BELGOROD STATE NATIONAL RESEARCH UNIVERSITY
DEPARTMENT OF FOREIGN LANGUAGES AND PROFESSIONAL COMMUNICATION,
INSTITUTE OF CROSS-CULTURAL COMMUNICATIONS
AND INTERNATIONAL RELATIONS

WE MAKE THE FUTURE

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This book is a collection of students’ articles written to present the most interesting and important universal scientific ideas and researches.

БЕЛГОРОДСКИЙ ГОСУДАРСТВЕННЫЙ НАЦИОНАЛЬНЫЙ ИССЛЕДОВАТЕЛЬСКИЙ УНИВЕРСИТЕТ
КАФЕДРА ИНОСТРАННЫХ ЯЗЫКОВ И ПРОФЕССИОНАЛЬНОЙ КОММУНИКАЦИИ
ИНСТИТУТ МЕЖКУЛЬТУРНОЙ КОММУНИКАЦИИ И МЕЖДУНАРОДНЫХ ОТНОШЕНИЙ

МЫ ДЕЛАЕМ БУДУЩЕЕ

Выпуск VI

Сборник студенческих статей по итогам работы межинститутского круглого стола „WE MAKE THE FUTURE“

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W 37 **We make the future** (Мы делаем будущее): сборник студенческих статей по итогам работы межинститутского круглого стола „WE MAKE THE FUTURE“ (сентябрь–декабрь 2020 г.) / Под ред. Л.В. Цуриковой, Е.Н. Тарановой, Е.А. Карабутовой. – Вып. VI. – Белгород, 2020. – 72 с.

Сборник студенческих статей охватывает широкий спектр актуальных проблем современной науки, отражает результаты теоретических и научно-практических исследований студентов специалитета, бакалавриата и магистратуры очной формы обучения неязыковых специальностей.

SECTION 5. LEGAL SCIENCE

SECTION 6. ENGINEERING TECHNOLOGY

SECTION 1. NATURAL AND HUMANITARIAN SCIENCES

URBANIZATION AS A GLOBAL PROCESS OF MODERNITY

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The article is devoted to a current issue – the global process of urbanization. The article deals with the essence of the urbanization process, in particular, the definition of the term of this process, the course of its development and the location of its main centers at this time on a global scale. In addition, the article also investigates the prospects for further development of this process.

Keywords: *urbanization process, urban population, modern world, stages of urbanization, urban agglomerations*

The modern world is becoming more and more urbanized, it is an undeniable fact of our time. At the present time, almost half of the world's population lives in densely populated cities, and every year the proportion of urban dwellers is steadily increasing.

The process of urbanization is inextricably linked to the socio-economic development of both individual states and human society as a whole. And in this regard, given the increasing pace of development and improvement of economic indicators of many countries in the world, the process of urbanization also began to develop at a very rapid pace, affecting many socio-economic events taking place in the 21st century.

However, against the background of these prospects, with the increase in the pace of development of the global urbanization process at present, numerous problems of global scale begin to emerge, ranging from environmental to socio-economic, caused, first of all, by contradictions in the structure, functioning and development of the main object of this process – urban agglomerations.

The main purpose of this article is to analyze and study the process of urbanization throughout the modern world.

In order to achieve this goal it is necessary to consider the following tasks:

- to examine the essence of the process of urbanization and the causes and consequences associated with it;
- to identify the main and prospective centers of the urbanization process;
- to identify the characteristic features of the urbanization process in developing countries.

Taking into consideration the information from open electronic book and written sources, and on the authoritative opinions of scholars in the field of urbanism, it is possible to draw the following conclusion about the essence of the concept of the process of urbanization.

Urbanization is the process of increasing the roles of cities, the establishment of a certain urban culture and the increase in the urban population due to a higher socio-economic level, compared to the countryside. Scientists nowadays observe the natural population growth which is connected with migration. These factors become the important reasons in the rapid growth of urban areas in the developing countries. They can explain this process by better medical care, spreading norms of hygiene and food availability. All these may lead to lower death rates and encourage the increase of the population. Most developing countries face the situation when being extremely poor people rush to change their rural homes by the urban dwellings because only in large cities they can find job, food, and better future for their children.

The process of urbanization undergoes a number of successive stages, or stages, in its development, which are distinguished by various specialists and scientists in the field of urbanism.

