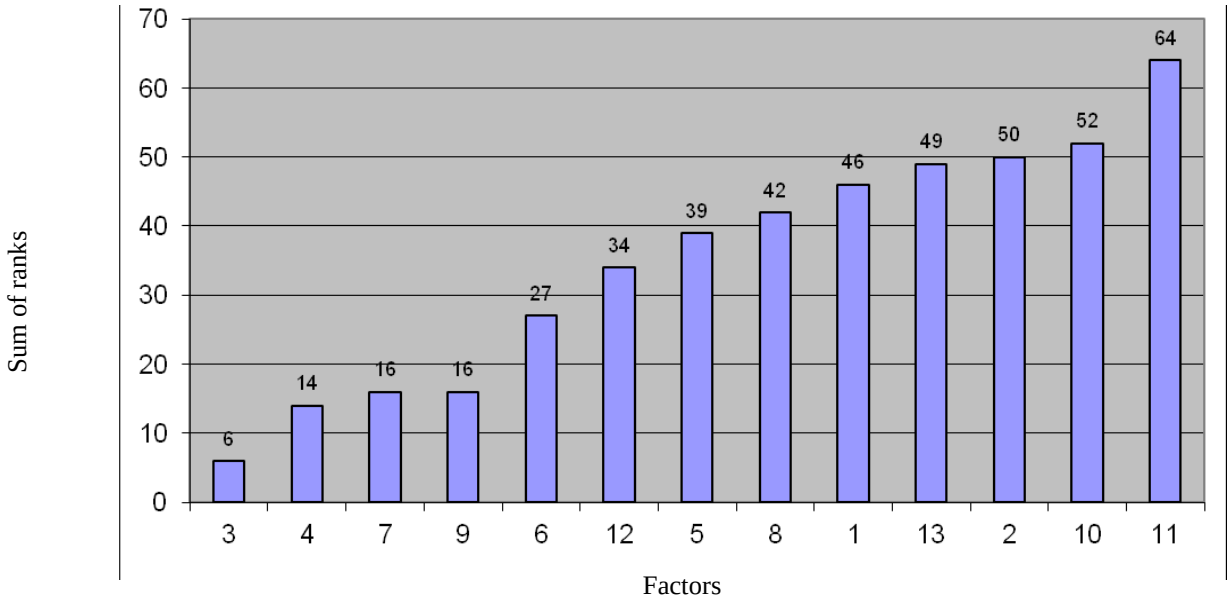


Figure 16 - The results of processing the a priori ranking of manufacturers according to their assessment of their competitive potential on the criteria for ensuring the competitiveness and demand for shoes made by children without heretics, i.e. without those respondents whose opinion does not coincide with the opinion of the majority of survey participants

Table 36 - Assessment of the competence of manufacturers on the demand for the assortment of footwear for children

АНАЛИЗ	Исключить	СТАРТ																				
Experts	Factors	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	W_i
1		9	7	1	4	8	6	2	10	3	11	13	5	12								0,97
2		1	3	5	2	8	7	4	9	12	6	13	11	10								0,66
3		2	3	1	5	4	8	9	6	10	7	11	13	12								0,63
4		9	10	6	7	8	2	1	4	3	5	11	12	13								0,73

5		10	9	1	4	3	2	5	6	7	11	12	8	13							0,87
6		5	6	1	9	10	13	7	8	2	12	11	4	3							0,70
7		5	11	4	1	10	2	3	12	6	9	13	8	7							0,87
8		2	7	4	5	6	1	9	3	8	12	13	11	10							0,71
9		7	13	2	11	1	6	12	10	3	4	9	8	5							0,55
10		9	13	5	1	2	4	3	6	7	8	12	10	11							0,82
11		12	13	1	6	7	3	2	8	5	4	9	10	11							0,78
12		5	8	2	4	7	10	1	12	11	13	3	9	6							0,63
13		5	2	11	4	7	13	8	12	1	6	9	3	10							0,59
14		10	13	2	4	6	5	3	11	1	7	12	8	9							0,90
15		5	3	1	2	7	6	4	10	8	11	12	9	13							0,87
16		3	4	1	7	9	8	5	10	2	11	13	12	6							0,77
17		5	6	1	2	6	8	7	3	4	11	12	10	9							0,83
18		9	13	2	4	7	5	6	3	1	8	10	12	11							0,82
19		10	11	1	2	5	7	3	6	4	12	13	9	8							0,91
20		3	8	4	6	10	5	12	7	1	13	9	2	11							0,79
21		9	8	2	7	5	6	1	10	3	11	12	13	4							0,75
22		2	10	13	11	9	6	8	12	7	5	1	3	4							0,26
23		12	4	1	2	8	9	3	7	5	10	13	11	6							0,79
24		10	9	1	2	12	3	4	6	5	11	13	7	8							0,91
25		5	6	1	7	11	13	2	10	3	9	12	4	8							0,82
26		11	10	5	4	1	3	9	2	7	12	13	8	6							0,68
27		7	6	5	2	1	8	9	3	4	12	13	11	10							0,74
28		9	10	2	3	6	11	8	7	4	12	13	5	1							0,76
29		8	10	4	5	1	3	9	2	11	12	13	7	6							0,65
30		7	10	1	2	8	6	4	9	3	11	13	5	12							0,84

Dear respondent!

What factors would you, parents, give preference to when assessing the competitive potential of enterprises in the regions of the Southern Federal District and the North Caucasus Federal District, taking advantage of the privileges – to assign them the appropriate rank from the arithmetic series – preferable starting from 1, and not preferable – a higher number, ensuring that the requirements of the arithmetic series are met, and namely, avoiding missing digits in the arithmetic series. If you have difficulties in choosing your preferences, you can use "linked ranks" by assigning two or more factors to the same rank, but here, too, the requirements of the arithmetic series must be observed.

Table 37 – Criteria for assessing the competitiveness and demand for children's shoes through the eyes of parents

No.	List of factors for assessing the competitive potential of enterprises in the regions of the Southern Federal District and the North Caucasus Federal District	Rank
1	Weight	
2	Color	
3	Quality of children's shoes	
4	Color fastness of materials used for shoe uppers to dry and wet friction and to perspiration	
5	Flexibility	

6	Bottom fastening strength	
7	Price	
8	Comfort	
9	Toe and heel deformation	
10	Maintainability	
11	Warranty period for children's shoes	

Table 38 – The results of the questionnaire survey of parents on their assessment of the competitive potential of the criteria for ensuring the competitiveness and demand for manufactured children's shoes

Factors / Experts	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11
1	4	11	2	3	7	5	6	1	8	10	9
2	3	4	1	7	8	6	5	2	11	10	9
3	3	4	1	5	6	8	7	2	10	9	11
4	2	6	1	7	4	11	5	3	9	10	8
5	4	8	1	5	7	9	3	2	10	11	6
6	4	8	1	7	6	5	3	2	11	10	9
7	3	5	1	8	6	9	2	4	11	7	10
8	2	3	4	10	5	8	9	1	11	6	7
9	3	4	1	7	2	6	5	10	11	8	9
10	2	8	1	7	3	5	6	4	10	9	11
11	3	7	1	6	5	8	4	2	10	9	11
12	2	6	3	5	7	9	4	1	11	8	10
13	4	6	3	5	7	10	1	2	11	8	9
14	4	7	3	6	5	10	1	2	11	8	9
15	3	8	4	6	5	7	1	2	11	10	9
16	2	5	4	6	7	10	3	1	11	9	8
17	5	9	2	8	6	4	1	3	10	11	7
18	3	7	2	8	4	9	6	1	10	11	5
19	6	5	1	8	4	7	3	2	9	10	11
20	3	7	4	6	5	8	1	2	9	11	10
21	3	7	4	6	5	8	2	1	9	10	11
22	1	3	5	4	8	7	9	10	2	11	6
23	9	10	1	8	4	3	5	2	11	6	7
24	4	2	3	1	6	7	5	8	11	10	9
25	5	11	1	4	2	3	10	6	7	9	8
26	1	7	6	8	5	9	10	2	11	3	4
27	4	9	6	7	5	3	10	2	1	11	8
28	2	1	3	8	10	9	4	7	6	11	5
29	4	7	1	2	8	3	5	10	6	9	11

Table 39 - The results of processing the a priori ranking of parents according to their assessment of their competitive potential on the criteria for ensuring competitiveness and the demand for shoes made by children

Factor / Expert	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	Kk
1	4	11	2	3	7	5	6	1	8	10	9	0,81
2	3	4	1	7	8	6	5	2	11	10	9	0,86
3	3	4	1	5	6	8	7	2	10	9	11	0,86
4	2	6	1	7	4	11	5	3	9	10	8	0,88
5	4	8	1	5	7	9	3	2	10	11	6	0,89
6	4	8	1	7	6	5	3	2	11	10	9	0,90
7	3	5	1	8	6	9	2	4	11	7	10	0,92
8	2	3	4	10	5	8	9	1	11	6	7	0,80
9	3	4	1	7	2	6	5	10	11	8	9	0,74
10	2	8	1	7	3	5	6	4	10	9	11	0,84
11	3	7	1	6	5	8	4	2	10	9	11	0,92
12	2	6	3	5	7	9	4	1	11	8	10	0,84
13	4	6	3	5	7	10	1	2	11	8	9	0,94
14	4	7	3	6	5	10	1	2	11	8	9	0,94
15	3	8	4	6	5	7	1	2	11	10	9	0,94
16	2	5	4	6	7	10	3	1	11	9	8	0,93
17	5	9	2	8	6	4	1	3	10	11	7	0,83
18	3	7	2	8	4	9	6	1	10	11	5	0,85
19	6	5	1	8	4	7	3	2	9	10	11	0,87
20	3	7	4	6	5	8	1	2	9	11	10	0,94
21	3	7	4	6	5	8	2	1	9	10	11	0,94
22	1	3	5	4	8	7	9	10	2	11	6	0,55
23	9	10	1	8	4	3	5	2	11	6	7	0,72
24	4	2	3	1	6	7	5	8	11	10	9	0,77
25	5	11	1	4	2	3	10	6	7	9	8	0,64
26	1	7	6	8	5	9	10	2	11	3	4	0,61
27	4	9	6	7	5	3	10	2	1	11	8	0,59
28	2	1	3	8	10	9	4	7	6	11	5	0,70
29	4	7	1	2	8	3	5	10	6	9	11	0,67
Rank sums	98	185	71	178	162	206	136	97	269	265	247	
Sum of ranks without heretics	17	35	18	29	27	43	6	9	51	47	48	
Coef. concord.		0,52		0,94								
Crete. Pearson		149,5		8,1								

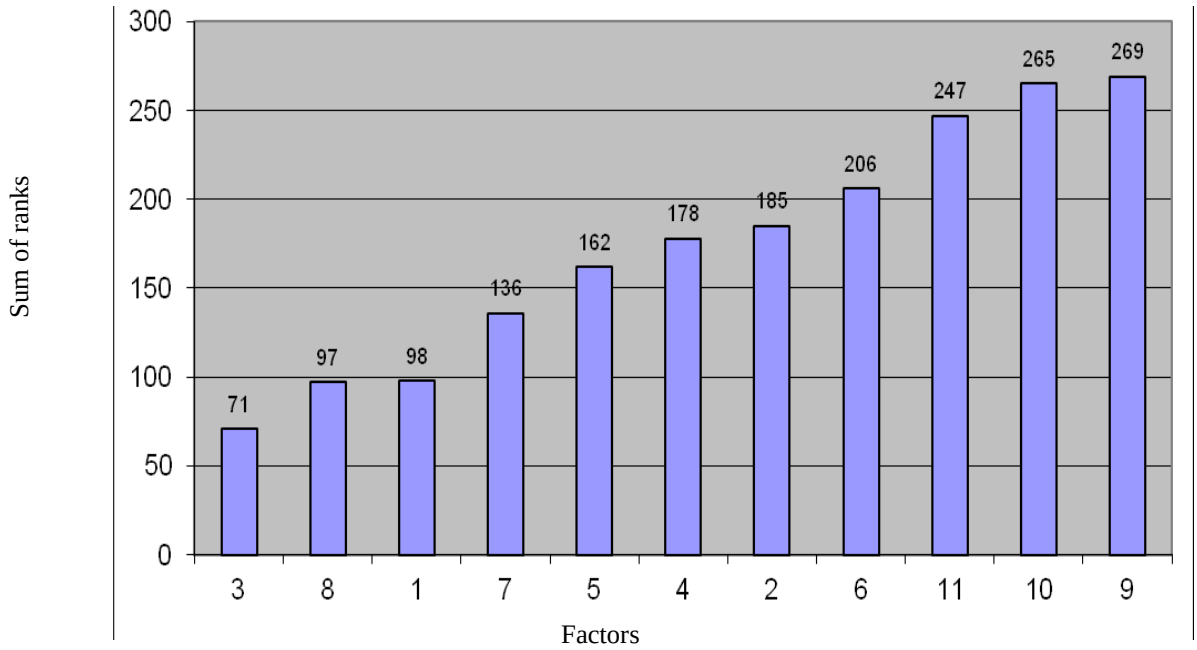


Figure 17 - The results of processing the a priori ranking of parents according to their assessment of their competitive potential on the criteria for ensuring competitiveness and the demand for shoes made by children

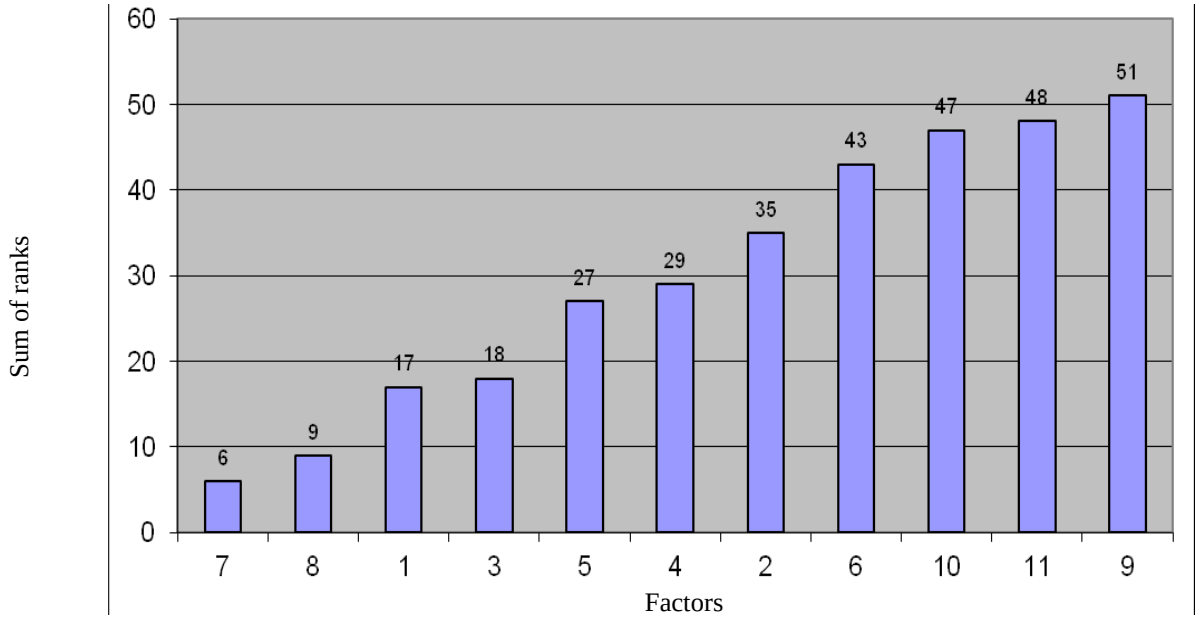


Figure 18 - The results of processing the a priori ranking of parents according to their assessment of their competitive potential on the criteria for ensuring the competitiveness and demand for shoes made by children without heretics, i.e. without those respondents whose opinion does not coincide with the opinion of the majority of survey participants

Table 40 - Assessment of the competence of parents about the demand for the range of footwear for children

АНАЛИЗ	Исключить	СТАРТ																			
Experts	Factors	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	W_i

1		4	11	2	3	7	5	6	1	8	10	9									0,84
2		3	4	1	7	8	6	5	2	11	10	9									0,88
3		3	4	1	5	6	8	7	2	10	9	11									0,86
4		2	6	1	7	4	11	5	3	9	10	8									0,90
5		4	8	1	5	7	9	3	2	10	11	6									0,91
6		4	8	1	7	6	5	3	2	11	10	9									0,93
7		3	5	1	8	6	9	2	4	11	7	10									0,90
8		2	3	4	10	5	8	9	1	11	6	7									0,69
9		3	4	1	7	2	6	5	10	11	8	9									0,71
10		2	8	1	7	3	5	6	4	10	9	11									0,86
11		3	7	1	6	5	8	4	2	10	9	11									0,95
12		2	6	3	5	7	9	4	1	11	8	10									0,93
13		4	6	3	5	7	10	1	2	11	8	9									0,94
14		4	7	3	6	5	10	1	2	11	8	9									0,95
15		3	8	4	6	5	7	1	2	11	10	9									0,98
16		2	5	4	6	7	10	3	1	11	9	8									0,93
17		5	9	2	8	6	4	1	3	10	11	7									0,90
18		3	7	2	8	4	9	6	1	10	11	5									0,86
19		6	5	1	8	4	7	3	2	9	10	11									0,92
20		3	7	4	6	5	8	2	1	9	10	11									0,99
21		1	3	5	4	8	7	9	10	2	11	6									0,48
22		9	10	1	8	4	3	5	2	11	6	7									0,69
23		4	2	3	1	6	7	5	8	11	10	9									0,75
24		5	11	1	4	2	3	10	6	7	9	8									0,60
25		1	7	6	8	5	9	10	2	11	3	4									0,55
26		4	9	6	7	5	3	10	2	1	11	8									0,58
27		2	1	3	8	10	9	4	7	6	11	5									0,69
28		4	7	1	2	8	3	5	10	6	9	11									0,65
29		3	7	4	6	5	8	1	2	9	11	10									0,94

Table 41 - Summary characteristics of the results of the survey of respondents - children, their parents, buyers and manufacturers to assess the competitive potential of shoe enterprises in the regions of the Southern Federal District and the North Caucasus Federal District

Results of the survey of children	Parent Survey Results	Customer survey results	Producer survey results
2 - Quality of children's shoes	3 - Quality of children's shoes	3 - Quality of children's shoes	3 - Quality of children's shoes
1 - Toe shape	8 - Comfort	9 - Comfort	4 - Functionality of children's shoes
11 - Weight	1 - Weight	6 - Compliance with the direction in fashion	9 - Comfort
5 - Comfort	7 - Price	7 - Price	7 - Price

13 –- Materials for the bottom of shoes	5 - Flexibility	4 - Functionality of children's shoes	6 - Compliance with the direction in fashion
22 - Compliance with the direction in fashion	4 - Color fastness of materials used for shoe uppers to dry and wet friction and to perspiration	1 - Weight	5 - Characteristics of materials for the upper of the shoe
4 - Price of children's shoes	2 - Color	5 - Characteristics of materials for the upper of the shoe	1 - Weight
21 - Variety of assortment of shoes for children in shops and shopping centers	6 - Strength of fastening of the bottom of the shoe	8 - Characteristics of materials for the bottom of the shoe	8 - Characteristics of materials for the bottom of the shoe
6 - The level of service for parents and children in shops and shopping centers	11 - Warranty period for children's shoes	2 - Color	2 - Color
7 - Color	10 - Maintainability	15 - What types of children's shoes are preferred: autumn	12 - Maintainability
9 - The height of the heel is up to 40 mm	9 - Deformation of the toe and heel	10 - The height of the heel of the shoe - up to 40 mm	13 - Warranty period for children's shoes
15 - Place of sale of shoes for children - the interior of a store, or a shopping center		14 - What types of children's shoes are preferred: winter	10 - The height of the heel of the shoe - up to 40 mm
8 - Warranty period for children's shoes		11 - The height of the heel of the shoe is over 40 mm	11 - The height of the heel of the shoe - over 40 mm
16 - What types of children's shoes are preferred: winter		12 - Maintainability	
18 - What types of children's shoes are preferred: spring		18 - Strength of fastening of the bottom of the shoe	
12 - Repairability of children's shoes, its expediency		16 - What types of children's shoes are preferred: spring	
3 - Flexibility of children's shoes		13 - Warranty period for children's shoes	
10 - The height of the heel of the shoe is over 40 mm		17 - What types of children's shoes are preferred: summer	
17 - What types of children's shoes are preferred: autumn			
20 - Strength of fastening of the bottom of the shoe			
14 - Materials for the upper shoe			
19 - What types of children's shoes are preferred: summer			
0.16 <W <0.69	0.52 <W <0.94	0.47 <W <0.91	0.33 <W <0.84

Table 42 - Summary characteristics of the results of the survey of respondents - children, their parents, buyers and manufacturers on the assessment of the competitive potential of shoe enterprises in the regions of the Southern Federal District and the North Caucasus Federal District, but without heretics, whose opinion does not coincide with the majority of respondents who participated in the survey

Results of the survey of children	Parent Survey Results	Customer survey results	Producer survey results
2 - Quality of children's shoes	7 - Price	6 - Compliance with the direction in fashion	3 - Quality of children's shoes
5 - Comfort	8 - Comfort	9 - Comfort	4 - Functionality of children's shoes
11 - Weight	1 - Weight	7 - Price	7 - Price
22 - Compliance with the direction in fashion	3 - Quality of children's shoes	3 - Quality of children's shoes	9 - Comfort
16 - What types of children's shoes are preferred: winter	5 - Flexibility	15 - What types of children's shoes are preferred: autumn	6 - Compliance with the direction in fashion
6 - The level of service for parents and children in shops and shopping centers	4 - Color fastness of materials used for shoe uppers to dry and wet friction and to perspiration	1 - Weight	12 - Maintainability
21 - Variety of assortment of shoes for children in shops and shopping centers	2 - Color	14 - What types of children's shoes are preferred: winter	5 - Characteristics of materials for the upper of the shoe
4 - Price of children's shoes	6 - Strength of fastening of the bottom of the shoe	4 - Functionality of children's shoes	8 - Characteristics of materials for the bottom of the shoe
7 - Color	10 - Maintainability	5 - Characteristics of materials for the upper of the shoe	1 - Weight
1 - Toe shape	11 - Warranty period for children's shoes	11 - The height of the heel of the shoe is over 40 mm	13 - Warranty period for children's shoes
12 - Repairability of children's shoes, its expediency	9 - Deformation of the toe and heel	2 - Color	2 - Color
8 - Warranty period for children's shoes		8 - Characteristics of materials for the bottom of the shoe	10 - The height of the heel of the shoe - up to 40 mm
13 –- Materials for the bottom of shoes		10 - The height of the heel of the shoe - up to 40 mm	11 - The height of the heel of the shoe - over 40 mm
15 - Place of sale of shoes for children - the interior of a store, or a shopping center		16 - What types of children's shoes are preferred: spring	
18 - What types of children's shoes are preferred: spring		17 - What types of children's shoes are preferred: summer	
3 - Flexibility of children's shoes		18 - Strength of fastening of the bottom of the shoe	
19 - What types of children's shoes are preferred: summer		12 - Maintainability	
14 - Materials for the upper shoe		13 - Warranty period for children's shoes	
9 - The height of the heel is up to 40 mm			

10 - The height of the heel of the shoe is over 40 mm			
20 - Strength of fastening of the bottom of the shoe			
17 - What types of children's shoes are preferred: autumn			
0.16 <W <0.69	0.52 <W <0.94	0.47 <W <0.91	0.33 <W <0.84

Dear respondent!

What indicators would you give preference to when analyzing and researching the status of the concept of "Product attractiveness", using the privileges - to assign them an appropriate rank from the arithmetic series - preferable starting from 1, and not preferred - a higher digit, ensuring that the requirements of the arithmetic series are met, namely, avoiding missing digits in the arithmetic series. If you have difficulties in choosing your preferences, you can use “linked ranks” by assigning two or more factors to the same rank, but here, too, the requirements of the arithmetic series must be observed.

Table 43 - Analysis and study of the status of the concept "Attractiveness of goods"

No.	Product attractiveness indicators	Rank
1	Feeling the need to buy a product	
2	Reliability of goods	
3	Manufacturer's responsibility for the quality of the goods	
4	Completeness of goods	
5	Service courtesy	
6	Trust in the seller, manufacturer	
7	Impressive warranty period	
8	Product availability	
9	Communication with the seller	
10	Mutual understanding with the seller, his interest	
11	Service culture	
12	Affordability	
13	Customer satisfaction	
14	The level of readiness of the consumer to make a purchase	
15	The level of interest of the manufacturer in the formation of the attractiveness of the product	
16	Consumer buying opportunity	
17	Manufacturer credibility	
18	Consumer communication	
19	Presence of opinion of an earlier made purchase of an ideal product	
20	The consumer's need to buy an attractive, original product	
21 22 23 24 25 26 27	The relevance of this purchase to the buyer Possibility of subsequent exchange of goods Availability of several necessary functions for the product Modern design Payment method for purchase Ease of operation of the product Organization and availability of service support for purchased goods	

Table 44 - Results of a survey of leading experts, teachers and merchandising students on the impact of the status of the concept "Attractiveness of goods" on import substitution of light industry products in the regions of the Southern Federal District and the North Caucasus Federal District

Factors Experts	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16	X17	X18	X19	X20	X21	X22	X23	X24	X25	X26	X27
Lecturer 1	2	1	3	6	19	11	15	9	22	14	23	4	12	27	17	25	7	18	13	20	5	16	26	21	10	8	24
Leading 2	2	1	3	24	9	8	21	17	22	10	7	4	16	26	12	23	18	20	25	19	5	27	11	15	14	13	6
specialist 3	5	6	7	12	13	14	15	4	16	17	5	3	17	18	19	2	23	20	7	17	1	21	8	9	10	11	22
4	24	4	8	10	11	3	12	7	24	2	1	26	18	20	19	5	9	13	16	21	14	15	17	22	23	6	25
5	25	4	5	10	11	3	12	6	13	14	15	1	20	22	21	2	26	16	17	23	24	18	8	27	9	7	19
6	7	2	1	3	17	18	4	8	25	26	27	9	10	11	19	12	5	24	13	23	14	20	6	22	15	21	18
7	2	5	4	3	26	17	6	16	27	25	18	1	19	20	15	7	8	24	9	21	10	22	11	12	23	14	13
8	1	3	11	12	13	5	6	5	12	14	6	7	8	9	10	12	5	3	2	1	12	13	15	11	1	2	3
9	1	3	11	22	5	15	16	14	4	8	6	2	13	19	17	24	12	18	4	23	21	7	26	9	10	20	25
10	1	7	10	17	18	19	15	8	20	21	16	2	9	6	22	11	12	11	13	14	3	23	4	25	24	5	26
11	1	11	3	5	16	17	6	7	21	22	18	2	23	12	13	19	24	25	8	9	14	26	4	27	20	15	10
12	2	8	9	13	23	22	7	12	21	20	27	11	4	5	24	1	6	19	18	14	3	25	10	15	26	16	17
13	1	2	18	16	17	14	15	11	13	12	10	9	19	26	20	8	7	25	24	6	5	21	22	3	27	4	23
14	3	1	4	11	7	5	6	8	10	9	19	2	25	15	22	13	12	26	20	21	14	15	16	23	24	17	18
15	1	19	18	17	22	4	6	3	26	25	24	2	21	15	15	14	12	13	5	11	6	20	7	10	9	8	23
16	13	4	8	23	20	7	19	12	11	10	18	2	21	24	9	22	5	25	3	14	1	26	15	6	27	16	17
17	1	5	10	11	16	7	12	24	17	18	15	8	3	19	27	23	4	25	22	21	2	20	9	6	26	13	14
18	1	3	14	10	21	22	11	7	20	9	8	2	6	23	13	18	25	19	12	17	16	26	27	5	4	24	15
19	4	1	8	9	3	10	19	7	11	2	18	6	15	17	16	12	14	26	13	21	27	22	23	24	20	5	25
20	4	2	3	1	16	7	5	6	14	17	13	9	8	19	22	12	18	11	19	21	23	24	20	20	25	15	10
21	1	5	6	2	23	7	22	24	21	20	18	3	16	19	17	15	14	25	13	12	4	11	27	8	26	9	10
22	4	1	2	3	6	5	7	8	22	10	9	11	12	25	20	14	23	15	21	13	16	18	17	19	27	24	26
23	9	1	2	4	14	13	26	3	15	16	17	4	10	11	18	5	6	12	19	20	7	21	8	23	22	24	25
24	5	19	20	21	27	6	23	4	26	25	24	2	1	7	8	3	9	10	11	12	13	18	14	17	16	15	22
25	2	5	12	19	6	26	13	7	18	20	21	1	23	22	17	16	8	27	9	3	4	24	10	11	15	25	14
26	7	5	1	4	8	6	14	9	24	15	26	20	16	10	21	25	17	11	27	3	2	18	22	12	23	19	13
Leading 27	5	3	11	15	21	6	20	12	7	19	22	2	27	10	13	16	26	24	23	18	1	17	4	8	25	9	14

specialist 28	14	3	15	13	12	22	26	6	20	21	5	2	18	19	17	4	7	9	8	10	11	25	16	1	23	24	27		
Lecturer 29	14	3	15	13	12	22	26	6	20	21	5	2	18	19	17	4	7	9	8	10	11	25	16	1	23	24	26		
Student 30	14	3	15	13	12	22	26	6	20	21	5	2	18	19	17	4	7	9	8	10	11	25	16	1	23	24	27		
31	14	3	15	13	12	22	26	6	10	21	5	2	18	19	17	4	7	9	8	10	11	25	16	1	23	24	27		
32	11	1	7	14	18	12	8	3	17	19	21	2	23	26	13	25	4	24	22	15	16	27	6	5	20	9	10		
33	2	8	1	25	23	18	9	5	24	21	22	6	18	10	11	13	12	20	7	14	4	19	15	3	26	16	17		
34	5	6	11	18	12	9	13	3	23	19	22	4	8	1	20	7	10	25	14	16	2	24	15	21	26	17	12		
35	3	3	10	9	9	8	8	5	19	17	11	4	18	1	18	11	2	15	16	14	2	6	7	13	12	12	7		
36	3	3	13	12	11	10	9	5	25	22	14	4	23	1	24	9	15	20	21	19	2	6	7	18	17	16	8		
37	3	2	13	12	11	10	9	5	26	22	14	4	23	24	25	9	15	20	21	19	1	6	7	17	18	16	8		
38	1	2	1	4	4	2	5	11	13	14	6	3	1	21	12	7	8	15	16	18	1	19	9	2	20	17	10		
39	9	2	8	12	21	11	27	10	10	20	15	3	22	13	7	24	6	16	25	23	1	26	17	4	5	18	20		
40	11	1	9	22	6	25	12	7	15	26	24	2	10	18	14	8	19	27	17	13	3	21	23	4	20	5	16		
41	10	4	17	23	5	11	24	1	18	12	25	2	19	6	13	3	26	14	20	7	8	15	21	9	16	22	27		
42	27	5	20	19	24	4	10	18	17	9	26	1	11	12	13	23	3	25	21	6	2	14	7	8	15	16	22		
43	1	5	6	12	26	13	14	15	23	24	25	7	8	16	20	18	21	17	27	2	3	19	4	11	22	9	10		
44	9	1	22	14	6	17	7	2	23	16	5	10	11	24	15	25	21	13	12	20	4	18	26	19	8	3	27		
45	3	14	1	7	17	12	26	19	11	22	2	23	25	18	6	24	15	8	27	20	16	4	21	9	10	13	5		
46	2	11	1	13	21	22	12	24	23	27	25	3	14	4	10	9	5	18	17	6	20	16	26	7	15	19	8		
47	2	3	8	6	20	19	12	18	21	22	23	5	9	6	13	8	9	4	7	10	1	11	14	3	15	17	16		
48	1	6	7	13	14	8	15	9	24	23	22	10	11	2	12	3	26	16	27	4	5	25	17	21	20	18	19		
49	5	1	2	4	19	16	6	7	22	23	24	8	11	12	13	9	17	25	18	14	3	26	10	20	15	17	21		
50	1	3	4	5	7	6	2	8	10	9	11	12	16	13	14	17	15	18	22	23	21	20	24	27	26	25	19		
51	1	3	2	9	12	11	10	4	18	5	19	6	7	13	15	14	21	24	23	17	27	26	25	22	8	20	16		
52	19	1	2	6	4	20	5	6	22	7	21	8	9	23	26	10	11	27	25	12	13	14	16	15	17	24	18		
53	1	3	7	9	11	12	10	8	14	15	16	4	17	18	21	6	20	23	24	25	2	5	13	22	26	21	19		
54	1	2	6	3	12	18	15	13	16	19	14	4	21	9	5	17	24	22	11	7	10	20	26	8	27	25	23		
55	16	2	17	12	10	13	18	14	19	11	9	8	1	22	20	21	7	27	23	3	4	24	5	6	26	15	25		
56	166	27	178	1223	1025	1324	189	1417	1927	1121	19	18	1	2221	2020	2111	7	2723	2313	3	34	2424	55	66	2626	1525	2516		
57	3	106	165	231	58	2242	273	179	1821	1213	182	107	2625	1141	1901	2261	215	2011	2132	24	12	245	53	64	1415	1516				
58	1	06	65	106	4	227	73	8	82	139	13	242	1225	151	1722	2623	144	2112	1167	2427	1226	1205	2423	1523	1419	1198				
59	3	5	113	06	245	255	2	231	2614	2725	2213	206	1212	1910	1811	237	1415	1617	1723	1	1206	1308	1379	1411	1179	1810				
60	19	4	13	2	515	24	31	14	25	13	12	10	11	26	10	16	23	19	29	21	22	20	17	17	08				
61																													

62	106	172	181	3	132	238	117	9	242	4	252	123	2	195	155	279	5	206	264	141	1	212	216	6	8	16	7
63				164				235		266			177																
64	3	2	3	4	2	1	4	5	4	5	3	2	5	5	6	7	4	5	5	4	7	8	5	4	3	8	5	6	
65	14	2	1	7	4	8	155	5	11	9	6	3	105	2	59	1	2	3	0	8	3	4	7	7	6	6	2	2	
66	26	7	6	20	2	9	11	1	22	1	1	5	8	11	14	2	2	2	3	1	1	2	1	2	1	1			
67	7	1	1	20	1	2	3	1	2	8	1	2	1	2	1	2	4	2	5	1	6	1	2	2	9	1	1		
68	3	1	14	15	20	4	2	3	2	1	6	4	2	2	2	1	1	1	1	1	5	6	1	1	8	7	9		
69	1	1	2	1	2	2	1	3	2	2	2	4	5	2	1	6	7	1	2	8	9	2	1	1	1	1	1		
70	2	3	2	3	1	1	2	1	1	1	1	1	1	2	2	4	2	1	2	5	6	2	1	2	1	7	8		
71	5	1	4	1	1	1	1	1	1	1	1	6	7	2	1	2	3	2	2	2	8	2	2	9	2	1	2		
72	1	1	1	2	1	1	1	1	1	1	1	3	8	2	2	2	2	7	2	2	2	6	5	4	9	1	2		
73	2	1	4	5	1	2	6	2	1	2	2	3	1	2	1	7	8	2	1	1	9	1	1	1	1	1	1		
74	2	7	1	1	4	1	1	1	1	8	1	2	3	1	6	5	2	2	2	2	9	1	2	1	2	1	1		
75	1	1	2	1	2	1	3	1	2	2	2	9	1	2	1	2	1	1	1	1	4	8	5	7	2	2	6		
Student 76	1	9	2	2	1	8	2	4	2	1	2	5	6	1	1	1	7	2	1	1	1	2	1	1	3	1	1		
Etalon 77	2	1	3	4	1	1	5	1	1	1	1	1	1	1	7	8	9	9	1	2	6	1	7	3	1	5	4		

Table 45– Results of processing questionnaires received with participation in a survey of leading experts, teachers and students-commodity experts on the impact of the status of the concept "Attractiveness of goods" on import substitution of light industry products in the regions of the Southern Federal District and the North Caucasus Federal District

Factor / Expert	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16	X17	X18	X19	X20	X21	X22	X23	X24	X25	X26	X27	QC
1	2	1	3	6	19	11	15	9	22	14	23	4	12	27	17	25	7	18	13	20	5	16	26	21	10	8	24	0,48
2	2	1	3	24	9	8	21	17	22	10	7	4	16	26	12	23	18	20	25	19	5	27	11	15	14	13	6	0,42
3	5,5	7	8,5	14	15	16	17	4	18	20	5,5	3	20	22	23	2	27	24	8,5	20	1	25	10	11	12	13	26	0,46
4	24,5	4	8	10	11	3	12	7	24,5	2	1	27	18	20	19	5	9	13	16	21	14	15	17	22	23	6	26	0,27
5	25	4	5	10	11	3	12	6	13	14	15	1	20	22	21	2	26	16	17	23	24	18	8	27	9	7	19	0,29
6	7	2	1	3	17	16	4	8	25	26	27	9	10	11	19	12	5	24	13	23	14	20	6	22	15	21	18	0,75
7	2	5	4	3	26	17	6	16	27	25	18	1	19	20	15	7	8	24	9	21	10	22	11	12	23	14	13	0,75
8	8	6	18,5	21,5	24,5	10	12,5	10	21,5	26	12,5	14	15	16	17	21,5	10	6	3,5	1,5	21,5	24,5	27	18,5	1,5	3,5	6	0,26
9	1	3	12	23	6	16	17	15	4,5	9	7	2	14	20	18	25	13	19	4,5	24	22	8	27	10	11	21	26	0,28

10	1	7	10	18	19	20	16	8	21	22	17	2	9	6	23	11,5	13	11,5	14	15	3	24	4	26	25	5	27	0,555
11	1	11	3	5	16	17	6	7	21	22	18	2	23	12	13	19	24	25	8	9	14	26	4	27	20	15	10	0,500
12	2	8	9	13	23	22	7	12	21	20	27	11	4	5	24	1	6	19	18	14	3	25	10	15	26	16	17	0,775
13	1	2	18	16	17	14	15	11	13	12	10	9	19	26	20	8	7	25	24	6	5	21	22	3	27	4	23	0,444
14	3	1	4	11	7	5	6	8	10	9	20	2	26	15,5	23	13	12	27	21	22	14	15,5	17	24	25	18	19	0,511
15	1	20	19	18	23	4	17	3	27	26	25	2	22	15,5	15,5	14	12	13	5	11	6	21	7	10	9	8	24	0,344
16	13	4	8	23	20	7	19	12	11	10	18	2	21	24	9	22	5	25	3	14	1	26	15	6	27	16	17	0,411
17	1	5	10	11	16	7	12	24	17	18	15	8	3	19	27	23	4	25	22	21	2	20	9	6	26	13	14	0,599
18	1	3	14	10	21	22	11	7	20	9	8	2	6	23	13	18	25	19	12	17	16	26	27	5	4	24	15	0,366
19	4	1	8	9	3	10	19	7	11	2	18	6	15	17	16	12	14	26	13	21	27	22	23	24	20	5	25	0,366
20	4	2	3	1	16	7	5	6	14	17	13	9	8	19,5	24	12	18	11	19,5	23	25	26	21,5	21,5	27	15	10	0,433
21	1	5	6	2	23	7	22	24	21	20	18	3	16	19	17	15	14	25	13	12	4	11	27	8	26	9	10	0,477
22	4	1	2	3	6	5	7	8	22	10	9	11	12	25	20	14	23	15	21	13	16	18	17	19	27	24	26	0,445
23	10	1	2	4,5	15	14	27	3	16	17	18	4,5	11	12	19	6	7	13	20	21	8	22	9	24	23	25	26	0,544
24	5	19	20	21	27	6	23	4	26	25	24	2	1	7	8	3	9	10	11	12	13	18	14	17	16	15	22	0,311
25	2	5	12	19	6	26	13	7	18	20	21	1	23	22	17	16	8	27	9	3	4	24	10	11	15	25	14	0,500
26	7	5	1	4	8	6	14	9	24	15	26	20	16	10	21	25	17	11	27	3	2	18	22	12	23	19	13	0,444
27	5	3	11	15	21	6	20	12	7	19	22	2	27	10	13	16	26	24	23	18	1	17	4	8	25	9	14	0,477
28	14	3	15	13	12	22	26	6	20	21	5	2	18	19	17	4	7	9	8	10	11	25	16	1	23	24	27	0,400
29	14	3	15	13	12	22	26,5	6	20	21	5	2	18	19	17	4	7	9	8	10	11	25	16	1	23	24	26,5	0,399
30	14	3	15	13	12	22	26	6	20	21	5	2	18	19	17	4	7	9	8	10	11	25	16	1	23	24	27	0,400
31	14	3	15	13	12	22	26	6	20	21	5	2	18	19	17	4	7	9	8	10	11	25	16	1	23	24	27	0,399

32	11	1	7	14	18	12	8	3	17	19	21	2	23	26	13	25	4	24	22	15	16	27	6	5	20	9	10	0,52
33	2	8	1	26	24	18,5	9	5	25	22	23	6	18,5	10	11	13	12	21	7	14	4	20	15	3	27	16	17	0,62
34	5	6	11	19	12,5	9	14	3	24	20	23	4	8	1	21	7	10	26	15	17	2	25	16	22	27	18	12,5	0,74
35	4,5	4,5	15	13,5	13,5	11,5	11,5	7	27	24	16,5	6	25,5	1	25,5	16,5	2,5	22	23	21	2,5	8	9,5	20	18,5	18,5	9,5	0,71
36	3,5	3,5	15	14	13	12	10,5	6	27	24	16	5	25	1	26	10,5	17	22	23	21	2	7	8	20	19	18	9	0,67
37	3	2	14	13	12	11	9,5	5	27	23	15	4	24	25	26	9,5	16	21	22	20	1	6	7	18	19	17	8	0,65
38	2,5	6	2,5	9,5	9,5	6	11	17	19	20	12	8	2,5	27	18	13	14	21	22	24	2,5	25	15	6	26	23	16	0,57
39	9	2	8	12	21	11	27	14	10	19	15	3	22	13	7	24	6	16	25	23	1	26	17	4	5	18	20	0,38
40	11	1	9	22	6	25	12	7	15	26	24	2	10	18	14	8	19	27	17	13	3	21	23	4	20	5	16	0,48
41	10	4	17	23	5	11	24	1	18	12	25	2	19	6	13	3	26	14	20	7	8	15	21	9	16	22	27	0,35
42	27	5	20	19	24	4	10	18	17	9	26	1	11	12	13	23	3	25	21	6	2	14	7	8	15	16	22	0,31
43	1	5	6	12	26	13	14	15	23	24	25	7	8	16	20	18	21	17	27	2	3	19	4	11	22	9	10	0,61
44	9	1	22	14	6	17	7	2	23	16	5	10	11	24	15	25	21	13	12	20	4	18	26	19	8	3	27	0,32
45	3	14	1	7	17	12	26	19	11	22	2	23	25	18	6	24	15	8	27	20	16	4	21	9	10	13	5	0,26
46	2	11	1	13	21	22	12	24	23	27	25	3	14	4	10	9	5	18	17	6	20	16	26	7	15	19	8	0,34
47	2	3,5	10,5	7,5	24	23	16	22	25	26	27	6	12,5	7,5	17	10,5	12,5	5	9	14	1	15	18	3,5	19	21	20	0,47
48	1	6	7	13	14	8	15	9	24	23	22	10	11	2	12	3	26	16	27	4	5	25	17	21	20	18	19	0,49
49	5	1	2	4	20	16	6	7	23	24	25	8	11	12	13	9	17,5	26	19	14	3	27	10	21	15	17,5	22	0,75
50	1	3	4	5	7	6	2	8	10	9	11	12	16	13	14	17	15	18	22	23	21	20	24	27	26	25	19	0,36
51	1	3	2	9	12	11	10	4	18	5	19	6	7	13	15	14	21	24	23	17	27	26	25	22	8	20	16	0,37
52	19	1	2	3	4	20	5	6	22	7	21	8	9	23	26	10	11	27	25	12	13	14	16	15	17	24	18	0,45
53	1	3	7	9	11	12	10	8	14	15	16	4	17	18	21,5	6	20	24	25	26	2	5	13	23	27	21,5	19	0,60

54	1	2	6	3	12	18	15	13	16	19	14	4	21	9	5	17	24	22	11	7	10	20	26	8	27	25	23	0,46
55	16	2	17	12	10	13	18	14	19	11	9	8	1	22	20	21	7	27	23	3	4	24	5	6	26	15	25	0,42
56	16	2	17	12	10	13	18	14	19	11	9	8	1	22	20	21	7	27	23	3	4	24	5	6	26	15	25	0,41
57	6	7	8	23	25	24	9	17	27	22	18	10	26	11	19	12	21	20	13	1	2	5	3	4	14	15	16	0,34
58	3	10	16	1	8	22	27	9	18	13	2	7	25	4	17	26	5	11	21	24	12	6	20	15	23	14	19	0,30
59	1	6	5	10	4	7	3	8	2	9	13	24	12	15	22	23	14	21	16	27	26	11	20	25	17	19	18	0,28
60	3	5	4	6	24	25	2	23	26	27	22	20	21	19	18	7	15	16	17	1	12	13	8	14	9	11	10	0,34
61	19,5	4	3	2	5	15	25	1	14	26	13	6	12	18	11	27	10	16	24	19,5	9	22	23	21	17	7	8	0,37
62	10	17	18	3	13	23	11	9	24	4	25	12	2	19	15	27	5	20	26	14	1	22	21	6	8	16	7	0,32
63	6	2	1	16	24	8	7	23	25	26	27	3	17	18	19	9	4	20	21	10	5	13	11	12	22	14	15	0,75
64	6,5	3	6,5	11,5	3	1	11,5	18	11,5	18	6,5	3	18	18	22,5	24,5	11,5	18	18	11,5	24,5	26,5	18	11,5	6,5	26,5	22,5	0,35
65	14	2	1	7	4	8	15	5	11	9	6	3	10	25	19	21	12	23	20	18	13	24	17	27	26	16	22	0,43
66	26	7	6	20	2	9	10	18	27	11	1	5	8	19	14	4	25	21	23	3	15	12	22	17	24	13	16	0,29
67	7	1	14	2	18	24	3	13	27	8	19	20	10	23	15	22	4	25	5	17	6	16	26	21	9	12	11	0,33
68	3	1	15	16	21	22	24	2	27	17	6,5	4	25	26	23	20	19	18	14	12	5	6,5	13	11	9	8	10	0,37
69	1	13	2	14	21	22	15	3	23	24	25	4	5	26	16	6	7	17	20	8	9	27	10	18	11	19	12	0,55
70	2,5	10	2,5	4	11	13	22	1	12	14	15	16	17	23	27	5	26	18	21	6	7	25	19	24	20	8	9	0,39
71	5	1	4	12	18	11	14	13	16	17	15	6	7	26	19	2	3	20	27	23	8	22	21	9	24,5	10	24,5	0,56
72	14	1	13	2	11	12	19	15	16	17	18	3	8	20	21	22	23	7	26	25	24	6	5	4	9	10	27	0,30
73	27	1	4	5	14	26	6	2	19	25	24	3	18	23	20	7	8	22	13	16	9	16	10	11	21	16	12	0,52
74	2	7	13	17	4	14	18	10,5	15	8	16	23	3	10,5	6	5	22	24	26	21	9	12	25	1	27	20	19	0,31
75	11	1	2	12	27	13	3	10	26	25	24	9	14	23	15	21	16	17	18	19	4	8	5	7	20	22	6	0,64

76	12,5	9	2	26	16	8	27	4	22	17	24	5	6	20	14,5	21	7	23	18	19	1	25	14,5	12,5	3	11	10	0,38
77	3,5	1,5	5,5	7,5	21	22	9,5	23	24	25	26	1,5	11,5	27	13,5	15	16,5	16,5	18	3,5	11,5	19	13,5	5,5	20	9,5	7,5	0,53
Суммы рангов	549	358	6522,5	8955,5	1120	1057	10081,5	7666,5	1486	1342	1255,5	519	1106,5	1304,5	1320,5	1070,5	1021,5	1456	1337	1144	7145	1444	1175	1023	1420	1191	1322	1342	

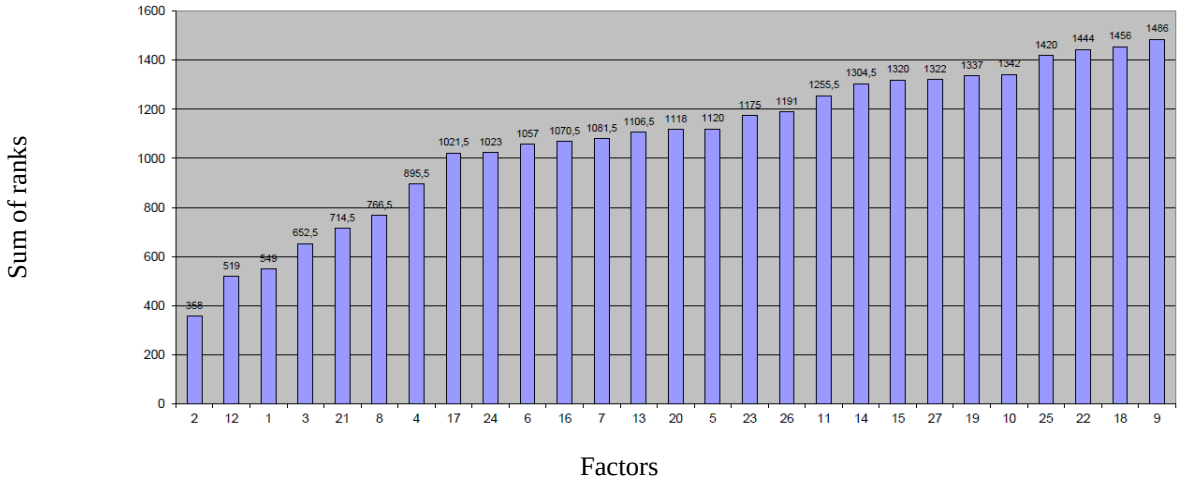


Figure 18– The results of processing questionnaires received with participation in a survey of leading experts, teachers and students-commodity experts on the impact of the status of the concept "Attractiveness of goods" on import substitution of light industry products in the regions of the Southern Federal District and the North Caucasus Federal District

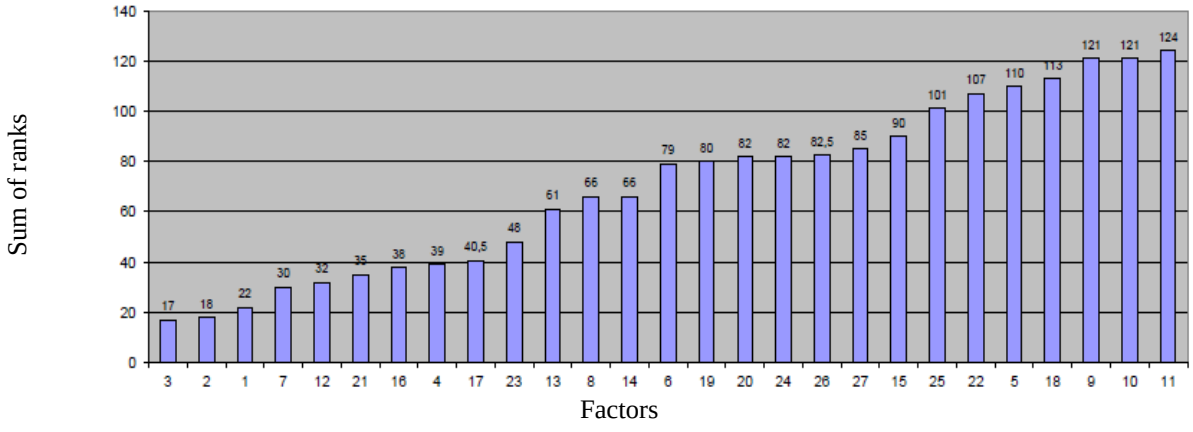


Figure 19– The results of processing questionnaires received with participation in a survey of leading experts, teachers and commodity students on the impact of the status of the concept "Attractiveness of goods" on import substitution of light industry products in the regions of the Southern Federal District and the North Caucasus Federal District without the participation of so-called heretics, that is, those respondents whose opinion does not coincide with the majority of survey participants

Table 46 - Comparative characteristics of experts' opinions on the impact of the status of the concept of "Product attractiveness" on the competitiveness and demand for products

No	Indicators of "Product attractiveness"	Results of a survey of teachers and students on the importance of criteria for assessing the impact of the concept of "Product attractiveness" on its demand						
		1*	2*	3*	4*	5*	6*	7*
1	Feeling the need to buy a product	3,5	3	3	3	3	3	1
2	Reliability of goods	1,5	2	1	1	1	1	2
3	Manufacturer's responsibility for the quality of the goods	5,5	1	4	4	2	4	3
4	Completeness of goods	7,5	8	7	7	9	7	9
5	Service courtesy	21	23	15	12	24	18	20
6	Trust in the seller, manufacturer	22	14	10	15	13	8	16
7	Impressive warranty period	9,5	4	12	10	6	14	13
8	Product availability	23	12	6	6	1	5	10
9	Communication with the seller	24	25	27	27	25	24	24
10	Mutual understanding with the seller, his interest	25	26	23	2	26	20	25
11	Service culture	26	27	18	20	27	19	23
12	Affordability	1,5	5	2	2	5	2	4
13	Customer satisfaction	11,5	11	13	11	12	16	11
14	The level of readiness of the consumer to make a purchase	27	13	19	19	20	21	12
15	The level of interest of the manufacturer in the formation of the attractiveness of the product	13,5	20	20	21	18	22	21
16	Consumer buying opportunity	15	7	11	14	14	9	5
17	Manufacturer credibility	16,5	9	8	9	16	10	7
18	Consumer communication	16,5	24	26	25	21	23	17
19	Having an opinion about an earlier purchase of an identical product	18	15	22	26	23	11	14
20	The consumer's need to buy an attractive, original product	3,5	16	14	13	8	17	18
21	The relevance of this purchase to the buyer	11,5	6	5	5	4	6	6
22	Possibility of subsequent exchange of goods	19	22	25	22	19	27	27
23	Availability of several necessary functions for the product	13,5	10	16	16	7	15	8
24	Modern design	5,5	17	9	8	10	13	19
25	Payment method for purchase	20	21	24	24	22	26	26
26	Ease of operation of the product	9,5	18	17	17	15	12	15

27	Organization and availability of service support for purchased goods	7,5	19	21	18	11	25	22

* Note: 1 - reference answer; 2 - the general opinion of the experts participating in the survey; 3 - the opinion of experts without heretics, that is, those experts whose opinion does not coincide with the majority of experts; 4 - opinion of student experts participating in the survey; 5 - the opinion of those student experts without heretics, whose answers do not coincide with the opinion of the majority; 6 - opinion of expert teachers participating in the survey; 7 - the opinion of expert teachers without heretics, whose answers do not coincide with the survey participants.

Analysis of the questionnaire survey on the influence of the competitive potential of enterprises in the regions of the Southern Federal District and the North Caucasus Federal District and on the increase in the competitive advantages of domestic fur products over imported fur products regretfully confirmed the lack of consistency of respondents on the criteria for the quality of light industry products formulated in the questionnaires. So, for example, the basic answer, the first expert, expressed by competent experts, received, according to the results of the survey, the value of the concordance coefficient equal to (W) 0.34, i.e. less than 0.5, and the basic answer about the quality of domestic fur products is the eighteenth expert, expressed by competent specialists - experts, although he received a higher value of the concordance coefficient, equal to (W) 0.47, but still less than 0.5. That is, in our case, the fact is confirmed that the survey participants are respondents, not competent in the issues under study. In this regard, the authors are engaged in the development of additional changes to the software product, with the help of which the competence of the survey participants - respondents will be assessed and weeding out those who do not have the same opinion with the reference answers expressed by an authoritative and competent expert commission - creating the basis for a more effective assessments of invited specialists as experts to work in customs commissions and improve their qualifications, which will allow our consumers to be confident in the high quality of products that have passed customs examination and offered for their sale on demand markets.