One of them was the classification of the stages of development of the urbanization process by the famous geo-urbanist Jack Gibbs (1963), who distinguished five stages.

The stages of population concentration can be the following:

1. Cities come into being, but the percentage increase of the rural population equals or exceeds the percentage increase of the urban population at the time cities first appear.

2. The percentage increase of the urban population comes to exceed the percentage increase of the rural population.

3. The rural population undergoes an absolute decline.

4. The population of small cities undergoes an absolute decline.

5. There is a decline in the differences among the territorial divisions with regard to population density, that is, a change toward a more even spatial distribution of population [1].

This classification is still relevant today.

The spatial differentiation of the process of urbanization in the modern world is very large and varied.

Urbanization is a process that has led to a global urban system including several mega-cities. Although an urban region is rarely a jurisdictional entity, it is a functional spatial unit that can take three main forms:

– Urban corridor;

– Extended Metropolitan Region (EMR);

– Mega Urban Region (MUR).

Mega urban regions do not have formal names since they are not official jurisdictional entities. Therefore, they are usually labeled either by a significant common physical feature (e.g. a river delta) or by the name of their two most important cities (or the cities at its respective ends). Still, this naming can be subject to contention and different alternatives have often been advocated.

The world has about 40 mega urban regions and extended metropolitan regions with the urban regions on the above map accounting for a population of more than 1 billion people. The world's most important urban regions are found in Asia. For instance, the MURs of the Yangtze River Delta, the Tokaido corridor and the Pearl River Delta have respectively populations of 88, 80 and 70 million inhabitants. They represent the largest accumulation of urban infrastructure on earth. The only true transnational MUR is the Rhine/Scheldt Delta that spans Belgium, the Netherlands and Germany with a population of 26 million. Singapore – Kuala Lumpur is also a transnational MUR, but to a lesser extent. The United States, mostly because of its high level of economic development and its integrated national economic system, has several large MURs, with BostWash (Boston-Washington; 44 millions) and ChiPitts (Chicago-Pittsburg; 54 millions but the urban region is more diffuse and less integrated) being the most significant [2].

Today, 55% of the world's population lives in urban areas, a proportion that is expected to increase to 68% by 2050. Projections show that urbanization, the gradual shift in residence of the human population from rural to urban areas, combined with the overall growth of the world's population could add another 2.5 billion people to urban areas by 2050, with close to 90% of this increase taking place in Asia and Africa, according to a new United Nations data set launched today.

The 2018 Revision of World Urbanization Prospects produced by the Population Division of the UN Department of Economic and Social Affairs (UN DESA) notes that future increases in the size of the world's urban population are expected to be highly concentrated in just a few countries. Together, India, China and Nigeria will account for 35% of the projected growth of the world's urban population between 2018 and 2050. By 2050, it is projected that India will have added 416 million urban dwellers, China 255 million and Nigeria 189 million.

Thus, the most urbanized regions comprise Northern America (with 82% of its population living in urban areas in 2018), Latin America and the Caribbean (81%), Europe (74%) and Oceania (68%). The level of urbanization in Asia is now approximately 50%. On the contrary, Africa remains mostly rural, with 43% of its population living in urban areas.

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THE IMPORTANCE OF USING PR TECHNOLOGIES IN CULTURE

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The article examines the position of public relations in the modern world. The concept of "public relations" is revealed and the main goals, tasks and principles of PR-activity are touched upon. The author describes specifics of organizing public relations in activities of a state institution of culture as well as the stages of organizing and conducting PR campaigns in the field of culture.

Keywords: *Public Relations (PR), advertising, PR activity, cultural institutions, culture, art*

There are modern, actively developing and attracting attention multidirectional specialistsin the field of public relations. The aim of organizing procedure of public relations activities is optimization of relationship of the basic subject of PR with its target audiences at certain time and place.

According to the opinion of an American researcher, “public relations is a management and coordination function that contributes to the maintenance of mutually beneficial relations between an organization and public, on which its success or failure depends” [Cutlip 2016: 34]

Obviously, public relations (PR) are considered to be a certain type of activity related to management and assuming its certain organization, coordination of the efforts of participants, etc. A number of authors use the term “science” and “art” to define public relations. Some authors consider PR a mechanism of social management.