But in this case, it is necessary to find a solution that would allow the manufacturer to have a tool for assessing the effectiveness of the developed innovative technological processes. Such a solution is possible if we use the efficiency coefficient for such an assessment, the value of which is considered as the value of the concordance coefficient for assessing the results of the prior ranking (W), which changes - Keff from 0 to 1. If its value tends to one, then this means that the manufacturer managed to find the most optimal solution to the innovative technological process, but if its value tends to zero, then an analysis of the reasons for such an unsatisfactory result and a search for errors that provoked such a result and ways to eliminate the mistakes are required.

The efficiency factor of the technological process is calculated by the formula 6:

$$Kef = K1\ K2\ K3\ K4\ K5\ K6\ K7\ K8\ K9\ K10\ K11\ K12, \quad (6)$$

where Kef is the weighting coefficient of assessing the effectiveness of innovative technological processes, formed for the production of competitive and demanded products

K1 - the weight of labor productivity (PT);

K2 is the weight of the workload of workers (ZR);

K3 - weight of footwear production (Ps);

K4 is the weight of the equipment cost per unit of flow assignment (C);

K5 - the weight of the total price per unit of production (Stotal);

K6 - the weight of the financial strength margin (Zfp);

K7 - the weight of the break-even point (Tb.y);

K8 - the weight of the profit of a unit of production (Ex);

K9 - weight of product profitability (R);

K10 - the weight of costs per 1 ruble of marketable products (31p.t.p);

K11 - the weight of conditionally variable costs (total variable costs of production of a unit of production) (Zusl.per.units);

K12 - the weight of conditionally fixed costs (total fixed costs of a unit of production) (Zusl.pos.units)

Also, software was developed to select the optimal power

At the same time, the criteria that have the greatest impact on the cost of the finished product were justifiably chosen as the criteria for a reasonable choice of the optimal power when forming the algorithm, namely:

– losses on wages per unit of production, rubles;
– shoe production, 1 m2;
– percentage of workload of workers,%;
– labor productivity of one worker, a couple;
– unit reduced costs per 100 pairs of shoes, rubles;
– the cost of equipment per unit of flow assignment (C)
– total price (Stotal);
– financial strength margin (Zfp);
– break-even point (TB.y);
– unit profit (Ex);

– product profitability (R);
– costs for 1 rub. marketable products (31p etc.);
– conditionally variable costs (Zusl. per.units);
– conditionally fixed costs (Zusl. settlement units).

From the above criteria, in our opinion, the manufacturer has the opportunity to give preference to those that, from his point of view, would guarantee him the production of import-substituting, competitive and demanded products, namely:

- labor productivity of 1 worker is the most important labor indicator. All the main indicators of production efficiency and all labor indicators, to one degree or another, depend on the level and dynamics of labor productivity: production, number of employees, wage expenditure, level of wages. To increase labor productivity, the introduction of new equipment and technology, extensive mechanization of labor-intensive work, automation of production processes, advanced training of workers and employees, especially when introducing innovative technological processes based on universal and multifunctional equipment, are of paramount importance;

- specific reduced costs - an indicator of the comparative economic efficiency of capital investments, used when choosing the best option for solving technological problems .;

- reduced costs - the sum of current costs taken into account in the cost of production, and one-time capital investments, the comparability of which with current costs is achieved by multiplying them by the standard coefficient of efficiency of capital investments;

- the margin of financial strength (Zfp) shows how many percent the company can reduce the volume of sales without incurring losses;

- the break-even point allows (Tb.y) to determine the minimum required volume of product sales at which the enterprise covers its costs and operates without loss, giving no profit, but also does not suffer losses, that is, this is the minimum volume of production at which income equality is achieved from sales and production costs;

- profit (loss) from the sale of products (Pr) is defined as the difference between the proceeds from the sale of products in the current prices of VAT and excise taxes and the costs of its production and sale;

- the profitability of production (R) reflects the relationship between the profit from the sale of a unit of production and its cost;

- conditionally fixed costs (total fixed costs of production of a unit of production) (Zusl.pos.units), which change in proportion or almost proportional to the change in the volume of production (1st - costs of raw materials and materials; 2st - costs of auxiliary materials; 3st - costs of fuel and energy for technological needs; 4st - the cost of additional and basic wages of production workers with insurance premiums to off-budget funds);

- conditionally variable costs (total variable costs of production of a unit of output) (Zusl.trans.units), which do not depend or almost do not depend on changes in the volume of production (5st - costs of preparation and development of production; 6 st - costs of expenses for the maintenance and operation of equipment; 7st - expenses for general production needs; 8st - expenses for general business expenses, they, together with conditionally fixed costs, constitute the production cost; 9 st - expenses for commercial expenses. All these items are forming conditionally variable costs and semi-fixed costs make up the full cost, that is, semi-variable costs can be defined as the full cost minus the semi-fixed costs, and vice versa,conditionally fixed costs can be defined as the total cost minus the conditionally variable costs);

- costs for 1 rub. commercial products show the relative amount of profit per ruble of operating costs, that is, this is the ratio of the unit cost to the wholesale price, which characterizes the effectiveness of measures taken to increase the competitiveness and demand for products in demand markets.

With the help of the software, the calculations of the optimal power for the range from 300 to 900 pairs for men's and women's shoes of the entire range of footwear were given. The analysis of the obtained characteristics for three variants of a given technological process in the manufacture of the entire assortment of footwear has confirmed the effectiveness of the software product given below for evaluating the proposed innovative technological process using universal and multifunctional equipment. So, with a range of 300 - 900 pairs, the best according to the given criteria is the production volume of 889 pairs of men's shoes and 847 pairs of women's shoes.

When calculating dimensionless estimates of the efficiency coefficient using software, it becomes necessary to formulate these very criteria as their evidence base. So, for example, the profit per unit of production is calculated depending on the profitability of the product, that is, first the size of the profitability is formulated from 5% to 25%, and then the size of the profit per unit of production is laid down. The same feature exists with the definition of the criterion of labor productivity, because at first they use innovative technological processes formed on the basis of universal and multifunctional equipment, the maintenance of which must be entrusted to highly qualified and responsible performers who empathize with the overall result of the entire technological cycle. guaranteeing them the production of demanded and competitive products, which are in high demand among consumers on domestic markets. The calculation of conditionally fixed costs for the production of a unit of product and conditionally variable costs for the production of a unit of production is interconnected with the peculiarities of organizing the production of competitive and demanded products, including for children. An analysis of the

results of the activities of leading foreign manufacturers confirms the fact that if the conditionally fixed costs make up 20% - 40% of the production cost, then, naturally, the conditionally variable costs - 60% - 80%. At the same time, it is again necessary to focus on the peculiarity of production products for children, when and profit, profitability, conditionally fixed costs and conditionally variable costs are formed on the basis of the implementation of the requirements of technical regulations and normative documents and acts, guaranteeing them the safety of life when using them. And if this is due to the need to produce them with such stringent characteristics, the state and manufacturers are obliged to be interested in each other and provide manufacturers with compensation for the additional costs of observing them and a guarantee that the manufactured products will not harm the health of children.

Of course, if the criterion for the loss of wages per unit of production should tend to zero, and the volume of footwear production from 1 m2 - to its maximum possible value, and the costs per 1 ruble of marketable products should tend to their minimum possible value and the cost of equipment per unit of flow assignment also strive for its minimum possible value, and other criteria - for their maximum possible value - in the aggregate, a dimensionless assessment of the effectiveness of the developed innovative technological processes (K) should always strive for unity and thereby confirm that the designed innovative technological process for the enterprise for the production of import-substituting products will be successful in their activities for the benefit of the population of those regions where they will operate,being city-forming for these small medium-sized cities and in which all branches of government are interested - both federal and regional and municipal.

Thus, the software developed by the authors for assessing the effectiveness of the formed innovative technological processes for the production of an import-substituting assortment of footwear, taking into account the calculated calculation components for the production of the planned assortment, allows us to make a justified decision on its launch, a decision on its balance, guaranteed demand and ensuring the enterprise a stable financial position.

An important factor affecting the level of costs for the production of footwear is the change in the assortment and the technological process.

Choosing a technology that is capable of efficiently realizing unmarked goals in a highly competitive environment will ensure that the developed range of footwear will be chosen by the buyer and will allow the enterprise to get the maximum profit.

To solve this problem, it is necessary to most widely use the injection method, which ensures the manufacture (production) of the entire assortment of high quality footwear with different profitability of certain types of footwear to meet the demand of various groups of the population.

In the cost of manufacturing footwear, the largest share is made up of costs for raw materials and basic materials, and then for wages and depreciation deductions.

The production of footwear by the molding method is possible with the use of artificial and synthetic leather and textile materials, which will reduce the cost and get a large profit, because the range of these materials is cheaper and much more varied.

Decrease in cost due to changes in prices for materials () is determined by the following relationship:$\Delta C_{ц}$

$$\Delta C_{ц} = \left(\frac{N^{i}_{отч} \cdot Ц^{i}_{пл}}{N^{i}_{отч} \cdot Ц^{i}_{отч}} \cdot 100 - 100\right)\gamma_{ц}, \quad (7)$$

where is the consumption rate of the i-th type of material before the introduction of the new method $N^{i}_{отч}$ fasteners;

and - the price of 1 dm2 of the type of material before and after the introduction of a new $Ц^{i}_{пл} Ц^{i}_{отч} i$ method, respectively, rubles;

- the proportion of materials for which the price has changed,%.$\gamma_{ц}$

Another factor in reducing the cost is the reduction in labor intensity, which is provided by the injection method, on which the costs depend on the item "Basic and additional wages of production workers with insurance contributions to extra-budgetary funds."

Savings on wages (ΔZP) is determined by the following relationship:

$$\Delta ЗП = (\rho_1 - \rho_2)(1 + \frac{Д}{100})(1 + \frac{СВВФ}{100}), \quad (8)$$

Where ρ_1 and ρ_2 - the price before and after the introduction of the new method, rubles;

D - additional wages of production workers,%;

SVVF - insurance contributions to off-budget funds,%.

At the same time, for the introduction of the injection method, it is necessary to use more expensive equipment (injection molding machine), which will affect the increase in the cost of footwear by increasing the cost of depreciation and repair funds (under the item "RSEO").

The increase in cost due to the use of expensive equipment (ΔCPCЭO) is calculated according to the following relationship:

$$\Delta C_{РСЭО} = \frac{\Delta К \cdot f}{100}, \quad (9)$$

where K is the cost of equipment necessary for the injection method, thousand rubles;

- the amount of depreciation and repair funds,%.$f \Delta C_{общ}$

Overall cost reduction

$$\Delta C_{общ} = \Delta C_{ц} + \Delta ЗП - \Delta C_{РСЭО} \quad (10)$$

Glue method	Injection method	
t_1 = 1.1 h.	t_2 = 0.678 h.	
P1 = 400 pairs.	P2 = 700 pairs.	(11)
$P^1_{год}$ = 98800 pairs.	$P^2_{год}$ = 172900 pairs.	

$$\Delta ЗП = (\rho_1 - \rho_2)\left(1 + \frac{Д}{100}\right)\left(1 + \frac{СВВФ}{100}\right)$$

$$= 47.85 \text{ p.} \quad (12)$$

$$\Delta ЗП = (98{,}41 - 56{,}18)\left(1 + \frac{10{,}76}{100}\right)\left(1 + \frac{30}{100}\right)$$

Artificial and synthetic leather

$$\Delta C_{М} = (17{,}27 \cdot 12{,}1 - 17{,}27 \cdot 7{,}5) + 30 = 79{,}44\text{p} + 30 = 109{,}44 \text{ p.}$$

$$\Delta C_{РСЭО} = \frac{42000000 \cdot 0{,}18}{172900} = 43{,}72 \text{ R.} \quad (13)$$

$$Э^1_{у.е.} = \Delta C_{общ} = (47{,}8 + 79{,}44 - 43{,}72) \cdot 172900 = 1440608\text{R.}$$

$$Э^2_{у.е.} = \Delta C_{общ} = (47{,}8 + 109{,}44 - 43{,}72) \cdot 172900 = 19627608\text{R.}$$

$$\text{Current} = \frac{\Delta K}{Э_{у.е}.} \quad (14)$$

$$T_{ок} = \frac{42000000}{14449253} = 2{,}91 \text{ (g)}$$

$$T\ 1ok = \frac{42000000}{14449253} = 2.91 \text{ (g)}$$

$$T\ 2ok = \frac{42000000}{9636253} = 2.14 \text{ (g)}$$

When using textile materials, the savings on top details are even greater - 120.89 rubles. Savings on salary 67.1 rubles. The nominal annual savings will amount to 24,944,283 rubles.

The payback period will be equal to:

$$... T_{ок} = \frac{42000000}{24944283} = 1{,}7 \text{ (года)} \quad (15)$$

The decrease in labor intensity is:

t_1 = 1.1 hours and = 0.678 hourst_2

...

$$a = \frac{1{,}1 - 0{,}678}{1{,}1} \cdot 100 = 42.91\% \quad (16)$$

Labor productivity growth with a constant number of workers (b):

$$b = \frac{100 \cdot 42{,}91}{100 - 42{,}91} = 75{,}1\ \% \quad (17)$$

Production per year before the introduction of 98,800 pairs, after the introduction of 172,900 pairs.

To make a profit, the enterprise must constantly monitor the proportion of costs for the manufacture of the proposed multi-assortment footwear production.

This is possible only if the heads of enterprises implement modern technological solutions formed on the basis of the use of multifunctional and universal equipment and at the same time it is necessary to remember that the innovative technological solution itself should not be costly, that is, on the one hand, provide the enterprise with sustainable technical and economic indicators and guaranteeing them demand not only in the sales markets of the regions of the Southern Federal District and the North Caucasus Federal District, but in the regions of other districts of Russia and to be attractive to foreign consumers. But on the other hand, consumers should have a choice to compare the price niche for the offered products with analogues of foreign firms, and always have priority. This will be possible during the formation of production.

Conclusion

The use of the injection method will allow the enterprise in the conditions of market relations to receive such a volume of profit that will allow it not only to firmly hold its positions in the sales market for its shoes, but also to ensure the dynamic development of its production in a competitive environment, this is especially important in the manufacture of the entire assortment of children's shoes ...

The considered examples of assessing the competence of respondents participating in surveys confirmed the high efficiency of the software developed by the authors on the basis of randomization, when using the concordance coefficient, all invited respondents to participate in the survey are distributed relative to the reference answer for their assessment of competence on the studied problem. A special feature of the software product developed by the authors is the fact that by calculating the concordance coefficient, you can check the validity of the choice of a reference answer, or the opinion of a highly qualified specialist on the problem under study. This is possible if we invited highly qualified specialists in this field as respondents, but their opinion did not coincide with the opinion of the main respondent. This result gives the researcher a

basis for rechecking both the opinion of the main specialist respondent on this topic and the opinion of the collective scientific school, if the value of the concordance coefficient lies within $0 \leq W \leq 0.5$, which is not enough to confirm the opinion of the reference respondent, and it is necessary to compare it with the so-called independent researcher, whose results are confirmed by the assessment of other scientists - the authors can use the list of factors included in the question list as the basis for conducting the main experiment, namely, when obtaining an estimate in the range of $0.5 \leq W \leq 1.0$. The seemingly multi-step solution to the problem is actually justified, because the cost of conducting a survey is incomparably small with the cost of conducting research using a large number of factors. Reducing their number is always justified and provides the researcher not only with the reliability of the experimental results themselves, but also with significant savings on its implementation, which is a guarantee of achieving the greatest effect with the lowest possible costs. At the same time , this software allows you to identify the wrongly chosen scientific direction of research, warn researchers from the wrong direction and exclude an erroneous decision, which in itself is significant for the experimenter. No less important is the use of this software product to assess the competence of a specialist when inviting him as an expert in the work of the customs commission. In this case, the use of the software product developed by the authors is the only correct one, since it allows the customs administration to have an independent methodology that guarantees them the formation of customs commissions through the participation of highly qualified specialists in them and objectively deny such a right to be experts to those who have not confirmed their competence. Therefore, we can confidently assume that the software developed by the authors creates the basis for the formation of an effective direction in the implementation of scientific works and in the formation of various expert commissions by competent and highly qualified specialists, ensuring the achievement of the highest results with the lowest possible costs, which is especially important for the import substitution of domestic products of high quality and at an affordable price for consumers of the regions of the Southern Federal Districtrict and the Northern Federal District.

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THE APPEARANCE AND CONDITION OF THE CITY OF NUKUS IN THE MIDDLE OF THE XX CENTURY: IN MEMOIRS AND MEMOIRS

Abstract: *The article reveals the appearance and condition of the city of Nukus in the middle of the XX century. The memoirs and memoirs used give an idea of the appearance of the city, housing conditions, clothing, food, and leisure of the population of the city of Nukus. These sources are rich in details of everyday life, which restore many interesting facts that are not reflected in other sources.*

Key words: *city, Nukus, memories, memoirs, theater, leisure, entertainment, park, appearance, culture, everyday life.*

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ОБЛИК И СОСТОЯНИЕ ГОРОДА НУКУСА В СЕРЕДИНЕ XX ВЕКА: В МЕМУАРАХ И ВОСПОМИНАНИЯХ

Аннотация: *В статье раскрывается облик и состояние города Нукуса середина XX века. Использованные мемуары и воспоминания дают представление об облике города, жилищных условиях, одежде, питании, досуге населения города Нукуса. Эти источники богаты деталями повседневной жизни, которые восстанавливают множество интересных фактов, не нашедших свое отражение в других источниках.*

Ключевые слова: *город, Нукус, воспоминания, мемуары, театр, досуг, развлечение, парк, облик, культура, повседневность.*

Введение

В последние годы все большую актуальность приобретает тема повседневная жизнь города как самостоятельного живого организма, возникает насущная необходимость изучения культурного пространства города. Имеющиеся мемуары и воспоминания позволяют наглядно представить культурное пространство города, а также выявить своеобразие и характерные черты социально-культурного облика Нукуса.

Есть выражение среди населения, что город всегда имеет свои преимущества. По воспоминанию К.Айымбетова в 1925 году в Нукусе было 3-4 хозяйства. Это были небольшие хозяйства уральцев (уральских казаков), состоявшие из 2-3 человек [1]. Герой Узбекистана Т.Каипбергенов в своих воспоминаниях писал, что «в послевоенные годы Нукус не был ещё ни многоэтажным, ни многолюдным и асфальтом тоже не мог похвастаться. В те годы зеленых

полей в нем было больше, чем в иных местах. Да и вообще внешне он скорее напоминал большой аул, нежели столичный город» [2].

Несмотря на то, что Нукус являлся столицей Каракалпакстана с 1932 года, город еще никак не походил на столицу вспоминает послевоенные годы Нукуса Гулайша Есемуратова. Из воспоминаний Гулайши Есемуратовы «В Нукус из Чимбая мы переехали в 1945 году. Связано это было с переводом Чимбайского института в Нукус, где старший брат Есемуратов Айтжан был старшим преподавателем в институте. Жить в Нукусе нам было негде. Семья Мырзагали Дарибаева (автора повести «Мыңлардың бири», погибшего в 1943 году в результате авиакатастрофы) - жена Мамык и дочь Роза Дарибаева, жила в Нукусе по улице Буденного в пятикомнатном доме. Это улица, которая сейчас располагается недалеко от базара. Так вот они, сдали нам две комнаты в аренду» [3].

Далее, она вспоминает, что «Водопровода нет. Я довольна крупная, взяв коромысло, таскаю воду из Кызкеткена. Нукус пыльный, асфальтная дорога тогда была редкостью. Как только выйдешь на улицу, сразу утопаешь в пыли. Большой проблемой в Нукусе было достать дров для отопления. Чтобы собрать дрова, сухие ветки и высохший кизяк, собравшись вместе с соседскими девочками и мальчиками шли на окраину города (сейчас это место, где расположились 24 и 25 микрорайоны). Там было много пасущихся верблюдов. Когда верблюд поднимал голову мы в страхе разбегались. Связано это было с тяжелым послевоенным положением. Продуктов питания не хватает. Чтобы купить хлеб необходимо в 3-4 часа утра поставить очередь, даже тогда оказывались в самом конце очереди. Продажа хлеба ограниченна. Существует карточная система. Продавец выдает хлеб соответственно количеству человек в семье. Если я не ошибаюсь, в то время на одного человека выдавалось 400 грамм хлеба. Проблема с мясом еще более тяжелая. Как я отметила, на окраине города пастухи пасли верблюдов и другой скот. В случае, когда животное заболевает и вот-вот помрет, его закалывали, а мясо продавали. Даже такое мясо было нарасхват, покупали те, кто успел. Насколько я помню, наиболее тяжелыми были 4-5 лет после переезда в Нукус. Ходить в школу было тяжело как зимой, так и летом. Летом утопаешь в пыли, книги, тетради все пыльное. Зимой - грязь, от холода чернила для письма замерзали. Самое лучшее блюдо в то время – машаба. Дров не хватает. Те, кто занимался хозяйством, привозили на ешек арбе мелкие сучья от обломавшихся джидовых деревьев, которые продавали на базаре, они были нарасхват» [3].

Вот, что она вспоминала, о состоянии системы образования вте года: «Какие трудности испытывали тогда преподаватели, не рассказывает ни один человек. Бедные учителя, голодными шли на урок. Состояние Нукуса очень плохое, как вспомню те дни, на душе тяжело становится» [3].

Ее печатлении о первых постройках: «В те годы в Нукуе было всего три дома, один из них двухэтажный. На первом этаже был магазин №3, на втором этаже жили люди с «правительства». Второй дом – магазин №6 назывался. В том магазине первоначально продавали ткани. Позже, он превратился в галантерейный, там продавали духи. Третий дом – незаконченное здание педагогического института. Когда институт открылся, в него невозможно было войти, помещения для занятий были полны пыли.

Других больших сооружении в городе не было. В основном маленькие домики. В 50-е годы Нукусе была одна больница. Находилась она возле педагогического института (ныне экстренная больница – авт.). В этой больнице и рожали и другие заболевания лечили. Тем, кто лежал в больнице, слышны были голоса новорожденных детей. Все в одном месте было» [3].

В своем мемуаре И.Шагилов пишет, что «1953-1954 годы строительство города Нукус только начиналось. На месте, где сейчас находится институт, (сейчас здание Медицинского института – авт.) располагалось кукурузное поле, за домом, в котором мы жили – медшкола, аэропорт и густые тугайные заросли» [4].

Отличник народного просвещения Узбекистана Старостина Фаина Николаевна, окончившая педагогическое училище в Марийэлской республике (Россия) в 1953 году из-за нехватки педагогических кадров в Узбекистане была направлена в Каракалпакстан, вспоминая как прибыли в Нукус и первое впечатление об увиденном рассказывает, «1953 году 2 августа 100 выпускников нашего училища выехало в Узбекистан. Состав формировался в Казане. Приехав в Ташкент нас направили в Нукус. На пароме через реку Амударья проехали Чарджау, Ургенч и прибыли в Нукус 19 августа 1953 г. Первое впечатление - огромная река, пустой берег, ни веточки» [5].

Внешний облик города Нукуса со второй половине XX века начал меняться и утратить статус сельского поселения. В городе сложилась городская инфраструктура, основным элементом которой являлись масштабные застройки, водопровод, канализация, электричество, телефон, транспортные средства, сфера бытового обслуживания. Правда, таким благоустройством пользовались в основном жители центральной части города [9].

Для сельской молодежи поездка в Нукус в те годы, была большим событием. «Я в первый раз из Тахтакупыра в Нукус попал в 1961 году, в ту пору я учился в 6 классе и, прибыв в Нукус, был очень удивлен городом, его размерами. Хотя сейчас вспоминая те годы, думаю, как же я был еще совсем мал, ведь Нукус в то время был небольшим, в нем имелось только две большие улицы – Турткульская и Калинина (ныне А. Досназарова). Позже появилась улица Ленина (ныне И. Каримова), вдоль которой были расположения здания Обкома, Совмина, эти здания казались очень большими. В 1965 году я окончив учебу в Ташкенте вернулся в Нукус, спустя каких-то 4-5 лет Нукус стал еще краше чем был, строились новые дома, появилась новая большая улица – улица Мира, в 1966 году был построен и сдан в эксплуатацию 21 микрорайон. В 1967 году в этом районе было возведено дом №17 для служащих театра не имеющих своего жилья» [6].

Из воспоминаний Фаины Старостины «Муж Сабыр Утепов 1930 года рождения, рано потерял отца, мать, Улби Мажитова была дочкой Сейфулгабита Мажитова, одна воспитывала детей. Сабыр с 13 лет начал работать в Станиславском театре Нукуса, в танцевальной группе. Тогда театр был расположен возле школы Пушкина. Послевоенные годы были долгие трудные годы. Не хватало еды, одежды. Послевоенные годы артистам было особое внимание, им выдавали правительственный паек. Выдавали каждый день 400 грамма хлеба, и Сабыр продав 200 грамма хлеба покупал масло.

Днем мать ходила туда и собирала мелкий хворост и дрова. В те времена было тяжело с дровами. Зима в тот год была особенно холодная. Дров не хватает, жилище еле прогревается. Тогда в Нукусе было сложно, как построить дом, так и найти дрова для отопления, в общем, жить в целом было тяжело. В Нукусе перебои с хлебом. Особенно остро ощущалась нехватка товаров первой необходимости - муки, сахара, чая, спичек, масла, мыла, соли» [4].

«Я хорошо помню во времена Хрущева (1953-1964 гг.) в магазинах не было муки, чтобы достать хлеб, вставали с постели в 4-5 утра, занимали очереди. Чему только не учит голод, недостаток. Мы, женщины умудрялись заваривать манку, туда клали яйца и пекли булочки. Сейчас, слава богу люди живут хорошо. Не надо стоять в большой очереди за хлебом, молоком» [5].

«Вплоть до 70-х годов денег у населения не было. Я в первый раз увидел деньги в 13 лет, в 1961 году. В районах денег не видели вообще. В сельской местности существовал обмен – «бартер». Наш отец, навьючив на лошадь мешок джугары (сорго) отправлялся на Чимбайский базар, где обменивал ее на сахар, масло. Люди сами выдавливали кунжутное масло. Хлопковое масло, продававшееся в магазинах, население не любило» [6].

Из воспоминаний Гулайшы Есемуратовы: «в 50-годы в городе Нукусе было много студентов. Все молодые – это период, когда многие стремились учиться. Жизнь у студентов была еще более тяжелая. Институтское общежитие зимой не отапливалось. Помещения холодные. Эта ситуация хорошо обрисована в стихах Ибрагима Юсупова «Тик тур десең, тик турады носкийым» («Скажешь стоять по «стойке смирно» - стоят мои носки»). В помещение было настолько холодно, что снятые с ног носки коченели.

Учимся днем и ночью. В те времена лампы нет, свечи тоже нет, даже если есть лампа, нет керосина, читать ночью при свече не дают, гасят. В магазинах очередь за лампой, если и удается приобрести, и то с боем. Я залезаю на крышу дома и там читаю под лунным светом. Пришедшие домой гости, увидев мое упорство, говорили: «Из этой девушки что-нибудь, да получиться». Читала даже найденные на улице обрывки газеты. Дома свечи нет. Если младшие братья, играя заденут моржу, она тут же разбивается. Моржи нет, даже если есть в магазине – дорого. У молодежи тех лет есть стремление к учебе, стремление двигаться вперед, но возможности были не у всех. Наш каракалпакский народ пережил самые тяжелые послевоенные годы и голод видел и нищету» [3].

«Если же обратимся к свободному время провождению людей, то в то время все работали, безработных людей трудно было найти. В те годы у людей нет еще телевизоров. Вечером люди, поужинав и взяв с собой всех своих домочадцев, закрыв дверь на замок, а бывало, что и не закрывали, отправлялись в парк. Авторы воспоминаний и мемуаров единодушно указывают на особую роль парка в жизни города, справедливо считая ее одним из самых оживленных мест Нукуса. Дворцы культуры, парки были очень хорошие. На месте парка был лес. Это студенты, изранив свои руки, разредили деревья в лесу, провели арыкы, тротуары сделали, посадили деревья. В открытие в 1948-1950 годы парка, мы тоже внесли свою лепту» [3], вспоминает Гулайша Есемуратова.

«Каждый день, как только наступает 5 часов наспех моем посуду и устремляемся в парк. Как только услышим звуки музыки, бежим на танцы. Внутри парка был небольшой театр, но пьесы там ставили не каждый день, но зато кино показывали по 3 сеанса в день. В театре было около 1000 мест. Люди не помещались в этот летний театр и смотрели концерты, спектакли, кинофильмы, взобравшись на деревья вокруг театра. Говорили, что по всему Союзу нет такого театра. Билеты в кинотеатр необходимо было покупать заранее, иначе не попадешь на просмотр фильма. Особенно

у населения пользовались популярностью индийские фильмы [7]. Кроме театра в парке была танцплощадка, пивная [10].

Внешний облик города Нукуса со второй половине XX века начал меняться и современем терял статус сельского поселения. В городе сложилась городская инфраструктура, основным элементом которой являлись масштабные застройки, водопровод, канализация, электричество, телефон, транспортные средства, сфера бытового обслуживания. Правда, таким благоустройством пользовались в основном жители центральной части города.

«Если мы обратимся к вопросу преступности в те времена - мы редко сталкивались с ним в дни нашей юности. В Нукусе были известны хулиганы по кличке Октябрь, «Мясник», «Казак», «Спартак». Но им не было дело до простых людей. Они были сами по себе» [6]. Пьянство существовало и в то время. Когда юноша являлся домой впервые попробовав водки, родители даже радовались «Наш сын не отстал от других».

В пятидесятые годы среди сельского населения бытовали самые различные представления о Нукусе. Если некоторые люди превозносили городских жителей, другие же рассказами о невоспитанности городского населения, заметно охлаждали сердца отцов и матерей. «В Нукусе водку подают прямо на улице, налив в кружки и стаканы. Сын такого-то из такого-то аула, превратился в алкоголика. Сына такого-то, из такого-то аула избили бандиты и оставили умирать на улице…», - разговоры похожие на эти я сам не раз слышал во время различных мероприятий. На самом же деле в бокалы наливали пиво, а не водку, а в стаканах подавали по 50-100 грамм водки или вина, и не на улице, как утверждали люди, а в специальных заведениях, называемых «Закусочная». В те годы, о которых идет речь, для сельских жителей увлечение водкой, становление на путь алкоголизма было страшным явлением [8].

Мемуарный источник и воспоминания очевидцев рассматриваемого периода ориентирован в целом на круг широкого читателя, что объясняется громадным интересом последнего к мемуарам и воспоминаниям. Изложение событий в них более яркое, более живое. Все это свидетельствует о «сильной» стороне мемуаров и воспоминаний как исторического источника и заставляет исследователей все чаще обращаться к ним в поисках информации. В нашем примере эти рассказы помогают ощутить атмосферу города того времени, лучше понять повседневную жизнь, особенности быта и нравов горожан.

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COMPARISON OF THE BULLET PENETRATION WHEN SHOOTING FROM THE AK-109 ASSAULT RIFLE AT THE TARGETS MADE OF VARIOUS METALLIC AND NON-METALLIC MATERIALS

Abstract: *The results of modeling the bullet penetration of the AK-109 assault rifle into the targets made of Kevlar, high-strength concrete, stainless steel, aluminum alloy, thermopolished glass and titanium alloy are presented in the article. An idea of the failure degree of metallic and non-metallic materials when shooting from the assault rifle is given. It was determined that under the same conditions of shooting, the targets made of titanium alloy showed maximum strength.*

Key words: *the bullet, the target, the penetration depth, destruction, elastic and plastic deformations.*

Language: *English*

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Introduction

The firearm is the weapon designed to mechanically defeat of the target at the distance by the projectile that receives directional movement due to the energy of the powder or other charge [1]. Automatic small arms, called the assault rifles, are used to create high-density fire and the targets defeat at the short distances. The reliability and the simplicity of the design of the Kalashnikov assault rifle make it the most common small arms in the world [2].

The 5.45mm and 7.62mm cartridges are used for shooting, depending on the modification of the Kalashnikov assault rifle. The 7.62mm cartridge considered in this work is used for shooting from the AK-109 assault rifle. The cartridge consists of the bullet, the case, the powder charge, and the percussion cap. The general view of the 3D model of the 7.62mm cartridge for the AK-109 assault rifle is presented in the Fig. 1.

Figure 1 – The 3D model of the 7.62mm cartridge for the AK-109 assault rifle.

The initial flight speed of the steel bullet is 700-720 m/s. The high flight speed and the design of the assault rifle bullet allow you to fire with high striking ability. One of the characteristics of striking ability of the bullet is the penetrating ability, which is determined by the path traveled by the bullet along the ballistic trajectory in the targets made of various materials [3-5]. It depends on the characteristics of the moving bullet. The values of the bullet penetration of the assault rifle into the metallic, brick, glass, wood, concrete and other targets were determined experimentally (under the normal conditions). However, the analysis of the deformation degree, cracking and destruction of materials can be done after the thorough examination in the laboratory. To reduce the time of testing and the laboratory examinations, it is rational to carry out shooting from the assault rifle and the analysis of the stress and strain state of the target materials by the method of finite element modeling in special software products.

2. Materials and methods

2.1. Modeling conditions

The computer simulation [6] of the process of shooting from the AK-109 assault rifle at the targets was implemented in the ANSYS Autodyn 14.5 program. The process simulation of penetration of the bullet model at the angle of 90 degrees into the targets models made of various metallic and non-metallic materials was the two-dimensional statement of the study. The initial velocity (v) of the bullet flight along the X-axis was adopted 720 m/s. The target was the plate fixed on one of the sides. The bullet and target models were divided into 1250 and 3500 finite elements, respectively [7]. The interaction between the bullet and the target was carried out by the Lagrange/Lagrange solver. The external gap during the contact was determined by the value of 0.008741. The safety factor in the conditions of deformation of the bullet and target models was adopted 0.2. The statement of the modeling process of the bullet penetration of the assault rifle into the target is presented in the Fig. 2.

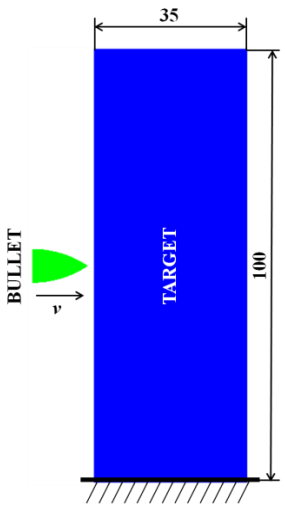

Figure 2 – The statement of the modeling process of shooting at the target.

The bullet and targets models were given the properties of carbon steel, Kevlar, high-strength concrete, stainless steel, aluminum alloy, thermopolished glass, and titanium alloy.

2.2. The properties of 1006 carbon steel (the bullet material)

1006 carbon steel is steel containing mainly carbon as the alloying element. It contains about 0.4% silicon and 1.2% manganese. Chromium, nickel, aluminum, copper and molybdenum are also present in small quantities in carbon steel. The features of AISI 1006 carbon steel are mainly softness and ductility. 1006 carbon steel was adopted for the bullet model of the assault rifle. The material density is 7.896 g/cm^3. The following parameters were set for the material state: the equation – shock; the Gruneisen coefficient – 2.17; the parameter *C1* – 4.569×10^3 m/s; the parameter *S1* – 1.49; the reference temperature – 300 K; the specific heat – 451.999969 J/(kg×K). The strength characteristics of material were set by the following parameters: the type of the strength model – Johnson-Cook; the shear modulus – 8.180001×10^7 kPa; yield stress – 3.5×10^5 kPa; the hardening constant – 2.75×10^5 kPa; the hardening exponent – 0.36; the strain rate constant – 0.022; the thermal softening exponent – 1.0; the melting temperature – 1.811×10^3 K; the reference strain rate (/s) – 1.0; the strain rate correction – 1st order.

2.3. The properties of Kevlar/epoxy composite (the first material of the target)

Kevlar is the heat-resistant and strong synthetic fiber, related to other aramids [8]. In unidirectional Kevlar/epoxy composite, the modular ratio is 20 and epoxy occupies 60% of the volume. This material was adopted for the target No. 1. The material density is 1.65 g/cm^3. The following parameters were set for the material state: the equation – orthotropic; stiffness – the stiffness matrix; *C11* – 3.425001×10^6 kPa; *C22* – 1.35×10^7 kPa; *C33* – 1.35×10^7 kPa; *C12* – 1.14×10^6 kPa; *C23* – 1.2×10^6 kPa; *C31* – 1.14×10^6 kPa; the shear modulus 12 – 1.0×10^6 kPa; the shear modulus 23 – 1.0×10^6 kPa; the shear modulus 31 – 1.0×10^6 kPa; the material axes – the *X-Y-Z* space; the *Z*-coordinate for the direction 11 (*XYZ*) – 1 mm; the volumetric response – polynomial; the bulk modulus *A1* – 4.153889×10^6 kPa; the parameter *A2* – 4.000001×10^7 kPa; the parameter *T1* – 4.153889×10^6 kPa; the reference temperature – 300 K; the specific heat – 1.42×10^3 J/(kg×K). The strength characteristics of material were set by the following parameters: the type of the strength model – elastic; the shear modulus – 1.0×10^6 kPa. The process of material failure during deformation was carried out according to the following specified parameters: the type of the failure model – material stress/strain; tensile failure stress 11 – 1.0×10^{20} kPa; tensile failure stress 22 – 1.0×10^{20} kPa; tensile failure stress 33 – 1.0×10^{20} kPa; maximum shear stress 12 – 1.0×10^{20} kPa; maximum shear stress 23 – 1.01×10^{20} kPa; maximum shear stress 31 – 1.01×10^{20} kPa; tensile failure strain 11 – 0.01; tensile failure strain 22 – 0.08; tensile failure strain 33 – 0.08; maximum shear strain 12 – 1.0×10^{20}; maximum shear strain 23 – 1.01×10^{20}; maximum shear strain 31 – 1.01×10^{20}; the material axes option – the *IJK* space; the post failure option – orthotropic; the residual shear stiffness fraction – 0.2; maximum residual shear stress – 1.0×10^{20} kPa; the decomposition temperature – 700 K; the matrix melt temperature – 1.01×10^{20} K; failed in 11, the failure mode – 11 only; failed in 22, the failure mode – 22 only; failed in 33, the failure mode – 33 only; failed in 12, the failure mode – 12 & 11 only; failed in 23, the failure mode – 23 & 11 only; failed in 31, the failure mode – 31 & 11 only; the melt matrix failure mode – bulk.

2.4. The properties of 140 MPa compressive strength concrete (the second material of the target)

Concrete is composite material composed of fine and coarse aggregate bonded together with fluid cement (the cement paste) that hardens (cures) over time [9]. Concrete is high-strength (it has compressive strength greater than 40 MPa). This material was adopted for the target No. 2. The material density is 2.75 g/cm^3. The following parameters were set for the material state: the equation – *P* alpha; the porous density – 2.52 g/cm^3; the porous sound speed – 3.242×10^3 m/s; initial compaction pressure – 9.33×10^4 kPa; solid compaction pressure – 6.0×10^6 kPa; the compaction exponent – 3.0; the solid *EOS* – polynomial; the bulk modulus *A1* – 3.527×10^7 kPa; the parameter *A2* – 3.958×10^7 kPa; the parameter *A3* – 9.04×10^6 kPa; the parameter *B0* – 1.22; the parameter *B1* – 1.22; the parameter *T1* – 3.527×10^7 kPa; the reference temperature – 300 K; the specific heat – 653.999939 J/(kg×K); the compaction curve – standard. The strength characteristics of material were set by the following parameters: the type of the strength model – *RHT* concrete; the shear modulus – 2.206×10^7 kPa; compressive strength (*fc*) – 1.4×10^5 kPa; tensile strength (*ft/fc*) – 0.1; shear strength (*fs/fc*) – 0.18; the intact failure surface constant *A* – 1.6; the intact failure surface exponent *N* – 0.61; the tens./comp. meridian ratio (*Q*) – 0.6805; brittle to ductile transition – 0.0105; *G* (elas.)/(elas.-plas.) – 2.0; elastic strength/*ft* – 0.7; elastic strength/*fc* – 0.53; the fractured strength constant *B* – 1.6; the fractured strength exponent *M* – 0.61; the compressive strain rate exp. alpha – 0.00909; the tensile strain rate exp. delta – 0.0125; the maximum fracture strength ratio – 1.0×10^{20}; use *CAP* on the elastic surface – yes. The process of material failure during deformation was carried out according to the following specified parameters: the type of the failure model – *RHT* concrete; the damage constant, *D1* – 0.04; the damage constant, *D2* – 1.0; minimum strain to failure – 0.01; the residual shear modulus fraction – 0.13; tensile failure – hydro (P_{min}). Material was given the

numerical mechanism to automatically removing the elements during the simulation: the type of the erosion model – geometric strain; erosion strain – 2.0; the type of geometric strain – instantaneous.

2.5. The properties of 304 stainless steel (the third material of the target)

SAE 304 stainless steel is the most common stainless steel [10]. Steel contains both chromium (between 18% and 20%) and nickel (between 8% and 10.5%) metals as main non-iron constituents. It is austenitic stainless steel. This material was adopted for the target No. 3. The material density is 7.9 g/cm^3. The following parameters were set for the material state: the equation – shock; the Gruneisen coefficient – 1.93; the parameter *C1* – 4.57×10^3 m/s; the parameter *S1* – 1.49; the reference temperature – 300 K; the specific heat – 422.999939 J/(kg×K). The strength characteristics of material were set by the following parameters: the type of the strength model – Steinberg-Guinan; the shear modulus – 7.7×10^7 kPa; yield stress – 3.4×10^5 kPa; maximum yield stress – 2.5×10^6 kPa; the hardening constant – 43; the hardening exponent – 0.35; the derivative *dG*/*dP* – 1.74; the derivative *dG*/*dT* – -3.504×10^4 kPa/K; the derivative *dY*/*dP* – 0.007684; the melting temperature – 2.38×10^3 K.

2.6. The properties of 2024 aluminum alloy (the fourth material of the target)

2024 aluminum alloy is aluminum alloy, with copper as the primary alloying element [11]. It is used in applications requiring high strength to the weight ratio, as well as good fatigue resistance. This material was adopted for the target No. 4. The material density is 2.785 g/cm^3. The following parameters were set for the material state: the equation – shock; the Gruneisen coefficient – 2.0; the parameter *C1* – 5.328×10^3 m/s; the parameter *S1* – 1.338.

2.7. The properties of float glass (the fifth material of the target)

Float glass is the sheet of glass made by floating molten glass on the bed of molten metal, typically tin, although lead and other various low-melting-point alloys [12]. This method gives the sheet uniform thickness and very flat surfaces. This material was adopted for the target No. 5. The material density is 2.53 g/cm^3. The following parameters were set for the material state: the equation – polynomial; the bulk modulus *A1* – 4.54×10^7 kPa; the parameter *A2* – -1.38×10^8 kPa; the parameter *A3* – 2.9×10^8 kPa; the parameter *T1* – 4.54×10^7 kPa. The strength characteristics of material were set by the following parameters: the type of the strength model – Johnson-Holmquist; the shear modulus – 3.04×10^7 kPa; the model type – continuous (*JH2*); the Hugoniot elastic limit – 5.95×10^6 kPa; the intact strength constant *A* – 0.93; the intact strength exponent *N* – 0.77; the strain rate constant *C* – 0.003; the fractured strength constant *B* – 0.35; the fractured strength exponent *M* – 0.4; the maximum fracture strength ratio – 0.5. The process of material failure during deformation was carried out according to the following specified parameters: the type of the failure model – Johnson-Holmquist; the hydro tensile limit – -3.5×10^4 kPa; the model type – continuous (*JH2*); the damage constant, *D1* – 0.053; the damage constant, *D2* – 0.85; the bulking constant, beta – 1.0; the damage type – gradual (*JH2*); tensile failure – hydro (P_{min}).

2.8. The properties of Ti-6Al-4V titanium alloy (the sixth material of the target)

Ti-6Al-4V is alpha-beta titanium alloy with high specific strength and excellent corrosion resistance. It is one of the most commonly used titanium alloys and is applied in the wide range of applications where the low density and excellent corrosion resistance are necessary such as e.g. aerospace industry and biomechanical applications. This material was adopted for the target No. 6. The material density is 4.45 g/cm^3. The following parameters were set for the material state: the equation – puff; the parameter *A1* – 9.940001×10^7 kPa; the parameter *A2* – 1.244×10^8 kPa; the parameter *A3* – 4.847×10^7 kPa; the Gruneisen coefficient – 1.0; the expansion coefficient – 0.67; the sublimation energy – 2.71×10^6 J/kg; the reference temperature – 300 K; the specific heat – 525 J/(kg×K). The strength characteristics of material were set by the following parameters: the type of the strength model – von Mises; the shear modulus – 5.5×10^7 kPa; yield stress – 1.5×10^6 kPa. The process of material failure during deformation was carried out according to the following specified parameters: the type of the failure model – hydro (P_{min}); the hydro tensile limit – -3.0×10^6 kPa; the reheal – yes; stochastic failure – yes; the stochastic variance (gamma) – 16; the minimum fail fraction – 0.1; the distribution type – the fixed seed.

3. Results and discussion

The dynamics process of the bullet penetration of the assault rifle into the target made of Kevlar/epoxy composite is presented in the Fig. 3. The target model was presented in the form of the finite elements inscribed into the dimensional rectangle. This allowed us to obtain the complete pattern of deformation of the target material during the bullet penetration. The results were recorded every 1200 cycles (0.002633 ms) of calculating the dynamics process of flight (movement) and penetration of the bullet into the target.

The penetration process is accompanied by crumpling the bullet (reducing the length and increasing the cross-section) and the formation of the blind hole in the target.

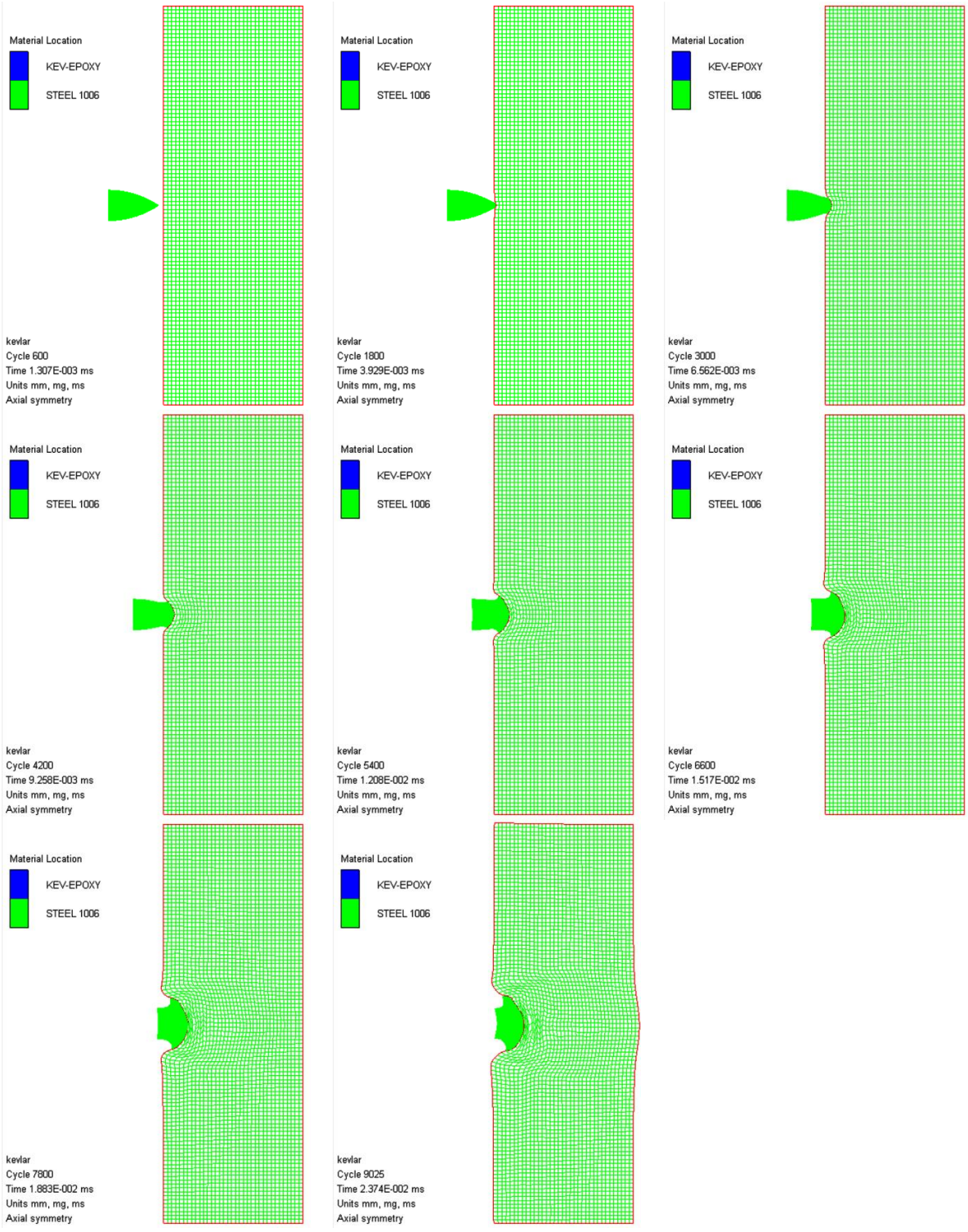

Figure 3 – The dynamics process of the bullet penetration of the assault rifle into the target made of Kevlar/epoxy composite.

It is determined that at the maximum bullet penetration (the bullet length is 14 mm), the target is bent on the reverse side. The target material in the contact zone with the bullet is significantly deformed (the maximum stretched and compressed finite elements of the target model). The images and the values of the bullet penetration into the targets made of various materials are presented in the Fig. 4 and in the table 1. The bullet is deformed in the same way during penetration into the targets made of stainless steel and thermopolished glass. The density of thermopolished glass is three times less than that of stainless steel. Maximum deformation of the bullet occurs during penetration into the target made of

titanium alloy. In accordance with the scales plotted on two coordinate axes, the maximum values of the bullet penetration into the targets were determined. Shooting at the target made of titanium alloy is characterized by the minimum depth of the bullet penetration, equal to 2 mm. Similar shooting at the target made of aluminum alloy is characterized by the maximum depth of the bullet penetration, equal to 15 mm.

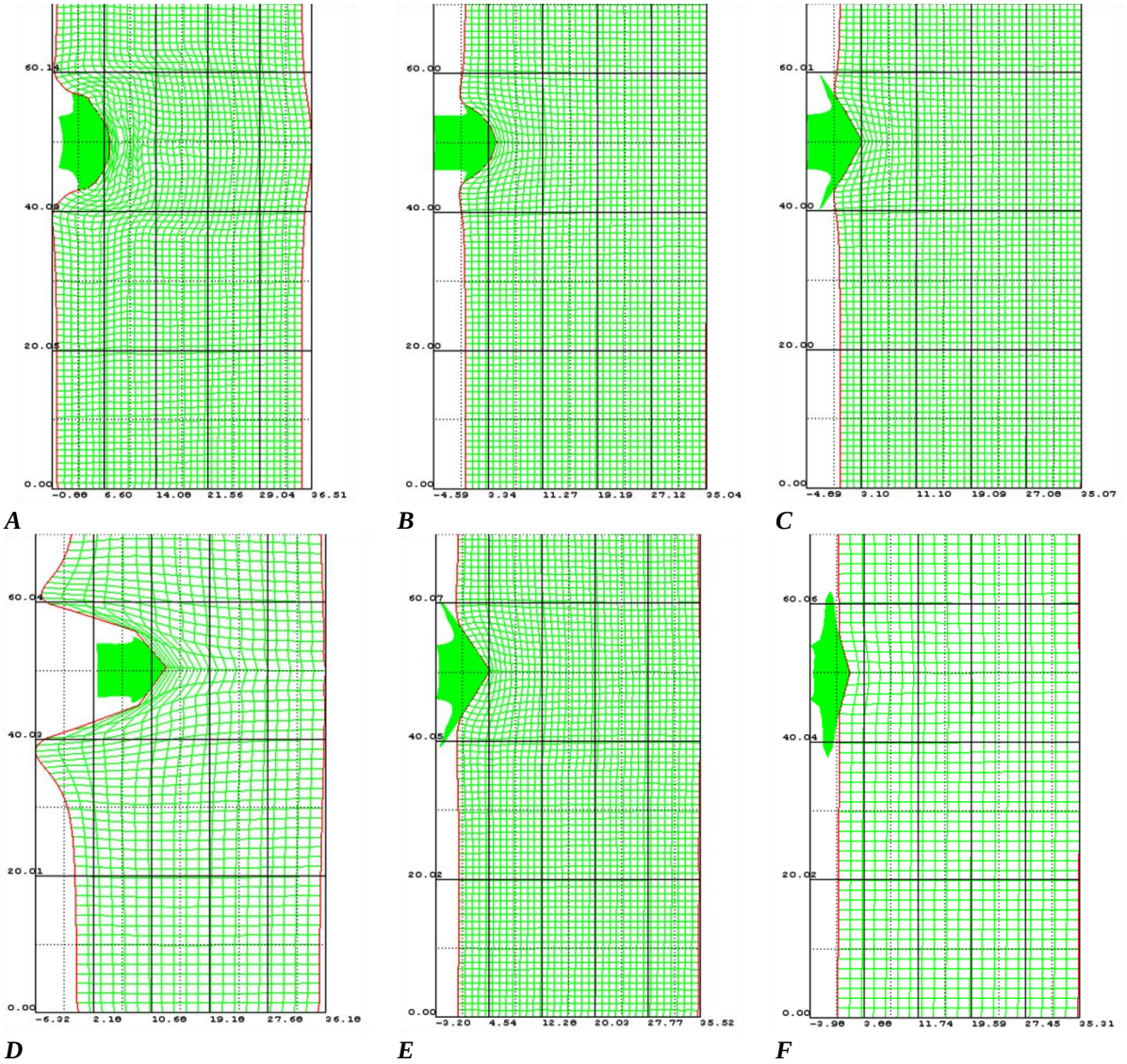

Figure 4 – The penetration depth of the steel bullet into the targets made of Kevlar/epoxy composite (*A*), 140 MPa compressive strength concrete (*B*), 304 stainless steel (*C*), 2024 aluminum alloy (*D*), float glass (*E*), and Ti-6Al-4V titanium alloy (*F*).

Table 1. The values of the maximum depth of the bullet penetration into the targets, in mm.

Target material	*Kevlar/epoxy composite*	*140 MPa compressive strength concrete*	*304 stainless steel*	*2024 aluminum alloy*	*Float glass*	*Ti-6Al-4V titanium alloy*
Maximum depth of bullet penetration, mm	8.0	4.7	3.1	15.0	4.5	2.0

The state of the steel bullet and the targets made of various materials is presented in the Fig. 5. The velocity vectors of material displacement of the bullet and the targets made of various materials are presented in the Fig. 6. The contours of effective strain of the steel bullet and the targets made of various materials are presented in the Fig. 7. The contours of compression of the steel bullet and the targets made of various materials are presented in the Fig. 8. The contours of pressure in the steel bullet and the targets made of various materials are presented in the Fig. 9.