Let's make a brief analysis of the above mentioned definitions. Almost all authors point out the informational nature of this activity, emphasize that the process of mutual understanding is carried out on the basis of the transfer of information and organization of feedback. The authors pay attention to the truthfulness, reliability of information (ethical aspect) and its completeness. In addition, publicly available information used in public relations should be necessary and sufficient. Considering PR a concept independent of public opinion is also imprecise. “Public opinion is the most important factor influencing public relations policy” [Krivonosov 2011: 56]. The task of specialists and public relations services is to create a certain dependence of public opinion on the goals of the subject of public relations.

PR activities of cultural product are carried out by various institutions, public and state organizations, as well as individuals. A public relations professional consciously interprets messages and creates pathways for their dissemination.

Why does the cultural sphere need PR? An advertising campaign is a fairly effective method of promoting products, influencing the sales and profit of any enterprise. As for cultural institutions, advertising will stimulate an influx of visitors, consumers of services, and it affects the popularity of the offered products and the functioning of the organization as a whole. “The emphasis on advertising as a component of the marketing mix allows increasing the number of potential consumers of cultural institutions' services, to create an image of the institution in order to improve the quality” [Kozlova 2008: 103].

However, it should be remembered that the forms and methods of use of advertising are so diverse that it is difficult to draw any conclusions about specific qualities. Moreover, in order to achieve the greatest communication effect, cultural institutions need to coordinate not only the incentive complex but the entire marketing complex as well.

Nevertheless, in the process of conducting an advertising campaign, any methods should be taken into account, since the specifics of fashion product promotion requires a variety of means and forms. It is noted that “advertising is the most effective way of communicating influence on the consumer of the service market, and it is the use of advertising media that contributes to the prosperity of cultural products” [Utkin 2008: 73]. The most effective thing is the advertising campaign that uses various media.

Today, cultural and art institutions are increasingly rethinking their activities, this is due to a change in their role in the society. “Currently, cultural and art institutions are oriented and take part not only in cultural processes but also in social and economic ones, while continuing to remain centers of leisure” [Kozlova 2008: 145].

It should be mentioned that the audience of cultural and art institutions has expanded significantly, and the needs of the audience in the field of leisure activities are changing dramatically.

The subject of cultural struggle of various cultural and art institutions is free time of population, and as a result, it needs innovative developments and technologies to create competitive advantages.

Today cultural institutions are no longer monopolists in the cultural services market. The sphere of culture is improving and developing in conditions of competition (external and internal), and it must be admitted that shopping and entertainment centers and enterprises are becoming the main competitors in the leisure market of population.

The area of culture and arts currently has an extensive package of proposals for implementation. The effectiveness of implementation (sales) directly depends on the extent which enterprises in this area are able to turn a cultural product into a commercial product.

“The subject of PR activity in the field of culture is a group of people who perform certain tasks and specific actions with the aim of building favorable relations with the audience and making certain amendments to the process of transforming the image of the PR subject, his strategy and tactics”

[Cutlip 2016: 37]. The subject of PR seeks to transmit and convey the usefulness of the functioning of a particular institution to the present and potential clients. It can be both a person and an organization.

"The object of PR is target groups, which are influenced by the subject of public relations" [Cutlip 2016: 38]. An object in the process of interaction usually becomes a subject, because we often see interaction and feedback in practice.

The main tasks of PR activities in the field of culture are the following:

1) formation of cultural institution image as a full-fledged member of society by means of establishing interaction between various groups with its social environment;

2) expanding the importance of institutions in the society;

3) formation of institutions among authoritative, main and well-known politicians, various scientists, professional workers of arts, culture, education, etc;

4) creation of psychological atmosphere in the organization itself with the aim of solving institutional problems.

Also, one of the tasks of PR is the settlement of crisis situations, which is characterized by knowledge of potential threat and the availability of plans for its resolution, namely:

• planned exit from crisis situations;

• training;

• establishing the structure of notification;

• informal lists of stakeholders, etc.

Thus, it's possible to conclude that the main functions of PR activities, including the field of culture, are:

1) correctly built mutual benefit of the organization and the public, as well as relationship of trust between organizers, transparency of information. The popular English specialist in this field S. Black believes that this approach is the main one;

2) the emphasis on the exact rules of mass consciousness impact on relations between people, various kinds of organizations and public, ardent rejection of subjectivity.