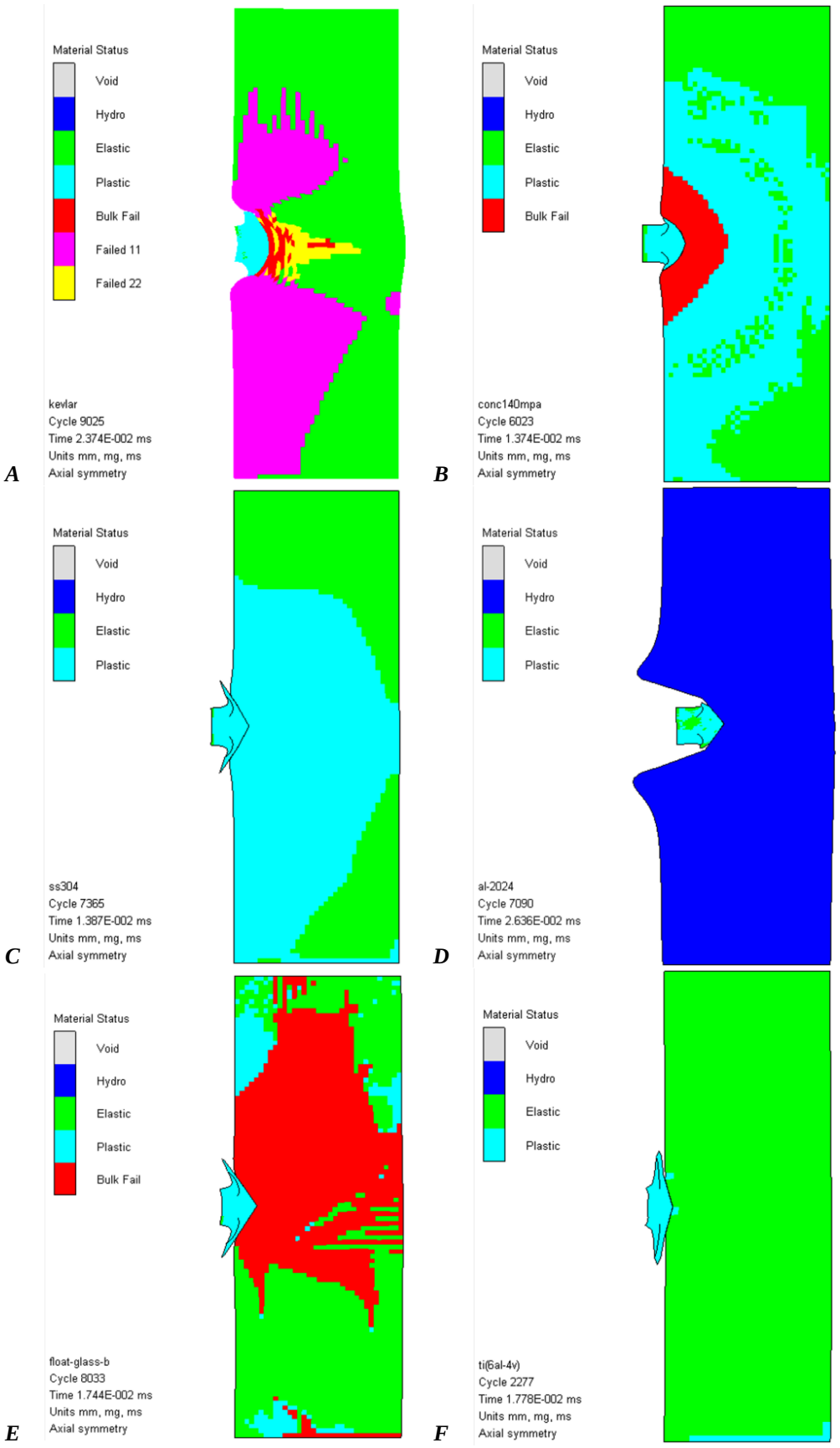

Figure 5 – The state of the steel bullet and the targets made of Kevlar/epoxy composite (*A*), 140 MPa compressive strength concrete (*B*), 304 stainless steel (*C*), 2024 aluminum alloy (*D*), float glass (*E*), and Ti-6Al-4V titanium alloy (*F*) after the simulation.

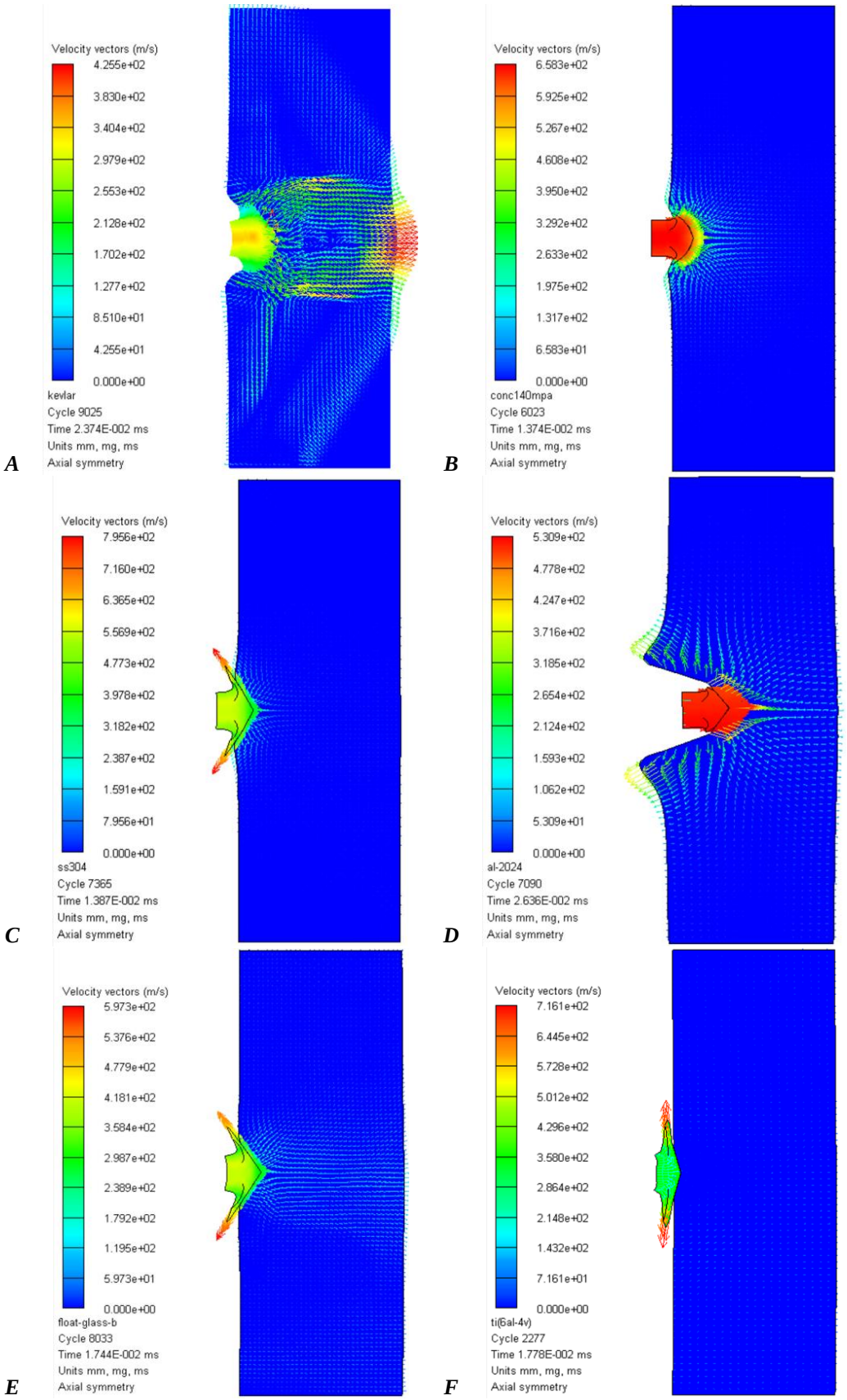

Figure 6 – The velocity vectors of material displacement of the bullet and the targets made of Kevlar/epoxy composite (*A*), 140 MPa compressive strength concrete (*B*), 304 stainless steel (*C*), 2024 aluminum alloy (*D*), float glass (*E*), and Ti-6Al-4V titanium alloy (*F*) after the simulation.

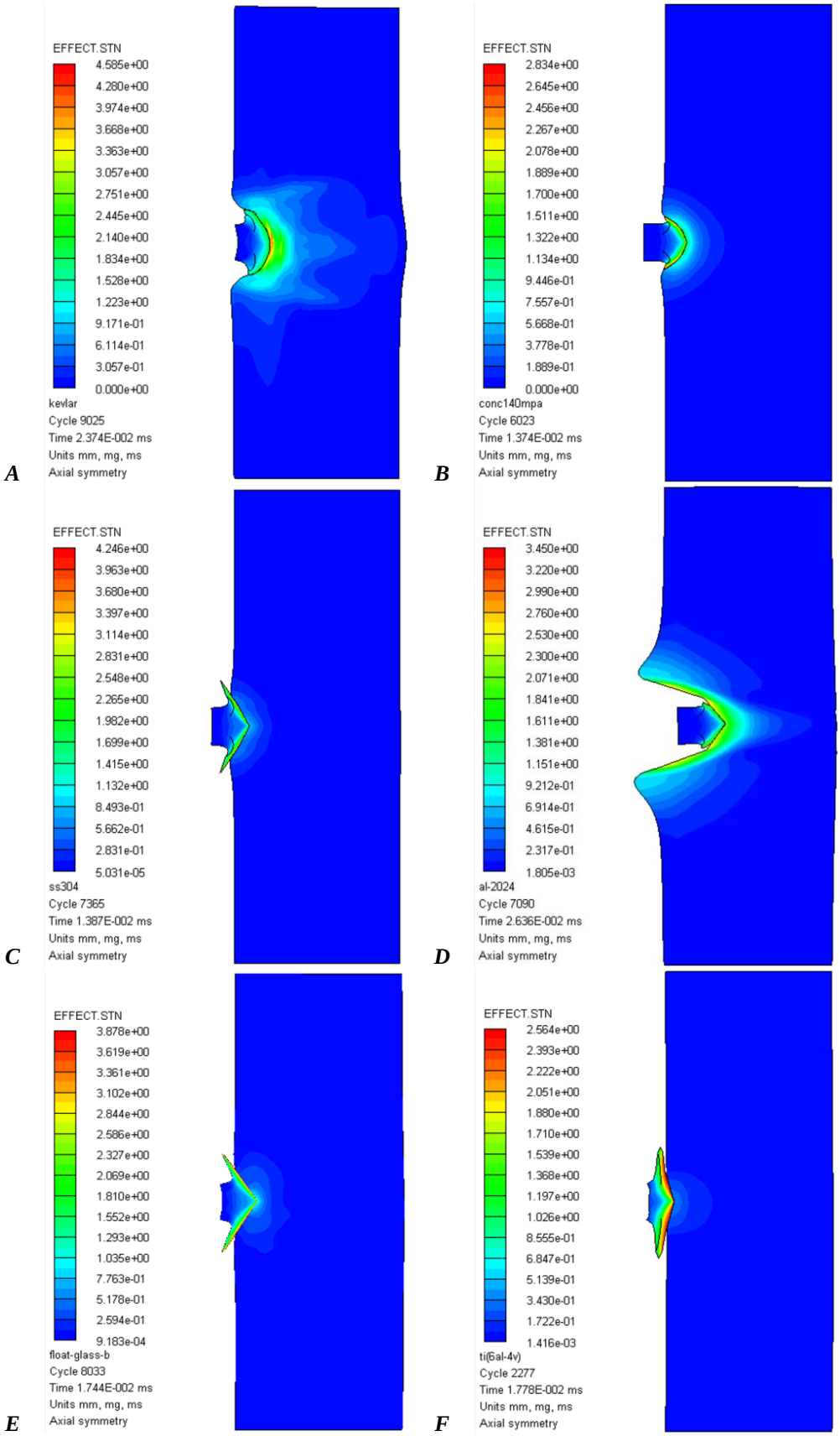

Figure 7 – The contours of effective strain of the steel bullet and the targets made of Kevlar/epoxy composite (*A*), 140 MPa compressive strength concrete (*B*), 304 stainless steel (*C*), 2024 aluminum alloy (*D*), float glass (*E*), and Ti-6Al-4V titanium alloy (*F*) after the simulation.

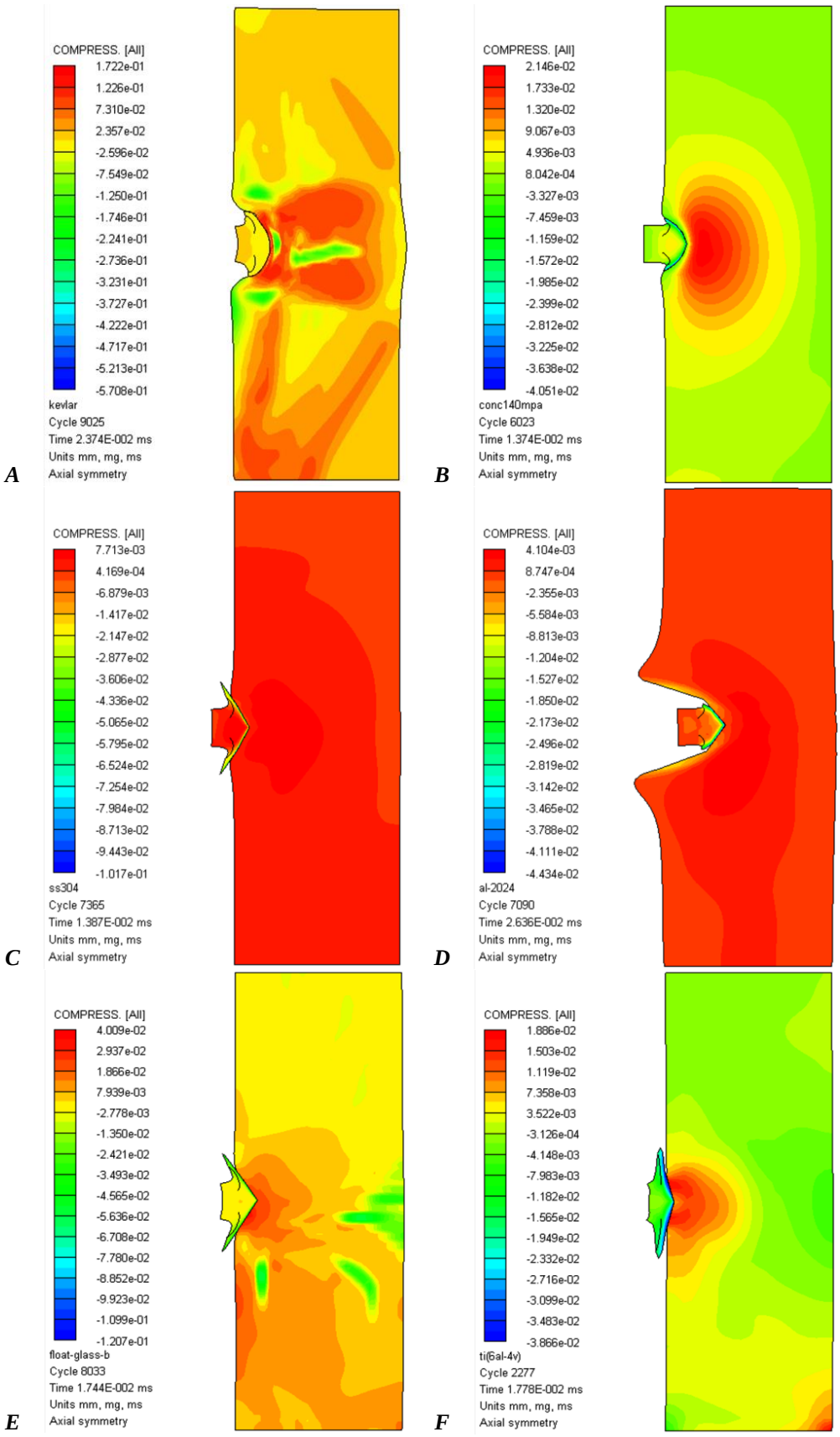

Figure 8 – The contours of compression of the steel bullet and the targets made of Kevlar/epoxy composite (*A*), 140 MPa compressive strength concrete (*B*), 304 stainless steel (*C*), 2024 aluminum alloy (*D*), float glass (*E*), and Ti-6Al-4V titanium alloy (*F*) after the simulation.

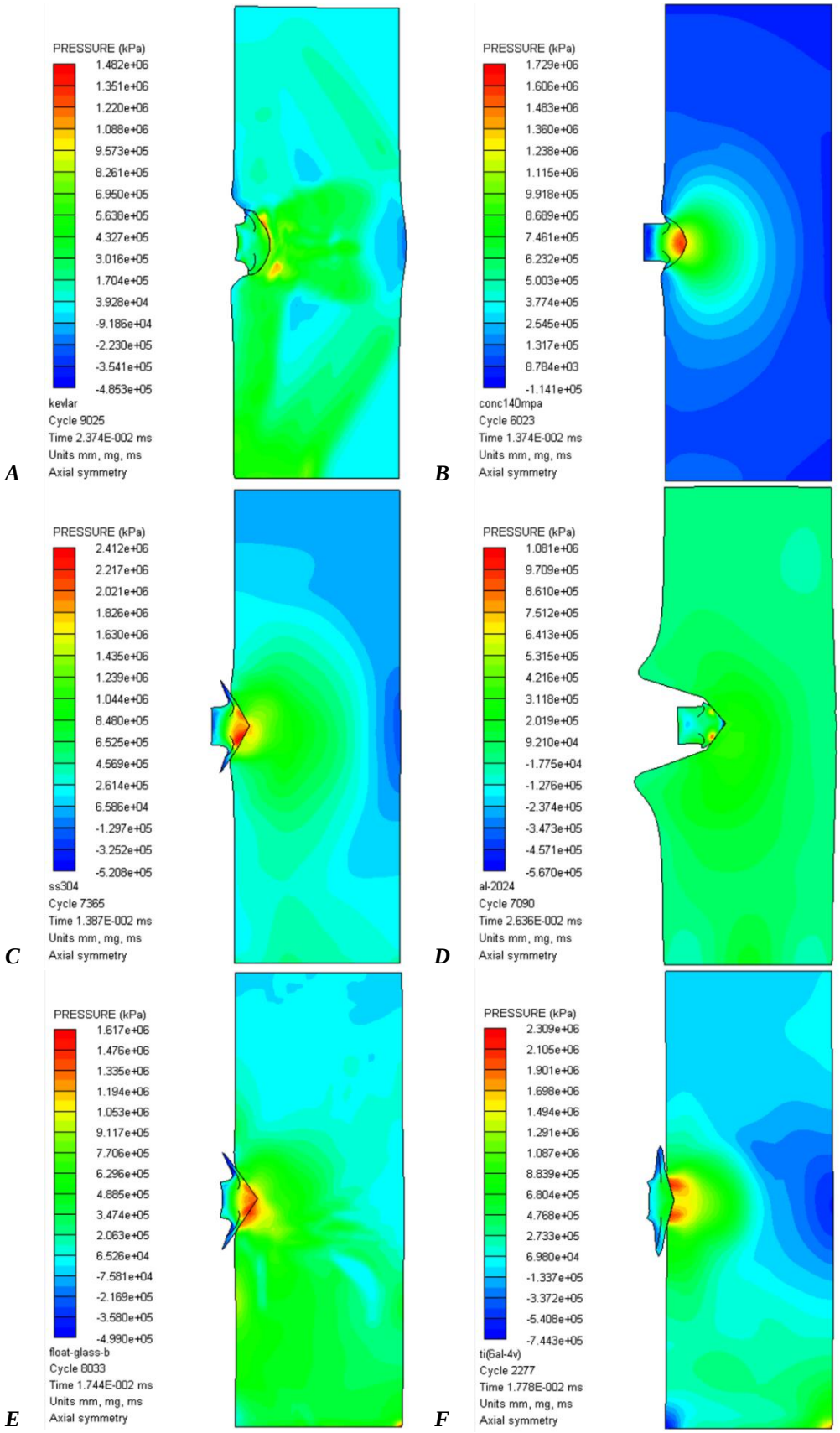

Figure 9 – The contours of pressure in the steel bullet and the targets made of Kevlar/epoxy composite (*A*), 140 MPa compressive strength concrete (*B*), 304 stainless steel (*C*), 2024 aluminum alloy (*D*), float glass (*E*), and Ti-6Al-4V titanium alloy (*F*) after the simulation.

The state of the bullet and the targets after the dynamic impact was calculated from the properties of materials. In all cases, the bullet material is subjected to plastic (changing the shape) and elastic (without changing the shape) deformations. The targets made of metallic alloys are also subjected to elastic and plastic deformations. For example, plastic deformations in titanium alloy after the bullet penetration are only 5%, and elastic deformations in stainless steel are about 40%. Thus, damage of the steel target is 12 times greater than that of the titanium target. The information about the state of the target made of aluminum alloy is not available due to the adopted properties of the model from the standard library of materials of the ANSYS Autodyn 14.5 program. The volume of destroyed material (about 8%) is formed in the contact zone of the bullet with Kevlar. There is no plastic deformation, but there are the failed volumes of material defined by two coordinate axes. The target will not change its original dimensions and the geometric shape due to elastic deformations after removing the dynamic load. High-strength concrete is characterized by the volume destruction in the impact zone of the dynamic concentrated load. The remaining volume of concrete is subjected to elastic and plastic deformations. Due to the protective layer of thermopolished glass, the bullet penetrates into the target to the depth equal to ½ of the bullet length. However, this leads to extensive destruction of material (at least 50% of the volume). It is possible to the target destruction, since this deformation is determined over the entire cross-section of the model. Elastic and plastic deformations of material are also observed. Elastic deformations prevail.

The velocity vectors determine the value and the direction of materials displacement during the bullet penetration. The displacement velocity of the target made of titanium alloy is uniform throughout the entire volume. The maximum displacement velocity is calculated for the target made of Kevlar. In this case, the displacement velocity of material in the contact zone with the bullet is less than the displacement velocity of material from the reverse convex side of the target. The uniform displacement velocity of the local volumes of the targets is observed for other materials.

The target made of Kevlar is subjected to maximum deformation, distributed on ⅓ of the model volume. Effective strain of damaged Kevlar can reach the value of 3.7. For other materials, this indicator is at least 2 times less. Minimum effective strain is observed during damage of the targets made of titanium alloy and high-strength concrete.

The contours of compression show the volumes of materials that are subject to compression deformation. In all cases, the material compression gradient zones are located behind the deformed bullet. The maximum value of compression was determined for damaged Kevlar, and the minimum value was determined for damaged aluminum alloy.

The contours of pressure determine the operating load per unit area of the target material. In the impact zone of the load in the target made of stainless steel, maximum calculated pressure of 2.021×10^6 kPa occurs. Aluminum alloy is destroyed under the pressure action of 3.118×10^5 kPa. Based on the calculated contours of pressure, it is determined that high-strength concrete has higher resistance to the dynamic loads compared to other considered materials.

4. Conclusion

The maximum depth of the bullet penetration is observed during shooting from the AK-109 assault rifle at the target made of aluminum alloy. However, the value of volumetric deformation of the aluminum plate (changing the geometric shape) after the bullet penetration is less than that of the plate made of Kevlar. Taking into account that the kevlar fabric is used for the body armor, deformation of this material at the high rate can lead to serious damage to organs and tissues of the human body. The most optimal choice of material for the body armor is titanium alloy, which is subjected to less deformation at the distance of up to 10 mm and destruction at the distance of up to 2 mm from the side of the bullet penetration. The volume of thermopolished glass is destroyed by about 50% after the bullet penetration. Destruction of high-strength concrete occurs at the distance of up to 10 mm from the deformed bullet along all coordinate axes. Thus, it can be concluded that stainless steel and titanium alloy have high strength when the bullet penetration.

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	GIF (Australia) = **0.564**	**ESJI** (KZ) = **9.035**	**IBI** (India) = **4.260**
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COGNITIVE COMPUTING: MODELS, CALCULATIONS, APPLICATIONS, RESULTS

Abstract: *The article presents new non-traditional models, problems, algorithms, programs, calculations, applications, and the results of cognitive computing.*

Key words: *cognitive computing, algorithms, programs.*
Language: *Russian*
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Scopus ASCC: *2604.*

КОГНИТИВНЫЙ КОМПЬЮТИНГ: МОДЕЛИ, ВЫЧИСЛЕНИЯ, ПРИЛОЖЕНИЯ, РЕЗУЛЬТАТЫ

Аннотация: *В статье представлены новые нетрадиционные модели, задачи, алгоритмы, программы, вычисления, приложения, результаты когнитивного (познающего) компьютинга*

Ключевые слова: *когнитивный компьютинг, алгоритмы, программы.*

Введение

«Человечество переживает наступление эры когнитивного, то есть разумного компьютинга или компьютинга со способностью к мышлению. Как появился термин Cognitive Computing и что за ним скрывается? Чего и когда ждать от разумных машин? Ответы на эти вопросы дает материал журналиста Леонида Черняка,подготовленный специально для TAdviser.»[1] . «Что касается слова computing, то оно является синонимом counting или calculating, переводимых как «вычисления». Но под давлением обстоятельств это слово приобрело иной смысл, вобрав в себя разнообразные операции по использованию компьютеров, электронные процесс сы, происходящие внутри них (аппаратное обеспечение), управление ими (программное обеспечение) и концептуальные основы (computer science, компьютерные науки). То есть компьютинг стал частью багажа цивилизации.»[1].

Когнитивный (познающий) компьютинг совершенствует (обновляет) процесс принятия решений при помощи искусственного интеллекта. К этому направлению исследований относят всё, что так или иначе связано с моделированием мозговых процессов, информационных процессов ИИ, системы с обучением, майнинг данных, извлечение цифровых знаний из числовых реальных данных, измерение неизмеримых показателей проявлений предпочтений, эмоций, чувств, проявлений поведенческих реакций индивидов (при разных видах деятельности: учеба, работа, покупка, продажа) и многое другое. «Когнитивные возможности, включая машинное

[1] https://www.tadviser.ru/index.php/ Статья: Когнитивный_компьютинг

обучение, обработку естественного языка и многие другие виды когнитивных технологий, предлагают современный альтернативный вариант аналитики, применяемый к большим объемам данных для выявления индикаторов известных и неизвестных рисков»[2] Под словами «многие другие виды когнитивных технологий» в данной статье извлечение цифровых знаний из числовых реальных структурированных данных, измерение (моделирование значений) неизмеряемых показателей (проявлений предпочтений, эмоций, чувств, проявлений поведенческих реакций индивидов (при разных видах деятельности: учеба, работа, покупка, продажа)) и … многое другое [8-22] (смотрите ниже).

Наши представленные в обзоре модели, задачи, алгоритмы, программы, вычисления, приложения, результаты несколько сближает функции интеллектуального и цифрового мозга[3].Эти иссле дования относятся к выше перечисленным направлениям когнитивного (познающего) компьютинга и дополняют их.

История и предпосылки появления когнитив ного компьютинга «в железе» изложены в статье[1]. Мы излагаем математическое и программное обеспечение когнитивного компьютинга: математические и когнитивные модели и связанные с ними оптимизационные, прямые, обратные, традиционные и новые смысловые задачи когнитивного моделирования, алгоритмы, программы, вычислительные эксперименты с реальными, модельными многомерными структурированными данными и – самое главное : приложения, результаты.

Математические модели для когнитивных моделей

Разработка математической модели предшествует разработке когнитивной модели. Математическая модель - математическое представление реальности, один из вариантов модели, как системы, исследование которой позволяет получать информацию о некоторой другой системе, ранее не проявлявшей себя.

Математическое моделирование и связанный с ним компьютерный эксперимент незаменимы в тех случаях, когда натурный эксперимент невозможен.

Когнитивное моделирование отличается от нейронного моделирования. Работают не человеческие живые нейроциты, а математические модели.

Математические модели для когнитивного моделей имеют в качестве входных, выходных объектов многомерные объекты – матрицы Z,R_{nn}, C_{nn}, Λ_{nn}, Y_{mn},U_{mn},V_{mn} Кратко перечислим математические модели для когнитивнs[моделей, их входные, выходные многомерные объекты – матрицы.

Исходным данными являются многомерные данные – измеренные данные измеренных значений многих признаков (свойств, имеющих свои единицы измерения) или данные, полученные в результате «гры над моделью во времени» (модельные). На вход такой модели «когнита» подается один или несколько числовых объектов. Вводной объект в модели (introductory object, IO) – объект (число, вектор, матрица), являющийся исходный математической величиной (скалярной или многомерной) для решаемой в модели задачи, имеющей существенное значение для рассматриваемой предметной области. Вводной объект является параметром математической модели моделирования цифровых многомерных данных, относящихся к предметной области.

На выходе после преобразований, сложной многоуровневой «переработки», человеко-машинного анализа образуется «цифровое знание» в виде сложносоциненных, сложноподченных предложения, с ключевыми словами из имен-смыслов z-переменных (или когнитивно определяемое смысловым именем z-переменной) и\или соответствующей валидной переменной. Валидное измерение - такое измерение, которое измеряет то, что оно должно измерять (эта узкая трактовка «валидности» является наиболее популярной, по факту она соответствует понятию «конструктная валидность»). То есть, к примеру, при валидном измерении интеллекта измеряется именно проявление интеллекта, а не что-то другое. Более прикладное определение понятия «валидность» — мера соответствия методик и результатов исследования поставленным задачам.

Если выделены по критерию Джоллиффа (или по другому критерию) несколько валидных переменных, то рассматривается система многомерных уравнений смыслов изменчивостей n переменных [1,2] для каждого функционального равенства (для одной валидной переменной: y- или u- или v-переменной) [3,4]. При наличии ℓ доминирующих собственных чисел рассматриваем ℓ функциональных равенств и имеем систему из ℓ многомерных уравнений смыслов изменчивостей переменных (смысловых

[2] (https://www2.deloitte.com/ru/ru/pages/risk/articles /cognitive-computing.html).

[3] (http://innotechnews.com/innovations/1072-propast-mezhdu-biologicheskim-i-tsifrovym-mozgom-suzhaetsya

многомерных уравнений) [1]. Для смысловых многомерных уравнений [1-3] должны быть известны постоянные коэффициенты с при переменных ℓ смысловых многомерных уравнений, образующих одну систему смысловых многомерных уравнений.

Для системы смысловых многомерных уравнений решается Смысловая Прямая задача (СПЗ [5,6]), для которой вычисляются или конструируются постоянные коэффициенты в виде матриц собственных векторов. Это – информаця, формируемая (вычисляемая с высокой степенью точности).

Пять матриц собственных векторов $C^{(1)}{}_{77}$ [1] (Таблица 1), $C^{(2)}{}_{7,7}$[8] (Таблица 2 [8]), $C^{(3)}{}_{99}$ [9] (Таблица 3 [9]), $C^{(4)}{}_{55}$ (Таблица 4 [10]), $C^{(5)}{}_{66}$ (Таблица 5 [11]) вычисляются после решения **ПСЗ**-прямой спектральной задач:R_{nn}=>(C_{nn},Λ_{nn}), RC=CΛ. При решении ПСЗ происходит диагонализация известной выборочной корреляционной матрицы $R_{nn}=R^{T}{}_{nn}$, для симметрической матрицы $R=R^{T}$, в результате решения **ПСЗ** вычисляются 2 матрицы: ортонормировая матрица C_{nn} собственных векторов $\mathbf{c}_j=(c_{1j},c_{2j}\ldots c_{nj})^{T}$, расположенных по столбцам матрицы $C_{nn}=[c_1|c_2|\ldots|c_n]$, согласованной со своим спектром $\Lambda_{nn}=diag(\lambda_1,\ldots\lambda_n)$ таким образом, что RC=CΛ, $C^{T}C=CC^{T}=I_{nn}$,$diag(R_{nn})=(1,\ldots,1)$,$tr(R_{nn})= 1+1+\ldots+1= tr(\Lambda_{nn})=\lambda_1+\ldots+\lambda_n=n$, $\lambda_1\geq\ldots\geq\lambda_n\geq 0$ [6].

Несогласованная со своим спектром $\Lambda_{nn}=diag(\lambda_1,\ldots\lambda_n)$ матрица C_{nn} собственных векторов рассматривается в ОМ АОИКП [4].

Наличие согласованной или несогласованной со своим спектром матрицы: ортонормировая матрица C_{nn} собственных векторов является важнейшим условием многих решенных задач, апробированных когнитивных моделей 2-х типов. В когнитивных моделях элементы матрици C_{nn} по-разному интерпретируются [3,12] и применяются как при математическом, так и при когнитивном моделировании.

Для математической модели диагонализации существует обратная модель симметризации симметризации известной диагональной матрицы Λ_{nn} [13], в результате имеем корреляционную матрицу $R_{nn}=R^{T}{}_{nn}$, ОСЗ [13] - обратная спектральная задача - обратная к ПСЗ [6] задача симметризации известной диагональной матрицы Λ_{nn}, со свойствами из ПСЗ, в результате решения которой вычисляются 2 матрицы [13]: ортогональная C_{nn} и симметрическая R_{nn}. В специальной литературе встречается термин «однородная спектральная задача» - иное традиционное название для ПСЗ.

Матрица C_{nn} собственных векторов позволяет удвоить число n анализируемых переменных: к n z-переменным добавляются еще n y-переменных: $Y_{mn}=Z_{mn}C_{nn}$. Эти новые y-переменные обладают новыми им присущими свойствами, могут выступать в роли валидных переменных [14]. Их принято называть - главные компоненты (principal components) или смысловые переменные. Система линейных ортогональных комбинаций стандартизованных z-переменных, которая характеризуется тем, что дисперсии этих комбинаций имеют экстремальные значения, равные собственным числам $\{\lambda_1, \lambda_2,\ldots,\lambda_n\}$ корреляционной матрицы R_{nn}, где к - ранг матрицы R_{nn},$1\leq k\leq n$,$\Lambda_{nn}=diag(\lambda_1,\ldots,\lambda_k,0,\ldots 0)$, $tr(\Lambda_{nn})=\lambda_1+\ldots+\lambda_n=n$ - спектр матрицы R_{nn}.

Некоррелированные y-переменные -данные, объединенные в матрицу $Y_{mn}=Z_{mn}C_{nn}$, в которой элементы j–го столбца y_{1j}, $y_{2j},\ldots,y_{mj}$ (j-ая y-переменная, j=1,…,n) имеют среднее арифметическое равное нулю: $(1/m)(y_{1j}+y_{2j}+\ldots+y_{mj})=0$, и дисперсию равную λ_j: $(1/m)(y^2_{1j}+y^2_{2j}+\ldots+y^2_{mj})=\lambda_j$, при этом сумма дисперсий равна n: $\lambda_1+\ldots+\lambda_n=n$. Матрица $Y_{mn}=Z_{mn}C_{nn}$, интерпретируется как многомерная выборка, является решением ПЗ АГК [6].

Стандартизованные коррелированные z-переменные – данные, объединенные в матрицу Z_{mn}, в которой элементы j–го столбца z_{1j}, z_{2j}, … , z_{mj} (j-ая переменная, j=1,…,n) имеют среднее арифметическое равное нулю: $(1/m)(z_{1j}+z_{2j}+\ldots+z_{mj})=0$, и дисперсию равную 1: $(1/m)(z^2_{1j}+z^2_{2j}+\ldots+z^2_{mj})=1$, сумма дисперсий равна n. Матрица Z_{mn} интерпретируется как многомерная выборка, является ассоциированным решением ОЗ АГК [6].

Кратко перечислим математические модели для когнитивного моделей, их входные, выходные многомерные объекты – матрицы.

ПМ АГК - прямая модель анализа главных компонент[6], поучаемая при решении ПЗ АГК, изображается Z => (R, C, Λ, Y), где 2 выборкам Z_{mn} и Y_{mn} соответствуют 3 матрицы парных корреляций (ковариаций): симметрическая R_{nn} – между парами z-переменных, диагональная Λ_{nn} - между парами y –переменных, C_{nn} - между парами переменных (z,y). Фиксируется последовательность вычислений матриц, в ПМ ГК: Z → R→ C, Λ → Y). здесь матрицы C, Λ вычисляются одновременно при решении ПСЗ.

ОМ АГК - обратная модель главных компонент[6]. Соотношения из ОМ ГК, получаются при решении ОЗ АГК. Схематическое изображение ОМГК:Λ=>(C, R, Y, Z,), где Y_{mn} является решением ОЗ АГК, матрица Z_{mn} - ассоциированным решением ОЗ АГК. Фиксируется последовательность их – матриц, вычислений в ОМ ГК: Λ→ C, R→Y→Z. Здесь моделируется матрица C, потом вычисляются матрица $R=C\Lambda C^{T}$.

ПМ АКП - прямая модель анализа канонических переменных, поучаемая при решении ПЗ АГК, изображается $Z_{mn}=[Z_{mq}|Z_{mp}]$=>(R_{nn},A_{qp},$B_{pp}\Lambda$,U_{mp},V_{mp}), где 2

выборкам $Z_{mq}|Z_{mp}$ соответствуют 3 матрицы парных корреляций (ковариаций): симметрическая R_{nn} – между парами z-переменных, диагональная Λ_{nn} - между парами v –переменных, C_{nn} - между парами переменных (z,y).

ПМ АИП - прямая модель анализа избыточных переменных: $(\Lambda^{(1)}_{pp},\Lambda^{(2)}_{pp},\Lambda_{pp}=>(A^{+}_{qp},B^{+}_{pp}, V^{*}_{mp},U^{*}_{mp}, Z_{mn}=[Z_{mq}| Z_{mp},],)$. Вычисляемые матрицы V^{*}_{mp},U^{*}_{mp}, где u^{*}-переменная–переменная (избыточная, redundance), обозначается буквой u^{*} и имеет различные значения: $u^{*}_1,\ldots,u^{*}_m$,. Если u-переменная имеет номер j и имеет m значений, то значения j-ой u^{*}-переменной обозначают так: $u^{*}_{1j},\ldots,u^{*}_{mj}$, они -элементы матрицы U^{*}_{mq} m-на-q-матрицы обозначаются : u_{ij}, i –номер строки, j – номер столбца матрицы U^{*}_{mq}.

v^{*}-переменная–переменная (избыточная, redundance), обозначается буквой v и имеет различные значения: $v^{*}_1,\ldots,v^{*}_m$. Если v^{*}-переменная имеет номер j и имеет m значений, то значения j-ой v^{*}-переменной обозначают так: $v^{*}_{1j},\ldots,v^{*}_{mj}$, они -элементы матрицы V^{*}_{mp} m-на-p-матрицы обозначаются: v^{*}_{ij}, i –номер строки, j – номер столбца матрицы V^{*}_{mp}.

ОМ АИКП-обратная модельАнализа Избыточно-Канонических Переменных [4]. Схема: ОМАИКП: $(\Lambda^{(1)}_{pp},\Lambda^{(2)}_{pp},\Lambda_{pp}=>(A^{+}_{qp},B^{+}_{pp},V_{mp},U_{mp},Z_{mn}=[Z_{mq}|Z_{mp}])$.

Избыточно-каноническая переменная (redundance-canonical) –это переменная, полученная в результате двойного преобразования z-переменной. Сперва z-переменная преобразуется в каноническую u-переменную. Затем полученная новая переменная преобразуется в избыточную переменную.

Применяются в математических моделях ПМ АГК, ОМ АГК, ОМ АМЛР[15,16], ОМ АИКП[4] .

С применением соотношений из ПМ АГК, ОМ АГК, ОМ АМЛР, ОМ АИКП, равенств для собственных векторов или псевдособственных векторов, равенств из теоремы [7] разработаны математические модели для излагаемых ниже когнитивных моделей когнитивного компьютинга. В перечисленных основных математических моделях решаются следующие матричные задачи-подмодели.

ПСЗ-прямая спектральная задача $RC=C\Lambda$ – прямая задача диагонализа ции известной выборочной корреляционной матрицы $R_{nn}=R^{T}_{nn}$, решаемая для симметрической матрицы $R=R^{T}$, в результате решения которой (ПСЗ) вычисляются 2 матрицы: ортонормировая матрица C_{nn} собственных векторов $\mathbf{c_j}=(c_{1j},c_{2j}\ldots c_{nj})^{T}$, расположенных по столбцам матрицы $C_{nn}=[c_1|c_2|\ldots|c_n]$, согласованной со своим спектром $\Lambda_{nn}=diag(\lambda_1,\ldots\lambda_n)$ таким образом, что $RC=C\Lambda$, $C^{T}C=CC^{T}=I_{nn}$,$diag(R_{nn})=(1,\ldots,1)$, $tr(R_{nn})=1+1+\ldots+1=tr(\Lambda_{nn})=\lambda_1+\ldots+\lambda_n=n$, $\lambda_1\geq\ldots\geq\lambda_n\geq 0$. Несогласованная со своим спектром $\Lambda_{nn}=diag(\lambda_1,\ldots\lambda_n)$ матрица C_{nn} собственных векторов рассматривается в ОМ АОИКП.

ОСЗ - обратная спектральная задача - обратная к ПСЗ задача симметризации известной диагональной матрицы Λ_{nn}, со свойствами из ПСЗ, в результате решения которой вычисляются 2 матрицы: ортогональная C_{nn} и симметрическая R_{nn} со свойствами из ПСЗ. В специальной литературе встречается термин «однородная спектральная задача» - иное традиционное название для ПСЗ.

В ПЗ АГК используется факт неизменности значений элементов $\lambda_1,\ldots,\lambda_n$, т е постоянство длин полуосей гиперэллипсоида. В прикладных исследованиях генерируются внутри него модельные n-мерные точки координатной системы y-переменных при любых ℓ–отклонениях в координатной системе z–переменных, преобразуемой ортогональным преобразованием $C^{(\ell)}_{nn}$ в другую координатную систему y-переменных.

Единственное решение Y_{mn} ПЗ АГК является одним из бесконечного множества решений ОЗ АГК [6,стр.110-112] согласно теореме 2.2 [6,стр.110-112]. Из теоремы 2.2 следует, что одни и те же содержательные выводы (цифровые знания) формулируются из анализа рассматриваемой реальной (C,Λ)-выборки или других модельных Λ-выборок ОМ ГК, являющихся ассоции рованными решениями ОЗ АГК [6]. ПЗ АГК решена в [17], ОЗ АГК решена в [6], ОМ ГК и ее применения описаны в [2,3,8,12-17,20].

Ассоциированные решения $Z^{(t)}_{mn}=Y^{(t)}_{mn}C^{T}_{nn}$, т..е. (C,Λ)-выборки $Z^{(t)}_{mn}$, соответствующие решению Y_{mn} ОЗ АГК генерируются в ОМ ГК: $\Lambda_{nn}=>(C_{nn},R_{nn},Y^{(t)}_{mn},Z^{(t)}_{mn})$, $t=1,\ldots,k_t$, модельно и гистограммно адекватные реальной выборке Z_{mn}, являющейся в рамках ОМ ГК также (C,Λ)-выборкой. Наличие модельной адекватности видно из трех свойств Λ-выборок, сформулированных в теореме о Λ-выборках ниже (при n=2) и в [2,3,8]-в теореме 2.1, для всех n>2. В трех свойствах Λ-выборок [6,18] изменение значения номера t (или номера ℓ или пары номеров (t,ℓ)) означает, что вариабельности подвергаются элементы матрицы $Y^{(t)}_{mn}$ (или пары матриц $R^{(\ell)}_{nn}$ и $C^{(\ell)}_{nn}$, или матрицы $Z^{(t,\ell)}_{mn}$) при постоянной матрице Λ_{nn}.

Вычисленные по известной корреляционной матрице R_{nn} ее собственные числа λ_j, $j=1,\ldots,n$, зависят от величин всех коэффициентов корреляции (ПСЗ). В ОМ ГК входным объектом является спектр $\Lambda_{nn}=diag(\lambda_1,\ldots,\lambda_n)$, n>2, вычисленный при решении ПСЗ $R_{nn}=>(C_{nn},\Lambda_{nn})$. Если нет реальных данных и нет корреляционной матрицы R_{nn}, то можно смоделировать модельный

спектр Λ_{nn}, (f_1,f_2,f_4)-адекватный "реальному" спектру: (f_1,f_2,f_4)=>Λ_{nn}, такой что его f-пара метры f_1,f_2,f_4 равны заданным значеиям, а остальные f-параметры-произвольны,где:$f_1(\Lambda_{nn})=\lambda_1+\ldots+\lambda_n)=n, f_2(\Lambda_{nn})=(\lambda^2{}_1+\ldots+\lambda^2{}_n), f_3(\Lambda_{nn})=\lambda_1/\lambda_n, f_4(\Lambda_{nn})=(\lambda_1+\ldots+\lambda_\ell)/n<1, f_5(\Lambda_{nn})=\lambda_1\times\lambda_2\times\lambda_3\times\ldots\times\lambda_n$, $f_6(\Lambda_{nn})=\lambda_1/\lambda_2+\ldots+\lambda_{n-1}/\lambda_n)$.Таккак $tr(R^TR)=tr(\Lambda^2)$, то соотношения между f-параметрами функционально зависят от элементов корреляцион ной матрицы R_{nn} [6, стр.37-46].

Свойства 1-3 теоремы о Λ-выборках [18] применяются при получении цифровых знаний [5-11]. Цифровые данные вида объект-свойства в рамках моделей, в них решаемых задач преобразовываются в новые информационные объекты, визуализирутся и подвергаются осмыслению, письменно сочиняют словесные предложения, адекватно описывающие геометриические объекты. Все объекты, модели, задачи применяются при конструировании цифровых знаний. С применением ПМ ГК получена информация – пара матриц (C_{nn},Λ_{nn}), матрица значений n у–переменных Y_{mn}. Далее построены когнитивные карты в виде ℓ орграфов, для их построения из матриц выделены ℓ первые столбцы C_{nn}. Из графической информации выявлены цфровые телекоммуникационные знания [1], практические правила вычислений степени рисковости изменения величии ны процентной ставки вида «доходность к дате погашения» у валютных [8] высокорисковых государственных ценных бумаг [9], рекомендуемых дилерам банка. Те же матрицы участвуют в процессе получения когнитивно точного разделения факторов влияния семьи, учителей, школы на смыслоые фактор-следствия, вычисленные с применением когнитивных карт (КК) и когнитивного моделирования [19]. Здесь проведена визуализация когнитивной карты (КК) и соотношения (объекты теоремы) из когнитивной модели социально-экономических факторов карьерной успешности школьников. Результат - формализация плохо формализуемой ситуации, позволившая «добыть» цифровые неформальные знания из экономических данных. При этом уточнены фразы-смыслы 2-х у-еременных, изображены 6 дуг в узлах КК, даны обоснования противоположности знаков весов дуг орграфа: 1-ое содержит 60,43% информации, извлеченных из реальных данных, 2-ое-23,255% информации, получившие когнитивно точные смыслы. Сформулирован простой эмпирический факт-«будущая карьерная успешность школьника зависит (формируется) под воздействием 2-х независимых факторов».

Применяемая в [1-6,8-11,14-16,8-9] когнитивная интерпретация - это совокупность значений (смыслов, поэтому применяяется прямая и обратная модели главных компонент (ПМ ГК, ОМ ГК, где у-переменные именуются смысловыми. Такому "осмыслению" подвергаются сами элементы-матрицы C_{nn}, Λ_{nn},Y_{mn} теории-(ПМ АГК, ОМ АГК,ПМ АИКП, ОМ АИКП), то есть интерпретируются символы связи объектов и формулы. При анализе этой сложной ситуации используется параметры и переменные ОСЗ:Λ=>(R,C) из ОМ ГК:Λ=>(R,C,Y,Z). Из формулировки ОЗ АГК из ОМ ГК следует, что обратная задача вычисления оптимальной системы весов (из матрицы C_{nn}), т.е. вычисление совокупности воздействий ($c_{j1},c_{2j},\ldots,c_{nj}$) на j–ый фактор системы (со своей моделью причинно-следственной зависимости в виде функций $y_{ij}=z_{i1}c_{1j}+z_{i2}\,c_{2j}+\ldots+z_{in}c_{nj}$, i=1,…,m, зависит от элементов спектра $\Lambda_{nn}=diag(\lambda_1\ldots,\lambda_n)$, $\lambda_1+\ldots+\lambda_n=n$, $\lambda_1\geq\lambda_2\geq\ldots\geq\lambda_n>0$, и от параметров спектра. Вершины, дуги орграфа №1 визуализируют «модель представления знаний эксперта в виде ориентирован ного орграфа (когнитивной карты [(Z,Y),C], где (Z,Y=ZC)–множество факторов (6 z- и 6 у-переменных) ситуации, C_{66} - множество измерений $n^2=6^2$ причинно-следственных отношений между факторами ситуации) и 6 методов анализа экономической ситуации в телекоммуникационной отрасли, выделяющие визуализируемые подмножества факторов» в виде одного фактора $\mathbf{y_1}$ [5]. При анализе будущих дебиторской и кредиторской задолженностей муниципалитетов городов США [20], с применением ПМ ГК получена информация - матрицы C_{66}, Λ_{66},$Y_{m,6}$,m=30. Далее с применениием когнитивных карт из матриц C_{66}, Λ_{66} выделены ℓ=3 первые столбцы, на их основе построены ℓ=3 орграфов-это графическая информация, а из последней выявлены цфровые знания[22]. В таких случаях иногда применяют термин «пространственная статистика» (Spatial Statistics), которые не работают напрямую со слоями ситуаций [20]. При когнитивной интерпретации до начала анализа преобразовывают информацию в класс пространственных объектов при помощи вышеприведенных инструментов-моделей, специальных задач.

Когнитивные модели когнитивного компьютинга

Когнитивная наука - это междисциплинарная область, изучающая природу и функции познания. Когнитивистика зародилась в 1950-е годы и сейчас считается одной из наиболее востребованных и перспективных научных областей. Наше понимание мира становится менее упрощенным и более всесторонним.

Мы не рассматриваем процедуры оценивания знаний, умений, навыков и (или) опыта деятельности, характеризующих этапы формирования компетенций, относящиеся к когнитивной лингвистике.

Исследование когнитивных систем затрагивает темы познавательных процессов в естественных и в искусственных системах. Когнитивные модели для когнитивного компьютинга превышают традиционные дисциплинарные границы с точки зрения последствий или с точки зрения подходов (например, психология, искусственный интеллект, измерение неизмеряемого).

Рассматриваемые нами когнитивные модели разделены в 3 группы с близкими областями приложений.

В первую группу образуют модели цифровизации:

Модель цифровизации валидных и измеряемых показателей предприятия [14], Модель цифровизации показателей индивидуального сознания [23], Цифровизация поведенческой модели с ошибками невозвратных затрат [24], Когнитивная модель оцифровки показателей индивидуального сознания цивилизованного предпринимателя[25], Математическая модель «низы - не хотят, верхи - не могут» [26], Будущие кредиторская идебиторская задолженности [22].

Вторую группу образуют когнитивные модели интеллектуального анализа аддиктивных видов услуг связи:

Когнитивная модель анализа трафика международных разговоров из РК [5],Когнитивное моделирование изменения цен и денежных затрат населения Республики Казахстан[8], Когнитивное моделирование зависимости количества телефонов в квартирах от изменения доходов и расходов населения Республики Казахстан [9], Когнитивное моделирование зависимости количества индивидуальных телефонов на предприятиях от изменений в структуре доходов и расходов предприятий [10],Формула валидного показателя «мощность прибыльного предприятия» [11].

Детали моделей из группы 2 изложены в [5,8-11]. В статье [11] обоснована необходимость применениянна практике телекоммуникационных компаний вычисляемого показателя «мощность прибыльного предприятия» в качестве ключевого показателя (KPI), применяе мого (контролируемого) в планах стратегии развития бизнеса. Стандартные ключевые показатели в настоящее время неправильно отражают эффекты работы предприятий, а «мощность прибыльного предприятия» измеряет то, нужно, поэтому он предпочтителен для применения в практике работы предприятий.

Третью группу когнитивных моделей образуют поведенческие модели:

Когнитивная модель изменчивости показателей отрицательной селекции индивидов [27], Измерение изменчивости неизмеряемых показателей сознания индивида [29], Когнитивная модель структуры муниципального органа по мониторингу моральной среды для субсидий человеческих ресурсов [28], Когнитивная модель оцифровки показателей индивидуального сознания цивилизованного предпринимателя [25], Когнитивная модель образовательной, научной работ профессора университета [30].

Для численного измерения (моделирования) изменчивости неизмеряемых показателей сознания индивида В статье [23,29] введено понятие «собственное отклонение» для неизмеряемых значений z–изменчивости (изменчивости z-переменной) неизмеряемого показателя индивидуального сознания и Аксиома существования собственного отклонения и шага отклонения. Данные из Таблицы 1 [29] обосновывают применимость термина «длина одного собственного отклонения (шага) для неизмеряемых значений z–изменчивости неизмеряемого показателя» к нашем задачам. После решения наших задач мы прведем визуализацию зависимых z–изменчивостей для j-ой z–переменной.

Для облегчения процесса конструирования фраз смыслов переменных, сумм смыслов переменных применяются когнитивная карта - орграф, образованный из факторов (элементов системы) и связей между ними, где вершины, соединены ориентированными дугами-связями, если элемент А связан с элементом В причинно-следственной связью. Это один из моделей представления знаний эксперта. Этот вид формализует визуализируемые ярлыки знания, извлеченные из многомерных данных, структурированных в виде таблицы объект-свойства. Числа являются результатом измерений n свойств у m объектов. Каждое из n свойств имеет имя, свою единицу измерения, значение средней арифметической, значение дисперсии. Среднее арифметическое и дисперсия j–ого показателя (свойства) вычисляется по m значениям j–го показателя, расположенных в j–ом столбце матрицы X^0_{mn}. Обычно простые «готовые» формализованные знания имеются в текстах книг, руководств, документов в виде общих и строгих фраз (законов, формул, моделей, алгоритмов и т.п.). Мы «добываем» знания из цифровых данных. Данные - это совокупность чисел (с именами свойств или с другими сведениями), зафиксированных на определенном носителе в форме, пригодной для постоянного хранения, передачи и обработки. Преобразование и обработка (анализ с применением

соответствующих методов) данных позволяет получить полезную и применяемую информацию и фактическое знание. Информация - это результат преобразования, компьютерного или иного анализа данных. Знание - результат процесса познавательной деятельности. В нашем случае деятельность связана с применением специфических инструментов познания: когнитивное моделирование взаимосвязей. Каких связей и между какими «объектами» будут выявлены и формализованы они,- зависит от свойств мтриц переменных и параметров, математических соотношений ними в применяемых нами Прямой и Обратной Моделей Главных Компонент.

Рассматриваемые ниже Когнитивные модели двух типов: совокупности смыслов и их комбинации извлечены в результате исследований и опубликованы в статьях [1,4-8] при когнитивном анализе нескольких реальных данных X^0_{mn} с одинаковым числом измереннмых показателей n=6. Во всех случаях извлечения цифровых знаний из Z_{mn}, вычисленных из X^0_{mn} подчиняющихся формальным правилам для цифровых фактов, в том числе вычисленных с применением Прямой и Обратной Моделей Главных Компонент.