Between PR and culture as a system of origin, there is a set of social experience, deep and multifaceted connection based on the key functions of socio-cultural activity:

• development –it has the aim to get knowledge in various fields of science, culture and art;

• creativeness –it is realization of human creative abilities.

This means that "PR activity itself is the broadcast of an already well-established culture, manifestation of corporate identity, consistent with the society and the image of the organization" [Krivonosov 2011: 21]. The next characteristic is: PR puts the position of the organization's activities in the full involvement of organization in culture. In addition, explicit actions and cultural PR projects quite daily carry out various events where various artists perform. The participation of various performers of institutions in PR (through sponsorship, various kinds of patronage) of commercial, industrial, political and other spheres is powerful, and perhaps, the main source of funding of culture and art.

The specific features of public relations organization in a state institution of culture activities are:

• the implementation of communicative function forces the state cultural institutions to expand their ties constantly;

• the activities of state cultural institutions are multidirectional and innovative and creative, this means that PR technologies create positive image of the organization as a whole.

“Since state cultural institutions are public organizations, they need to improve their social image, where the main characteristics are social responsibility and availability of offered cultural services” [Utkin 2008: 76].

State cultural institutions have advantages which allow them to run their own PR campaigns successfully and provide PR services to other organizations. This is due to historically established experience in promoting social ideas and shaping public outlook.

Thus, cultural institutions have a wide range of arsenal means and forms of organizing sociocultural activities, administrative and managerial technologies, professional competencies of creative workers, sustainable long-term connections with social partners and our own logistics base.

The main PR tools in the field of culture are mass media (mass and specialized), Internet, social networks, special events, building up communication with authors, sponsors, authorities, etc.

Summing up, PR-support is an integral part of the promotion of any cultural event. Today all over the world PR support is used in all spheres of activity. All this determines the use of new innovative approaches to promote cultural products, one of which is PR support. Thus, competent, systematic PR activities of executive authorities are becoming a strategic resource in cultural sphere and in the processes of interaction with the public.

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MEDIENBILDGESTALTUNG VON A. KRAMP-KARRENBAUER IN DER DEUTSCHEN PRESSE

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Annotation: *In dem Artikel geht es um die Gestaltung des Medienbildes einer bekannten deutschen Politikerin durch die Medien am Beispiel des Zeitschrifts „Spiegel“. Im vorgeschlagenen Material werden die stufenweisenden Veränderungen des Bildes der Politikerin auf der Grundlage der anschaulichen Bilder, die auf den Druckseiten erstellt sind, betrachtet. Zusätzlich zu allem wird eine lexik-semantische Analyse von Publikationen durchgeführt, die lexikalische Einheiten enthalten, die ein einheitliches Persönlichkeitsbild widerspiegeln.*

Stichwörter: das Medienbild, die Politik, der Kanzler, Annegret Kramp-Karrenbauer, die Semantik, das Vorwahlrennen

Die Weltpresse hat die Entscheidung von Angela Merkel, im Jahr 2021 nicht als Kanzlerin wiedergewählt zu werden, erschüttert. Von da an diskutierten die deutschen Medien intensiv über mögliche Bewerber um den Posten des Parteichefs der Christlich Demokratischen Union. Der Wahlkampf um Angela Merkels Nachfolgerin Annegret Kramp-Karrenbauer (AKK) war einer der Höhepunkte, skandalös und kurz. Dies ist zum einen auf eine Reihe von Fehlern zurückzuführen, die der Politiker bei der Auflösung des „Thüringer Kasus“ gemacht hat, zum anderen auf die überraschende Ablehnung von AKK als Parteichefin sowie auf die Teilnahme am Wahlkampf um das Amt der Bundeskanzlerin. Die lokale Presse hat alle Schritte, die Frau Annegret auf der politischen Bühne unternommen hat, ausführlich beschrieben und analysiert. Die genaueste und objektive Charakteristik ihrer Tätigkeit, unserer Meinung nach, wird auf den Seiten der Ausgabe mit der anerkannten weltberühmten Autorität – der Zeitschrift „Spiegel“ vorgestellt.

Die Aktualität der Forschung ist dadurch bedingt, dass das Thema der Kanzlerwahlen in Europa und in der ganzen Welt sehr populär und diskutiert ist. Gegenstand der Studie ist das Konzept des Medienbildes von Annegret Kramp-Karrenbauer, die von der deutschen Fachzeitschrift "Spiegel" widerspiegelt wurde.