Мы ниже излагаем новые косвенные сведения, содержащиеся в матрице собственных векторов, не отмеченные в статьях [31-33]. В матрице собственных векторов C_{nn} (из ПМ АГК) компоненты у первых ℓ (ℓ=2 или 3) собственных векторов содержатся не только индикаторы, но и изменяемые алгоритмами разных Оптимизационных Задач компоненты. Ряд задач из 31-33] решают требуемые для когнитивных моделей задачи на матрице собственных векторов C_{nn}.

В работе [5] разработана «модель представления знаний» эксперта в виде ориентированного орграфа (когнитивной карты [(Z,Y),C] с соответствующими вершинами). Здесь в двух множествах анализируемые факторы (Z,Y=ZC) интерпртируются как события из n=6 z- и из n=6 y-переменных. Матрица C_{66} интерпретируется как множество измерений $n^2=6^2$ причинно-следственных отношений между факторами ситуации) и n=6 когнитивных КК в виде функциональной модели $y_{ij}=z_{i2}c_{21}+z_{i3}\ c_{31}+z_{i5}\ c_{51}+z_{i6}\ c_{61}+\varepsilon_1$ с ограничениями на веса $C^T_{nn}C_{nn}=C_{nn}C^T_{nn}=I_{nn}$. Применялись и матрицы $C^{(\kappa)}_{66}$ (получена при решении ОСЗ $\Lambda=>(C^{(\kappa)},R^{(\kappa)})$, где симметрическая корреляционная матрица $R^{(\kappa)}$ удовлетворяет соотношению $R^{(\kappa)}=C^{(\kappa)}\Lambda C^{(\kappa)T}$, κ=1,…, ∞, решаемой в ОЗ АГК из ОМ ГК [3]:$\Lambda=>(R^{(\kappa)},C^{(\kappa)},Y,Z^{(\kappa)})$, κ=1,…,∞. Отобранные по критериям матрицы C_{nn}, $C^{(\kappa)}_{nn}$, соответствовали одному знаию, извлекаемого из них с применением одной когнитивной методики.

Матрица $C^{(\kappa)}_{66}$ определяет ассоциированное решение $Z^{(\kappa)}_{mn}=Y_{mn}C^{(\kappa)T}_{nn}$ при известном решении Y_{mn} ПЗ АГК. Предполагается, что ПЗ АГК решена всегда, ее решение имеет вид $Y_{mn}=Z_{mn}C_{nn}$. Если известна матрица Z_{mn}–стандар тизованная выборка, вычисленная по известной выборке реальных данных X^0_{mn} (при этом вычисляются 2 вектора – вектор средних арифметических $(x^{cp}_1,\ldots,x^{cp}_n)$ и вектор дисперсий $s^2=(s^2_1,\ldots,s^2_n)$), существует корреляционная матрица $R_{nn}=(1/m)Z^T_{mn}Z_{mn}$.

Когнитивные модели разработаны для извлечения цифровых знаний из реальных числовых данных [1-7]. Элементами когнитивной модели служат формулы вида смысл(y_{ij})=смысл(z_{i1})*c_{1j}+смысл(z_{i2})*c_{2j}+…+ смысл(z_{in})*c_{nj}, где слагаемое смысл(z_{kj}) означает **смысл z-переменной** z_k (равный смыслу ее изменчивости z_{kj}) –заданное (или когнитивно определяемое) смысловое имя-смысл z-переменной. Имя-смысл z-переменной – фраза, имеющая смысл, связанный (в СПЗ) или не связанный (в СОЗ) со смыслом составной y-переменной (при n=6). Смысл z-переменной совпадает со смыслом изменчивости z_{ij} z-переменной z_j: смысл(z_j) =смысл(z_{ij}), i=1,…,m. Номер i означает номера многомерных объектов или моменты времени.

Извлечение цифровых знаний из числовых реальных данных - это превращение данных (числа) в значимую информацию (структуриро ванные матрицы,векторы) за счет применения различных инструментов и технологий (например, разработки математической модели и многомерных уравнений когнитивных смыслов изменчивостей переменных), направленных на получение требуемых знаний (фраз) и/или ценности.

Многомерное уравнение когнитивных смыслов изменчивостей переменных имеет 2 типа изменчивости переменных: z-переменные (коррелированные с равными 1 дисперсиями, в сумме равных n) и y-переменные (некоррелиро ванные с разными дисперсиями, в сумме равных n).

Некоррелированные y-переменные -данные, объединенные в матрицу Y_{mn}, в которой элементы j–го столбца y_{1j}, $y_{2j},\ldots,y_{mj}$ (j-ая y-переменная, j=1,…,n) имеют среднее арифметическое равное нулю: $(1/m)(y_{1j},+y_{2j}+\ldots+y_{mj})=0$, и дисперсию равную λ_j: $(1/m)(y^2_{1j},+y^2_{2j}+\ldots+y^2_{mj})=\lambda_j$, сумма дисперсий равна n: $\lambda_1+\ldots+\lambda_n=n$. Матрица Y_{mn} интерпретируется как многомерная выборка.

Стандартизованные коррелированные z-переменные – данные, объединенные в матрицу Z_{mn}, в которой элементы j–го столбца z_{1j}, z_{2j}, … , z_{mj} (j-ая переменная, j=1,…,n) имеют среднее арифметическое равное нулю: $(1/m)(z_{1j},+z_{2j}+\ldots+z_{mj})=0$, и дисперсию равную 1: $(1/m)(z^2_{1j},+z^2_{2j}+$

… + z^2_{mj})=1, сумма дисперсий равна n. Матрица Z_{mn} интерпретируется как многомерная выборка.

Некоррелированные y-переменные имеет традиционное название «главные компоненты» или «смысловые переменные». Главные компоненты (principal components) - система линейных ортогональных комбинаций стандартизованных z-переменных, которая характеризуется тем, что дисперсии этих комбинаций имеют экстремальные значения, равные собственным числам $\{\lambda_1, \lambda_2, \dots, \lambda_n\}$ корреляционной матрицы R: $R_{nn}C_{nn}=C_{nn}\Lambda_{nn}$, где к – ранг матрицы R_{nn} равен $k,1\le k\le n,\Lambda_{nn}=diag(\lambda_1,\dots\lambda_n)$, $tr(\Lambda_{nn})=\lambda_1+\dots+\lambda_n=n$ - спектр матрицы R_{nn}.

Из ПМ АГК известно, что решение ПЗ АГК (решаемой в рамках ПМ ГК) имеет вид $Y_{mn}=Z_{mn}C_{nn}$, где Z_{mn} – входной объект ПМ АГК или является одним из множества ассоциированных решений ОЗ АГК, а выборка Y_{mn} состоит из m значений n y-переменных $y_{ij}=z_{i1}*c_{1j}+z_{i2}*c_{2j}+\dots+z_{in}*c_{nj}$, равных линейной комбинации значений n z-переменных, соответствующих номерам i=1,…,m.

Для математической модели $Y_{mn}=Z_{mn}C_{nn}$ формируем смысловую модель в виде m многомерных уравнений когнитивных смыслов изменчивостей значений n y-переменных смысл(y_{ij})=смысл(z_{i1})*c_{1j}+смысл(z_{i2})*c_{2j}+…+ смысл (z_{in})*c_{nj}, равных линейной комбинации смыслов n z-переменных $z_1,\dots,z_n$, смысл(z_{ij})=смысл(z_j), соответствующих номерам i=1,…,m;j=1,….,n.

Извлечение цифровых знаний из числовых реальных данных произво дится, если решаем смысловую прямую (СПЗ) или смысловую обратную (СОЗ) задачу для одного или нескольких смысловых моделей в виде m многомерных уравнений когнитивных смыслов изменчивостей значений $\ell<n$ y-переменных и смысл(y_{ij})=смысл(z_{i1})*c_{1j}+ смысл(z_{i2})*c_{2j}+…+ смысл(z_{in})*c_{nj}, где j – номер одного из ℓ доминирующих собственных чисел $\lambda_1,\dots,\lambda_\ell$, $\lambda_1>\dots>\lambda_\ell>\lambda_0=1$ или иное кпороговое число [7].

При наличии ℓ доминирующих собственных чисел $\lambda_1,\dots,\lambda_n$ рассматриваем ℓ функциональных равенств и имеем систему из ℓ многомерных уравнений смыслов изменчивостей переменных.

Виды и методы решения систем из ℓ многомерных уравнений смыслов изменчивостей переменных изложены в статьях [5,8-11].

В центре когнитивных моделей стоит задача моделирования изменчивости переменных $y_{ij}=z_{i1}*c_{1j}+z_{i2}*c_{2j}+\dots+z_{in}*c_{nj}$. Оно является объектом математического моделирования в Смысловых обратных и прямых задачах.

Для математических моделей $y_{ij}=z_{i1}*c_{1j}+z_{i2}*c_{2j}+\dots+z_{in}*c_{nj}$ разработаны и найдены когнитивные решения (имена-смысли n z-переменных при известном имени-смысле j-ой y-переменной, j=1,…,ℓ) многомерного уравнения когнитивных смыслов изменчивости n z-переменных [5,8-11].

В многомерном уравнении когнитивных смыслов изменчивости n z-переменных постоянными коэффициентами при n неизвестных смысл(z_{ik}), k=1,…,n, являются значения c_{kj}, k=1,…,n.Если заданы имена-смысли смысл(y_j) каждой j-ой y-переменной, j=1,…,ℓ, то имеем систему из ℓ многомерных уравнений когнитивных смыслов изменчивости n z-переменных [5,8-11].

В связи с расширением сферы применений ОМ АГК, а также с необходи мостью формализации ранее неформализованных ситуаций, событий, социаль ных явлений были разработаны Смысловые Обратные Задачи и найдены когнитивные решения (имена-смысли n z-переменных при известных именах-смыслах смысл(y_j) каждой j-ой (из ℓ штук, j=1,…,ℓ) y-переменной [1-7]. Схематически СОЗ при ℓ=2 обозначается так:

({значения z-переменных z_k,k$\in${1,…,6}, значения y-переменных y_1 и y_2} => (смысл(z_k),смысл(y_1) и смысл (y_2)).

Постоянный параметр многомерного уравнения из СОЗ (например, член уравнения +смысл(z_{ij})*c_{2j}+) равен компоненту (например,c_{2j}) одного (из ℓ) собственного вектора $\mathbf{c_j}=(c_{1j},c_{2j}\dots c_{nj})^T$, j=1,…,$\ell$, расположенного среди ℓ первых столбцов матрицы $C_{nn}=[c_1|c_2|\dots|c_n]$, соответствующей своей матрице собственных чисел $\Lambda_{nn}=diag(\lambda_1,\dots\lambda_n),\lambda_1,\dots,\lambda_\ell,\lambda_1>\dots>\lambda_\ell>\lambda_0=1$. Этим ℓ столбцам ставится в соответс твие система из ℓ многомерных смысловых уравнений когнитивных смыслов изменчивости n z-переменных.

В многомерных смысловых уравнениях постоянные параметры (c_{kj}, k=1,…,n) при неизвестных (смысл(z_{ij}),j=1,…,k,i=1,…,m) у ℓ многомерных уравнений равны k-ым компонентам $c_{nj}>c_0$ соответствующего собственного вектора $\mathbf{c_j}=(c_{1j},c_{2j}\dots c_{nj})^T$,расположенного в j–ом столбце матрицы $C_{nn}=[c_1|c_2|\dots|c_n]$.

Это были многомерные (смысловые) уравнения смыслов изменчивостей переменных. Такая система решается в СПЗ [2].

Отличие смыслового уравнения от числового уравнения можно понять на примере головоломки о 3-х спичках. «Имеются 3 спички III, как переставить 1 спичку и получить шесть». Решатель воспринимает слово шесть как «шесть спичек». А надо было смысл требуемого решения трансформировать в римскую цифровую форму. Изменив заданный смысл на другой. Была дана фраза, неполная словесная постанока задачи. Полная словесная постанока задачи: «даны 3

спички (III), требуется переставить 1 спичку и получить цифровое решение». Фигура вида VI является «фигурным» решением спичечной задачи ((спички)=>(VI)). Спичечная фигура должна преобразоваться в римскую цифровую фору: (спички)=>(VI)). Геометрический фигура трансформируется в цифровую знаковую форму. О присутствии этой трансформации нет явного признака в постановке задачи. Если бы задача была озвучена фразой «Имеются 3 спички (III), как переставить 1 спичку и получить VI», то не было бы подмены понятий, процесс решения можно формализовать без когнитивного осмысления.

Смысловая Прямая задача(СПЗ)-когнитивное конструктирование (при n=6, ℓ=1,k=n=6) k неизвестных смыслов вычисленной переменной y_1 по известным смыслам z-переменных z_k, k=1,…,6:

смысл(z_1)+смысл(z_2)+смысл(z_3)+смысл(z_4)+смысл(z_5)+смысл(z_6)=смысл(y_1), при наличии линейной связи вида: $z_1c_{k1}+z_2c_{k2}+z_3c_{k3}+z_4c_{k4}+z_5c_{k5}+z_6c_{k6}=y_1$.

Смысловая Обратная задача(СОЗ) является прансформацией системы из ℓ линейных уравнений в систему из ℓ сумм когнитивных смыслов изменчивостей z-переменных, характеризующих рассматриваемое явление.

СПЗ (Смысловая прямая задача) – когнитивное конструктирование (моделирование) неизвестных z-переменных z_k,k∈{1,…,6}, по известным смыслам вычисленных 2-х переменных (или более) y_1 и y_2 по ПМ АГК или по ОМ АГК:

а)смысл(y_1)=смысл(z_{i1})*c_{11}+смысл(z_{i2})*c_{21}+(z_{i3})*c_{31}+(z_{i4})*c_{41}+(z_{i5})*c_{51}+(z_{i6})*c_{61}, где некоторые компо ненты c_{s1}, s∈{1,…,6}, 1-го собственного вектора по абсолютной величине превышают пороговое число c_1:c_{s1}>c_1,s∈{1,…,6}, при наличии линейной связи (линейного уравнения) для изменчивостей z-переменных вида $z_{i1}c_{11}+z_{i2}c_{21}+z_{i3}c_{31}+z_{i4}c_{41}+z_{i5}c_{51}+z_{i6}c_{61}=y_{i1}$;

б) смысл(y_{i2})=смысл(z_{i1})c_{12}+смысл(z_{i2})c_{22}+смысл(z_{i3})c_{32}+смысл(z_{i4})c_{42}+смысл(z_{i5})c_{52}+смысл(z_{i6})c_{62}, где c_{k2}>c_2, k∈{1,…,6}, при наличии линейной связи (линей ного уравнения) для изменчивостей z-переменных вида $z_{i1}c_{12}+z_{i2}c_{22}+z_{i3}c_{32}+ z_{i4}c_{42}+z_{i5}c_{52}+z_{i6}c_{62}=y_{i2}$.

СОЗу: (смысл(z_k),смысл(y_1) и смысл(y_2), k=1,…,n)=>({значения z-переменных z_k,k=1,…,6, значения y-переменных y_1 и y_2}

Когнитивному решению СПЗ:({значения z-переменных z_k,k∈{1,…,6}, значения y-переменных y_1 и y_2}=>(смысл(z_k),смысл(y_1) и смысл (y_2)) соответствует не единственное решение вышеизложенной Смысловой Обратной Задачи: цифровая трансформация системы известных смыслов z-переменных z_k,k=1,…,6, в систему линейных комбинаций (в виде элементов матрицы Z_{mn}) значений z_{ik}, изменчивостей z-переменных z_k,k=1,…,6, в уравнениях вида $z_{i1}c_{k1}+z_{i2}c_{k2}+z_{i3}c_{k3}+z_4c_{k4}+z_5c_{k5}+z_{i6}c_{k6}=y_{i1}$,i=1,…,m, при известном спектре Λ_{nn}=diag(λ_1,…λ_n), элементы λ_1,…λ_ℓ которого равны ℓ дисперсиям: (1/m)(y_{ij},…,y_{mj})^T (y_{ij},…,y_{mj})=λ_j, j=1,…,ℓ<n, ℓ y-переменных. Когнитивно (познава тельно) полученное решение СПЗ (n+ℓ подобранные смыслы) единственно, но смыслы могут формулироваться разными словесными фразами, смысли которых одинаковы. Поэтому можно говорить об «когнитивной единственности» решения СОЗ. Числовое решение СПЗ ({значения z-переменных z_k,k∈{1,…,6}, значения y-переменных y_1 и y_2} => (смысл(z_k),смысл(y_1) и смысл (y_2)) **не является** единственным.

Задачи когнитивного моделирования

В задачах, решаемых в моделях 3-х типов когнитивного моделирования, создается проблемная ситуация вычисления для каждой **z-переменной** (обозначается буквой z) имеет различные значения: z_1,…,z_m, их среднее арифметическое равно нулю: (1/m)(z_{1j},+z_{2j}+…+z_{mj})=0, а дисперсия равна 1:(1/m)(z^2_{1j},+z^2_{2j}+…+z^2_{mj})=1. Если z-переменная имеет номер j и имеет m значений, то значения j-ой z-переменной обозначают так: z_{1j},…,z_{mj}, они - элементы матрицы Z_{mn} m-на-n)-матрицы обозначаются: z_{ij}, i –номер строки, j – номер столбца матрицы Z_{mn}. Величина компоненты собственного вектора называется «весом», «вес» бываю положительные, отрицательные, абсолютное и весомое значение компоненты из их набора c_{1j},c_{2j}, …,c_{nj} является индикатором присутствия знания в j –ой переменной. Задачи 2-х типов: ф)вычислительные; б)моделирования матричных объектов в когнитивных моделях. К 1-му типу задач относятся следующие задачи.

Основные задачи: ПЗ АГК - прямая задача анализа главных компонент: для матрицы Z_{mn} стандартизованных коррелированных z-переменных с одинаковыми дисперсия ми найти способ преобразования их в новые некоррелированные y-переменные из матрицы Y_{mn} (m значений n переменных) с разными дисперсиями. Здесь решается ПСЗ.

ОЗ АГК - обратная задача анализа главных компонент: для известных дисперсий Λ_{nn} неизвестных преобразованных некоррелированных y-переменных из матрицы Y_{mn} требуется найти способ преобразования их в матрицу Z_{mn} стандартизованных коррелированных z-переменных с одинаковыми дисперсиями (m значений n переменных). Здесь решается ОСЗ.

В ПЗ АГК и ОЗ АГК решаются ПСЗ, ОСЗ (в 6 вариантах).

К 2-му типу задач относятся задачи решений систем многомерных смысловых уравнений: СПЗ,СОЗ,ОМ АИКП ОМ АИКП (Схема ОМ АИКП:($\Lambda^{(1)}_{pp}$,$\Lambda^{(2)}_{pp}$, Λ_{pp})=> (A^{+}_{qp},B^{+}_{pp},V_{mp},U_{mp},Z_{mn}=[Z_{mq}| Z_{mp},],)), постановки этих задач ориентированы на реализацию в ЭТ Excel

Когнитивный поиск фактов присутствия знаний является одним из базовых элементов при создании когнитивных алгоритмов. Поиск проводится по индикаторам. Индикаторы присутствуют в паре матриц (C_{nn},Λ_{nn}). Если имеем ℓ доминирующих собственных чисел $\lambda_1,\ldots,\lambda_\ell$, $\lambda_1>\ldots>\lambda_\ell>\lambda_0=1$ или иное кпороговое число, то заметные значения компонентов в ℓ собственных векторах $\mathbf{c}_j=(c_{1j},c_{2j}\ldots c_{nj})^T$,j=1,…,$\ell$, расположенных в ℓ первых столбцах матрицы $C_{nn}=[c_1|c_2|\ldots|c_n]$, назначаются нами индикаторами присутствия знаний. Индикатор наличия знания – компонент собственного вектора, значение которой превышает известный порог: $c_{kj}>c_0$. Номер собственного вектора совпадает **с** номером j доминирующего собственного числа λ_j. Величина компоненты собственного вектора c_{kj} - k-ая компонента j-го собственного вектора (j-го столбца матрицы C_{nn} собственных векторов), превышает назначенное пороговое значение c_0 =0.4. Величина компоненты c_{kj} равна $c_{kj}=corr(z_k,y_j)$ указывает на вхождение имени-смысла переменной z_k (знания об z_k) в имя-смысл переменной y_j (равной $y_{ij}=z_{i1}*c_{1j}+z_{i2}*c_{2j}+\ldots+z_{in}*c_{nj}$, а смысл y_j равен сумме смыслов переменных $z_{i1},z_{i2},\ldots,z_{in}$. Извлечение знания описывается фразами: наличие знания в k-ой z-переменной, присутствующей в формуле j-ой y-переменной $y_{ij}=z_{i1}*c_{1j}+z_{i2}*c_{2j}+\ldots+z_{in}*c_{nj}$, $c_{1j}=corr(z_1,y_j),\ldots$, $c_{nj}=corr(z_n,y_j)$, i=1,…,m, равной линейной комбинации z-переменных $z_1,z_2,\ldots,z_n$, с разными «весами» $c_{1j},c_{2j},\ldots,c_{nj}$, возможно имеющих разные знаки.

Знание в k-ой z-переменной с заметным весом c_{kj} извлекается словесной когнитивной интерпретацией произведение $z_{ik}*c_{kj}$, («**смысл** j-ой z-переменной z_j **проявляется** с силой $\mathbf{c_{kj}}$ и **с изменчивостью** $\mathbf{z_{ik}}$ в моменты времени i=1,…,m» величина z_{ik} показывает степень проявления изменчивости k-ой z-переменной z_k, i – номер изменчивости k-ой z-переменной, измеренной в момент времени i.

Знание содержится в имени-смысле k-ой z-переменной. Сумма смыслов смысл(z_{i1})*c_{1j}+ смысл(z_{i2})*c_{2j}+…+смысл(z_{in})*c_{nj} с «весами» $c_{1j},c_{2j}+\ldots,c_{nj}$, равна смыслу y-переменной смысл(y_{ij}) =смысл($z_{i1}*c_{1j}+ z_{i2}*c_{2j}+\ldots+z_{in}*c_{nj}$). Смысл произведения $z_{ik}*c_{kj}$, равен знанию в k-ой исходной переменной z_k. Для добычи этого знания нам пришлось вычислять много чего. «Твердость» **смысла** k-ой z-переменной z_k **проявляется** с силой $\mathbf{c_{kj}}$ и **с изменчивостью** $\mathbf{z_{ik}}$ в момент времени i, i∈{1,…,m}, величина z_{ik} показывает степень проявления и направление изменчивости k-ой z-переменной z_k, i – номер изменчивости k-ой z-переменной, измеренной в момент времени i.

Смысловая Прямая задача(СПЗ) - когнитивное конструктирование неизвестных смыслов вычисленной переменной y_1 по известным смыслам z-переменных z_k, k=1,…,6,: смысл(z_1)+смысл(z_2)+смысл(z_3)+смысл(z_4)+ смысл(z_5) +смысл(z_6)=смысл(y_1), при наличии линейной связи вида: $z_1c_{k1}+z_2c_{k2}+z_3c_{k3}+ z_4c_{k4}+z_5c_{k5}+z_6c_{k6}=y_1$.

Вместе с «весом» c_{kj} и с изменчивостью z_{ik} в момент времени i, i∈{1,…,m}, величина z_{ik} показывает степень проявления и направление изменчивости k-ой z-переменной z_k, i – номер изменчивости k-ой z-переменной, измеренной в момент времени i. Величина z_{ik} изменчивости k-ой z-переменной влияет на изменчивости k-ой z-переменной через значение коэффициента корреляции между ними: $z_{ik}=r_{kj}* z_{kj}$ **.** Заметное слагаемое входит в формулу переменной y_j : $y_{ij}=z_{i1}*c_{1j}+z_{i2}*c_{2j}+\ldots+ z_{ik}*c_{kj}* z_{kj}+\ldots z_{in}*c_{nj}$ и ее(k-ой z-переменной) имя-смысл является частью имени-смысла переменной y_j. Мы отметили 2 свойства «весом» $\mathbf{c_{kj}}$ **с** изменчивостью z_{ik}.

Второй сомножитель произведения $z_{ik}*c_{kj}$, равен знанию изменчивости k-ой исходной переменной z_k. **Изменчивость переменной** – количество s в отклонении $x_i=(x^0_i-x_{cp})$ измеренного значения x^0_i от среднего значения x_{cp}. Изменчивость переменной присуща каждому измеренному (или модельному) значению x^0_i, i=1,…,m. Значения s и x_{cp} определены для совокупности значений $x_i=(x^0_i-x_{cp})$ и x^0_i, i=1,…,m. существует связь между изменчивостью $z_{ki}=r_{ij} z_{kj}$, $r_{ij}=corr(z_i,z_j)$,k=1,…,m;i=1,…,n;j=1,…,n.

Требование определения тем или иным способом значений весов переменных, изменчивостей - это реально существующее в науке познавательное противоречие, способы (методы) разрешения которого в данный момент еще не известны (не ясны).

Алгоритмы и программы когнитивного моделирования

Когнитивное моделирование не возможно без наличия математической модели и алгоритмов решения сопутствующих задач матричной алгебры, оптимизационных задач над частями матриц собственных векторов, собственных чисел. Вычислительное эксперименты (преобразования исходных реальных данных, формирование и\или слияние матриц индикаторов наличия скрытых знаний, когнитивные вычисления, извлечение знаний, визуализация

совместных динамик показателей) с когнитивными моделями, излагаемых в статьях [1-1-5,8-11,19-33] – имитация для постижения сути явления, не прибегая к экспериментам на реальном объекте.

Цель когнитивных исследований, их направлений, моделей и методов - знание ряда специальных терминов, таких как: когнитивная наука и когнитивистика, когнитология (инженерия знаний), когнитивный подход (познавательный), технология когнитивного (познавательно-целевого) моделирования, визуализация, когнитивное моделирование, когнитивная структуризация (концептуали зация), методология когнитивного моделирования, когнитивная модель, когнитивная карта.

Когнитивное моделирование – это возможность создать простой и понятный алгоритм достижения поставленной цели. Для когнитивного моделирования присущи задачи :

1)оптимизации с линеаризованными уравнениями f-параметров (f1, f2, f3, f4, f5, f6) – спектра [34];

2)моделирования блочно-диагональных корреляционных матриц, применяемых для моделирования многомерных Λ-выборок [35];

3) моделирования 2-мерных Λ-выборок [18], имеющих заданное значение коэффициента корреляции [9] из диапазона [-0.2,+0.98];.

3) задача решения двух однородных спектральных задач при анализе данных с 2-мя группами переменных (Теоремы о значениях отношений между группами переменных [7]).

Для разработанных и программно реализованных алгоритмов когнитивного моделей применяются алгоритмы соответствующих математических моделей, решаются соответствующие Оптимизационные Задачи. **Вводным** объектом в модели является число, вектор, или матрица, являющийся исходный математической величиной (скалярной или многомерной) для решаемой в модели задачи, имеющей существенное значение для рассматриваемой предметной области. Вводной объект является параметром математической модели моделирования цифровых многомерных данных, относящихся к предметной области.

При моделировании наших многомерных выборок $Z^{+}_{mn}=[\ Z^{+}_{mq}|Z^{+}_{mp}]$ нами реализованы этапы разработки, отладки, применения программ из ППП «Спектр» [36] и разработки программ-таблиц в надстройке «Поиск решения». Процессы вычислений с применением надстройки «Поиск решения» в ЭТ Excel применялись переходы из одной операцинной системы (Windows 10) в другую MS DOS. Файлы конвертировались из одной среды в другую, применялись 64- 32-битовые редакторы WordPad и Блокнот.

Для работы с ППП «Спектр» использовалась 2-ая виртуальная машина VirtualVM. Oracle VM VirtualBox — специальная программа, она дает возможность запустить на компьютере виртуально другую операционную систему. С её помощью можно виртуализировать разные версии Windows, MS DOS. В этой VirtualVM загружалась 2-ая ОС MS DOS . и через шлюз XP на диске C: осуществлялся интерфейс файлов ППП «Спектр» из одной мшины с другой.

Программы алгоритмов решения задач: ПСЗ, ОСЗ, ПЗ АГК, ОЗ АГК функционируют с применением надстройки «Поиск решения» в ЭТ Excel. Алгоритмы СПЗ,СОЗ,ОМ АИКП ОМ АИКП (Схема ОМ АИКП:$(\Lambda^{(1)}_{pp},\Lambda^{(2)}_{pp},\ \Lambda_{pp})$ => $(A^{+}_{qp},B^{+}_{pp},V_{mp},U_{mp},Z_{mn}=[Z_{mq}|\ Z_{mp},],))$ реализованы в ЭТ Excel

Приложения и результаты когнитивного компьютинга

Когнитивные модели разработаны в 3-х группах с близкими областями приложений.

Выделим несколько оригинальных приложений, результатов. Из первой группы когнитивная модель «низы - не хотят, верхи - не могут» [37] выделяется оригинальностью формализации общественных процессов в России хорошо изученного историками периода времени 18-19-го веков. Приложение СПЗ когнитивного компьютинга в модели цифровизации значений изменчивости переменных из двух множеств.

Модельные матрицы решаемой Смысловой Прямой Задачи вычислены при моделировании исторического принципа «верхи – не могут, низы – не хотят». В результате математического моделирования предметной области выделены 2 фактора (генераторы кризиса) с «негативными» динамиками их «приближенно параллельных» кривых (Рисунки 2 и3): кривая (низы) «число крестьян, взявших в аренду или купивших участки земли» («вес» равен $\mathbf{b}_{41}$=0,3580) «приближенно параллельна» кривой (верхи) «степень распространения (внедрения) идеи либерализма в среде помещиков» («вес» равен $\mathbf{a}_{41}$=-0,50000). Противоположые знаки «весов» $\mathbf{b}_{41}$=0,3580, $\mathbf{a}_{41}$=-0,50000 показывают убывание количества крестьян, свободных от крепостничества и рост либерализма в среде помещиков. Эта ситуация с течением времени привела к принятию царем закона об отмене крепостного права. Здесь область значений функции смысл() – условно непрерывна (считается – смысл имеет бесконечно много оттенков). В рассмотрен бинарная область значений когнитивной функции вид() [22].

Другая модель из этой группы [22]: бинарная - будущие кредиторская идебиторская задолженности муниципалитетов городов США.

Проведедена когнитивная интерпретация сводных показателей социальных обязательств $x_1,x_2,\ldots,x_6$ в терминах видов будущих задолженностей (валидная переменная, определяющая сумму смыслов z -переменных, имеет только 2 смысла-БДЗ,БКЗ) муниципалитетов 20 городов США (Бирмингем, Окснард, Салинас, Данбери, Нью-Хейвен, Норуолк, НовыйОрлеан, Балтимор, Детройт, Сент-Луис, Клифтон, Нью-Йорк, Норт-Хемпстед, Талса, Филадельфия, Мемфис, Хопуэлл, Норфолк, Мадисон, Южные Милуоки). В смыслах переменных z_1,z_3,z_4,z_5, z_6 различаются только задолженности 2-х видов: БКЗ, БДЗ. Наши переменные z_1,z_3,z_4,z_5,z_6, представляют собой важные для практики когнитивные факторы. Одна и та же информация, например, «прирост населения» может быть представлена множеством различных смыслов. При этом каждый смысл формирует уникальные когнитивные факторы, влияющие на смысл другой информации, связанной с этим смыслом. Внимательно выбирая слова для представления информации мы можем сделать более вероятными ту или иную реакцию на нее. В этом случае, не искажая фактического содержания информации, мы меняем ее смысл и знания, которые получит человек, например, муниципальный менеджер. Проинтерпретируем в терминах «БКЗ» и «БДЗ» (в их смыслах) обобщенные факторы – синтетические показатели y_{i1} и y_{i2}. - i-ую строку матрицы $Y_{20,6}$. Правильное раскрытие и классификация БКЗ и БДЗ, их эквивалентов, необходимы для точной оценки финансового состояния города. Для этого необходимо своевременное и точное отражение БКЗ и БДЗ в сводных таблицах финансового состояния города.

В работе получены 2 новых вида будущих задолженностей муниципа литетов. Проведедена когнитивная интерпретация сводных показателей социальных обязательств $x_1,x_2,\ldots,x_6$ в терминах видов будущих задолжен ностей муниципалитетов 20 городов США (Бирмингем, Окснард, Салинас, Данбери, Нью-Хейвен, НоруолкНовый Орлеан, Балтимор, Детройт, Сент-Луис, Клифтон, Нью-Йорк, Норт-Хемпстед, Талса, Филадельфия, Мемфис, Хопуэлл, Норфолк, Мадисон, Южные Милуоки). В смыслах переменных z_1, z_3, z_4, z_5, z_6 различаются только задолженности 2-х видов: БКЗ, БЗ. Наши переменные z_1, z_3, z_4, z_5, z_6, представляют собой важные для практики когнитивные факторы. Одна и та же информация, например, «прирост населения» может быть представлена множеством различных смыслов. При этом каждый смысл формирует уникальные когнитивные факторы, влияющие на смысл другой информации, связанной с этим смыслом. Внимательно выбирая слова для представления информации мы можем сделать более вероятными ту или иную реакцию на нее. В этом случае, не искажая фактического содержания информации, мы меняем ее смысл и знания, которые получит человек, например, муниципальный менеджер. Проинтерпретируем в терминах «БКЗ» и «БДЗ» (в их смыслах) обобщенные факторы – синтетические показатели y_{i1} и y_{i2}. - i-ую строку матрицы $Y_{20,6}$. Правильное раскрытие и классификация БКЗ и БДЗ, их эквивалентов, необходимы для точной оценки финансового состояния города. Для этого необходимо своевременное и точное отражение БКЗ и БДЗ в сводных таблицах финансового состояния города.

Применим оператор вид() к частям формулы для y_{i1}:

Вид (y_{i1})=0.5101вид(z_{i1}) - 0.3820 вид (z_{i3}) - 0.3918 вид(z_{i4}))+0.4447вид (z_{i5}))+ 0.4149вид(z_{i6}). Вид в формулы валидной y-переменной y_{i1} без учета величин «весов» 0.5101, 0.3820, - 0.3918, 0.4447, 0.4149 при изменчивости переменных более краток: вид(y_{i1})=<БКЗ>–(<БКЗ>+<БДЗ>)-(<БКЗ>-<БДЗ>)+(<БКЗ>+ <БДЗ>)+<БКЗ>=<БДЗ>+<БКЗ>=<БКЗ>+<БДЗ>. Смысл фактора y_{i1} есть «муниципальные будущая кредиторская и будущая дебиторская задолженности всех типов».

Аналогично рассмотрим 2-ой главный фактор: y_{i2}=0.5719z_{i3}+0.5645z_{i4}+ +0.3311z_{i5} - 0.4164 z_{i6}. Он не коррелирован с 1-ым фактором. Составим смысловую комбинацию видов задолженностей для фактора y_{i2}, используя вид задолженности каждого показателя $z_{i3},z_{i4},z_{i5},z_{i6}$, которые зафиксированы экспертом-бухгалтером.

Так как y_{i2}=0.5719z_{i3}++0.5645z_{i4}+0.3311z_{i5}-0.4164z_{i6}, то Вид(y_{i2})=0.5719*вид(z_{i3})+ 0.5645*вид(z_{i4})+0.3311*вид(z_{i5})-0.4164*вид(z_{i6})= +0.5719<БКЗ>+0.5645<БДЗ> +0.3311<БКЗ>-0.4164 (=<БДЗ>+<БКЗ>).

Аналогично вышеизложенному, считая, что при любом ненулевом проявлении изменчивости $z_{i3},z_{i4},z_{i5},z_{i6}$ (ненулевом значении «веса» c_{k2},k=3,4,5,6) z-переменной в формуле валидной y-переменной, выводится тип вида задолженности 2-го фактора, равного <БКЗ>: вид(y_{i2})=<БКЗ>+<БДЗ>+<БКЗ>-(<БДЗ>+<БКЗ>) = 2<БКЗ>=<БКЗ>. Мы обнаружили, что задолженности 1-го y_{i1} трактуется как <БКЗ>+<БДЗ>, задолженности 2-го y_{i1} трактуется как «БКЗ». Смысл 3-ей комбинации отличен от смыслов первых 2-х комбинаций: он означает «время» - срок платежей по векселям (в сотнях месяцев). Срок платежей по векселям (время) всегда является существенным фактором, он независим от двух видов задолженностей.

Заметим, что смысл «веса» не учитывает знак смысла (из-за многозначности области условно непрерывных значений оператора смысл: оттенков, нюансов много во фразах, передающих

смысл), а вид «веса» учитывает знак «веса» (из-за бинарности области значений оператора вид).

Во второй группе выведена оригинальная формула вычисляемого каждым предприятием отдельно ключевого показателя «мощность прибыльного предприятия». Данный показатель измеряет то, что нужно, поэтому он предпочтителен для применения в практику работы предприятий. Разработана когнитивная модель интеллектуального анализа. Формула валидного показателя «мощность прибыльного предприятия» [11].

Детали моделей из группы 2 изложены в [5,8-11]. В статье [11] обоснована необходимость применениянa практике телекоммуникационных компаний вычисляемого показателя «мощность прибыльного предприятия» в качестве ключевого показателя (KPI), применяе мого (контролируемого) в планах стратегии развития бизнеса. Стандартные ключевые показатели в настоящее время неправильно отражают эффекты работы предприятий, а «мощность прибыльного предприятия» измеряет то, нужно, поэтому он предпочтителен для применения в практике работы предприятий.

Из третьей группы когнитивных поведенческих моделей выделим когнитивную модель изменчивости показателей отрицательной селекции индивидов [0], из применения которой получены несколько содержательных знаний-выводов для фактического (наблюдаемого в сегоднящей жизни) поведения индивидов, попавших под действие формализованного нами закона отрицательной селекции (П.Сорокин) и его последствий.

Когнитивная модель изменчивости показателей отрицательной селекции основана на математической модели изменчивостй некоррелированных валидных, коррелированных z-переменных с управляемыми значениями дисперсий (вычисляемых и моделируемых). Модельные изменчивости показателей, соответствующие закону отрицательной селекции, показателей «потери индивидом «чувственной культуры» (следствие закона отрицательной селекции) адекватны реальным. Взаимные динамики рядов собственных изменчивостей смоделированных показателей точно соответствуют заданным значениям измерителей тесноты связи ([37], Рисунки 1,2,3,4,5,6,7). Получены несколько содержательных выводов (цифровых знаний) для поведения индивидов, попавших под действие формализованных нами [37] закону отрицательной селекции и его последствиям, например: «при постоянном убывании «стремления к самостоятельности» (из-за отсутствия необходимости в этом: зависит от других факторов) при законе отрицательной селекции жажда власти более выражена, ее тренд не убывает, колебания высоки, сильнее выражены, чем у «лени». Выводы сформулированы по m=36 (3 года) значениям каждого из модельных переменных. Сопоставимость кривых основана на аксиоме о собственных отклонениях.

Изучены особенности математической и когнитивной моделей изменчивостей показателей отрицательной селекции и показателей «потери индивидом «чувственной культуры» [37].

Описания когнитивных моделей из третьей группы и детали их применения в других предметных областях: когнитивная модель измерений изменчивостей неизмеряемых показателей сознания индивида [29], когнитивная модель структуры муниципального органа по мониторингу моральной среды для подвидов человеческих ресурсов [28], когнитивная модель оцифровки показателей индивидуального сознания цивилизованного предпринимателя [25], когнитивная модель образовательной, научной работ профессора университета [30].

Модель цифровизации поведенческой модели с ошибками невозвратных затрат (Digitalization of the behavioral model with errors of non-returnable costs) является приложением теории перспектив 1-го поколения (Thaler R.H.-лауреат премии Нобеля по экономике за 2017г.) [24]. Модель цифровизации поведенческой модели с ошибками невозвратных затрат реализовала оцифровку ситуаии подталкивания человека к индивидуально оптимальным решениям и ситуацию подталкивания индивида к антиобщественным решениям: «купить диссертацию … и получать стимулирующие выплаты» [24]. Модель может применяться для описания и объяснения целогоряда решений, не вписывающихся ни в какие канонические теории рационального экономиического выбора.

Когнитивная модель оцифровки показателей индивидуального сознания цивилизованного предпринимателя изложена в статье [25], когнитивное моделирование изменения цен и денежных затрат населения Республики Казахстан – в [8], когнитивное моделирование зависимости количества телефонов в квартирах от изменения доходов и расходов населения Республики Казахстан – в [9], когнитивное моделирование зависимости количества индивидуальных телефонов на предприятиях от изменений в структуре доходов и расходов предприятий – в [10], формула валидного показателя «мощность прибыльного предприятия», назначенного как новый ключевой показатель (KPI) получена при когнитивном моделировании [11]. Стандартные ключевые показатели в настоящее время неправильно отражают эффекты работы

предприятий, а «мощность прибыльного предприятия» измеряет то, нужно, поэтому он предпочтителен для применения в практике работы предприятий.

Когнитивная модель образовательной, научной работ профессора университета [30] позволяет реализовать реалистичную рейтинговую оценку рейтинга ППС вуза. Когнитивная модель оцифровки показателей индивидуального сознания цивилизованного предприни мателя предназначена служит инструментом реформирования бизнеса страны.

Когнитивный компьютинг хорошо проявлен в приложениях в разных предметных областях. Приложения моделей на проведенных «натурных» экспериментах над «живой» системой, где происходят (произошли) процессы, события, «живой» системе: в семье, на предприятии, в районе, в области, в сознании индивида, циыилизованного предпринимателя.

Реальность оказалась гораздо интереснее и сложнее [3,4,7-11]. Без субъективного восприятия, без субъективных критериев компетентного индивида нельзя обходиться в моделях поведенческой экономики, поведенческой финансов – новых отраслей науки, изучающих жизнь индивидов в разных ситуациях (Live Science).

В статьях [5,8-11] формализуются и моделируются «процессы системной дезинтеграции, происхо дившие в экономике (народном хозяйстве), социальной структуре, общественной и политической сфере привели к появлению в Казахстане небольшого количества крупных доходных и недоходных предприятий с инвестициями в основном капитале. В неприятные, непонятные ситуации попали как работодатели, так и менеджеры, наемные работники и население страны».

Когнитивный компьютинг имеет приложения в финансовой инжнерии и в инжнерии технических систем. Учет индивидуального поведения дилеров и интересов финансового бизнеса реализован в моделях расчета риска изменения процентной ставки «доходность до погашения» по государственным ценным бумагам республики казахстан, номинированным в тенге, в долларах [19,20].

В статье [38] разработана цифровая модель работы гидромотора. Рассмотрены реальные измерения в технической системе агрегат-гидромотор.Выявлен факт: 3-мерные реальные выборки $Z^{(1)}_{mn}$,$Z^{(2)}_{mn}$,$Z^{(3)}_{mn}$,$Z^{(4)}_{mn}$, m=45,n=3, имеют одинаковые «цифровые портреты», а при анализе 4-х таблиц стандартизованных данных, выявлены скрытые (неизмеряемые, но вычисляемые) показатели работы гидромотора. Вычислены 2 существенных показателей y_1, y_2) с имнами-смыслами «мощность, потребляемая гидромотором на вращение с управляемой частотой оборотов гидромотора и поддержание уровня давления» (y1) и «регулируемая частота оборотов «механизма X» (y_2). Цифровые портреты ([38],Таблица 1,Таблица 2) и модельные формализации разработаны в виде линейных уравнений изменчивости переменных (измеренных и вычисленных) и в виде многомерных уравнений когнитивных смыслов изменчивости переменных. Номинальная мощность гидромотора распределяется на сумму из 3-х локальных мощностей: 36.650916% от номинальной мощности гидромотора плюс 36.650916% мощности гидромотора, затрачиваемой на регулирование перепада давления в гидромоторе, плюс 26.697889 % траты мощности гидромотора на обеспечение нужной частоты оборотов гидромотора».

Когнитивные вычисления по сути проводятся с помощью двух арифметических операций сложения и вычитания, что соответствует натурным действиям приумноженя, убавления (в разы). Это соответствует когнитиности смысловых многомерных уравнений.

При когнитивной цифровизации работы технической системы необходимо оперировать с числами без единиц измерения, можем умножать или делить их друг с другом. Например, числовые значения с единицами измерения физических величин кВт, мПа, обороты/мин должны подвергаться арифметическим операциям умножения, деления, сложения, вычитания. Тогда получаемые результаты не имеют единиц измерения. Единицы измерения физических величин кВт, мПа, обороты/мин при статистическом анализе взаимосвязей должны заменяться безразмерными числами.

Если число a умножается на число 1+e (увеличивается при сложении), то к значению числа a прибавляется число ae. Если число a делится на число 1+a (уменьшается при вычитании), то от числа a вычитается число e, уменьшенное в 1+e раз. Таким образом при арифметических операциях с числом a, имеющим размерность (например, м), его значение либо увеличивается на ae, либо уменьшается (a/(1+e)=(a+ae-ae)/(1+e)=a-[ae/(1+e)]) на величину ae/(1+e). Следовательно эти 2 изменения значения числа a отклоняют влево на величину ae\(1+e), вправо на величину ae. спинимать как изменчивость величины a в тех же единице измерения (например, в квт). Об изменчивости мощности любого механизма он хорошо осведомлен.

В приложения применяются требуемые модели такие как модель расчета субъективных вероятностей в бизнесе, обратная модель множественного линейного регрессионного анализа [15].

Сформирована База знаний (текстовые файлы)- совокупность фраз и правил (критериев), матриц индикаторы знаний, объединенных Единый инфо-объект [39]. К ЕИФ прилагается ЕЦО – цифровой, содержащий входные и выходные объекты. База знаний из выбранной предметной области.является важнейшей частью настольной экспертной системы как модели поведения экспертов в определённой области знаний с использованием процедур логического вывода и принятия решений, экспертных систем

Результаты исследований и проведенных когнитивных вычислений, фрагменты сложных расчетов по применению когнитивных моделей решения прямой задачи цифровизации взаимосвязанных показателей с заданными именами-смыслами и заданными индикаторами наличия извлекаемых знаний из пары матриц A^{+}_{qp}, B^{+}_{pp} сохраняются в ЕИФ и ЕЦО, обновляются, уточняются.

Подсистема интеллектуального анализа БС - полсистема извлечения знаний в Экспертной Системе биллинга, развивается с появлением новых решений и других проблемных ситуаций.

Извлечение цифровых знаний из числовых реальных данных- превращение данных в значимую информацию за счет применения различных инструментов и технологий (например, разработки математической модели и многомернх уравнений когнитивных смыслов изменчивостей переменных), направленных на получение требуемых знаний и/или ценности.

ЕИО и ЕЦО ценны при отсутствии «натурного» эксперимента над «живой» системой (в сознании индивида, в семье, на предприятии, в районе, в области, в отрасли экономики, республике). Эксперимент над моделью системы или игра над моделью во времени – модельные данные, равные значениям признаков объектов, если процесс измерений дорог, невозможен или недопустим (опасен).

Заключение

Мы изложили теоретические, прикладные результаты, использовались таблиц реальных данных, вычислительные и модельные расчеты по таблицам реальных данных. Убедились на что и как нацелен когнитивный компьютинг. Увидели как и при каких математических условиях (при формализации неформализуемого явления, события) возможно создание требуемых (наличие уместности для более широкого развития) интеллектуальных экспертных систем, которые могут решать поставленные задачи с участием человека.

Проведены исследовательская, аналитическая, вычислительная работы по разработанным прикладным программам углубленного анализа многомерных данных. Математическое, алгоритмическое, программное обеспечения для реализации приложений когнитивных моделей 3 типов.

Решаемые задачи при эксплуатации указанных программ когнитивного компьютинга (в приложениях моделей) являются новыми. Разработанные математическое и информационное обеспечение использовались в АО «Народный банк Казахстана» [19,20], в подсистеме извлечения знаний ЭС биллинга. Наше ПО дополняет по функциям ранее внедренные в АО «Казахтелеком» прикладное программное обеспечение поддержки актуальных бизнес- и информационных процессов биллинга. Результаты анализа из подсистемы извлечения знаний должны изменять приносящие доходы бизнес-процессы АО «Казахтелеком». Компьютерные программы вошли в состав функционального наполнения ППП «Спектр» [36]. Входные текстовые файлы с расширением *.inp, выходные текстовые файлы с расширением *.out файлы и описания используемых моделей, алгоритмов, реальных цифровых данных.

Научное обоснованное теоретической (модельной) адекватности полученных модельных многомерных данных обязательно подтверждается визуализацией взаимных динамик нескольких показателей. Эти графики наглядно показывают то, что должно быть в действительности. Не возникает сомнений по «работе» когнитивного компьютинга, по уместности когнитивных допущений. Описание вычислительных экспериментов (с применением виртуальной БД) когнитивного компьютинга – тема отдельной статьи.

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CLUSTERS IN THE CONSTRUCTION INDUSTRY - INTEGRATION, INNOVATION AND CRITERIA FOR ECONOMIC GROWTH (ON THE EXAMPLE OF THE REPUBLIC OF UZBEKISTAN)

Abstract: *The more industrialized the construction industry, the higher the economic and export potential of the state and the higher the well-being of the people. This article discusses the creation of infrastructure based on advanced technologies, the introduction of a cluster approach in the construction industry, as well as the analysis of regulatory documents in the field of construction in the Republic of Uzbekistan.*

Key words: *construction, industry, economics, technology, cluster, innovation, construction economics, investment, building materials, manufacturing, clusters, innovation, regional development.*

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Introduction

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In our country, measures are being taken for the rapid development of the construction sector. In the process, special attention is paid to increasing the volume of production of new types of competitive building materials, aimed at export, and meeting the domestic need for these products. This creates broad opportunities to support local and foreign entrepreneurs.

The draft decree of the president of the Republic of Uzbekistan "On the strategy of modernization, rapid and innovative development of the construction sector of the Republic of Uzbekistan for 2020-2025 year" [1] has been developed. In this project, the main directions of modernization, rapid and innovative development of the construction sector of our country were defined as:

- digitalization of the construction industry by creating additional subsystems and databases;
- modernization of the regulatory framework in the field of urban planning and adaptation of foreign normative documents;
- improvement of the system of development of residential areas;
- to improve the position of the Republic of Uzbekistan in the international index of "Doing business" on the indicator of "Obtaining building permits" by simplifying certain procedures of granting permits in the field of construction;
- develop the mortgage loan market and the construction of apartment houses by attracting a wide range of population funds for the construction of

houses on the basis of the inclusion of shares in the construction of residential real estate;

- implementation of innovative technologies in the development of building materials and construction of objects;
- step-by-step transition between participants of investment projects to the indicators that are summarized in mutual calculations;
- improvement of the system of examination work by abolishing state examination in the estimate section of the project;
- improving the quality control system of construction by directing state, author and technical control to the non-governmental sector;
- establishment of modern project institutions with participation of advanced foreign companies by realization of shares package to advanced foreign investors;
- improvement of the system of Organization of training, retraining and professional development of personnel in the field of construction, considering the application of modern and innovative methods of teaching;
- formation and consolidation of the Institute of non-governmental customers, considering the liberalization of public segments, in the implementation of projects from the account of public sources of financing and equated resources to them;
- development of scientific potential in the field of construction and architecture by increasing the efficiency of fundamental, Intermediate and applied scientific research and developments;
- to meet the requirements for labor protection and safety techniques in the performance of construction and installation works in construction sites;
- development of human capital, improvement of material and technical supply of the activities of construction agencies and institutions, creation of new ways of social and material stimulation of workers.

Main part

According to the State Statistics Office of the Republic of Uzbekistan, today Tashkent has a significant share in the formation of the investment and construction complex of Uzbekistan and plays a special role [2].

The number of registered enterprises in the country amounted to 419.5 thousand for January 1, 2020, of which 38.1 thousand correspond to the construction sector. In addition, the total number of operating enterprises accounted for 398.1 thousand, 9.1 percent of them are in the construction sector [3].

In order to further deepen the reforms in the field of construction, reduce bureaucratic obstacles, broad introduction of innovative ideas, developments and advanced information and communication technologies, as well as to ensure transparency at all stages of construction, the president of the Republic of Uzbekistan signed the decree № PD-5963 on March 13, 2020 “On additional measures to deepen reform in the field of construction of the Republic of Uzbekistan” [4].

In this decree, the following main tasks were identified:

- the existence of project-estimate documents agreed before the withdrawal of funds for the construction of houses on the basis of the inclusion of a share, limiting the purposeless use of the funds of those who added a share, which is concentrated in the bank accounts of the building organization;
- maintaining a single register of construction organizations attracting funds for participation in construction on the basis of compulsory state registration of contracts for participation in construction on the basis of share inclusion and share inclusion;
- organization of short-term training courses on training and retraining of construction workers, ensuring the issuance of professional certificates by the Ministry of higher and secondary special education;
- creation of electronic rating of project and construction-contract organizations.

Thanks to innovative technologies, most of the production facilities produce new building materials for the construction enterprises of the cluster. Speaking about the advantages of the cluster in construction from other production structures, this single technological chain, which is a set of combined enterprises and links, which at the same time determine a new stage in the transition to an innovative economy in this area. This is of great importance in the deepening of the integration of science, education and production, and the rapid introduction of new innovative technologies into practice [5].

It is worth mentioning that during his visit to the Chilanzar district of Tashkent in 2017, the head of our state got acquainted with the project of the Orient Ceramic enterprise and gave instructions for the implementation of the construction process in a batch mode in order to complete it on time and efficiently. After that, the company was allocated 3.6 hectares from the territory of Chilanzar district. Over the past time, the building of the modern enterprise has been modernized and installed equipment for the production of ceramic products and tiles [6].

The total cost of the enterprise, which started operations in July 2020, is about $ 14 million, and the production capacity is 3.6 million square meters of ceramic products per year. At the moment, there are 270 workers and specialists working here [7].

It is important to note that almost 100 percent of the company's products are made from local materials. Currently, 30 percent of the company's products are exported to Kazakhstan, Tajikistan, Kyrgyzstan and

Afghanistan. In recent months, construction materials worth $500 thousand have been sold abroad [8,9].

Therefore, the creation of a cluster requires the integration of scientists and specialists of the construction industry to increase the project potential and best practices in a single whole. Therefore, when developing a new project, proposals were made to create a scientific and technical council, a scientific center and a Training Council with the participation of leading scientists, specialists of research centers, as well as entrepreneurs not only from Uzbekistan, but also from abroad [10].

Simply put, a construction innovation cluster is a production method that unites contractors in the implementation of a construction project into a team within the project. In this process, the interests of all participants are coordinated. That is, the supplier of raw materials and all other project participants will be equally responsible for the quality of the product. This can not only increase the duration of the activities of construction organizations, but also give their activities an expansion of opportunities.

Conclusion

The fact that the state chooses the path to the development of the digital economy opens up new directions in the field of Information Technology and, in general, the turnover of electronic documents. And the use of the cluster in the construction network is driving the economy of the country.

In our country, measures are being taken for the deep processing of local products. In this process, special attention is paid to increasing the production of new types of competitive building materials aimed at export and meeting domestic needs. This creates a wide range of opportunities to support local and foreign entrepreneurs such as:

- coordination of national regulatory documents based on the study and analysis of international norms, rules and standards in the field of construction;
- development of measures to improve the energy efficiency of buildings, structures and their individual elements, as well as measures to improve the energy efficiency of buildings and structures;
- creation and maintenance of a scientific and technical library and an electronic database of normative, including foreign documents;
- by cooperating with foreign and international organizations, specialists and involving them in improving the base of national regulatory documents, we can say that we can contribute to a slight increase in the economic indicators of our country.

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