Das Ziel der Studie: die Stadien der Bildung des Medienbildes der Politik zu identifizieren und zu erforschen. In diesem Zusammenhang werden die folgenden Aufgaben gelöst:

1) die von Annegret Kramp-Karrenbauer für den Zeitraum von Januar bis April 2020 Publikationen im Magazin „Spiegel“ sammeln und analysieren;

2) die Periodisierung der Texte im Zusammenhang mit der Änderung der Medien gegenüber der politischen Figur durchzuführen;

3) eine Lexikon-semantische Analyse der Publikationen in „Spiegel“ durchführen.

Medienbild ist ein komplexes und multidimensionales Phänomen, das heute nur an Popularität gewinnt. In der heimischen Geisteswissenschaft gibt es viele seiner Definitionen, die verschiedene Seiten des Begriffs charakterisieren.

D. D. Zilurik behandelt das Medienbild als „Vorstellung, ausgeprägte Techniken und Methoden des Journalismus“ [4]. E. N. Bogdan definiert es in seiner Dissertation als „ein besonderes Bild der Realität, das von der Medienindustrie einem Massenpublikum vorgelegt wird“ [1]. Unter solchen verschiedenartigen Interpretationen, die geräumig und geeignet für unsere Studie sind, steht im Vordergrund die Erklärung von T. N. Galinskaja: „Medienbild“ – das sind die Fragmente der Realität, die in den Texten nur professionellen Journalisten beschrieben werden, um Ihre Weltsicht, Wertorientierungen, politischen Präferenzen, sondern auch psychologische Qualität zu reflektieren“ [2].

Weiter werden wir untersuchen, wie die Korrespondenten des Zeitschrifts „Spiegel“ das Bild eines potenziellen Bundeskanzlers bilden und auf welche Techniken man dafür zurückgegriffen wird.

Die betrachteten Publikationen wurden in vier Perioden unterteilt, die bedingt genannt wurden: Nominierung, erste Fehler, Selbstverleugnung und Flaute. Der Beginn der ersten Periode zeichnet sich durch eine Reihe von neutralen Nominierungen als *„CDU-Vorsitzende“, „Politiker“* aus. Den Schwerpunkt legen die Korrespondenten auf die Tätigkeit von Annegret Kramp-Karrenbauer und nicht auf die Charakterisierung Ihrer Persönlichkeit. In den ersten Informationen zur Nominierung des neuen Kandidaten stellt sich AKK als Nachfolgerin von Angela Merkel vor: *„CDU-Chefin“, „Nachfolgerin“, „Wunschnachfolgerin“, „Kronprinzessin“*.

Diese Metaphern ermöglichen es den Korrespondenten, eine Parallele zwischen demokratischer und monarchischer Macht zu ziehen. Die Entstehung solcher Ausdrücke kann dadurch erklärt werden, dass das Auftreten von sogenannten „Schützlingen“ für das Demokratische System nicht typisch ist. Neben sprachlichen Elementen zeigt sich die Ähnlichkeit der beiden Politikerinnen auch nicht verbal. Die meisten Publikationen sind mit Fotos von Angela Merkel und AKK illustriert: ähnliche Frisuren, Kostüme, Gesten. Auf die Nachfolgerin setzt man große Hoffnungen, voraus, sie sind nicht nur äußerlich ähnlich, sondern sind auch gleichgesinnte, was bedeutet, dass sich die Partei weiter auf dem geplanten Kurs entwickeln wird. In einer Publikation wird Annegret beispielsweise als *„Eine der wesentlichen Politikerinnen dieser Stunde“* charakterisiert [15].

Nach der Ernennung von Annegret Kramp-Karrenbauer verfolgte die Öffentlichkeit die Aktionen des potenziellen Kanzlers genau. Seit Februar macht Frau Kramp-Karrenbauer erste Fehler. In dieser Zeit gibt es viele Veröffentlichungen mit negativen Konnotationen, in denen Korrespondenten viele der Handlungen des erklärten Kandidaten kritisieren. Also, im Material vom

24.01.2020 treffen wir uns: *„…Das Elend von Annegret Kramp-Karrenbauer begann mit einem Karnevalsscherz…“* [5]. Der CDU-Vorsitzende sprach auf der jährlichen Karnevalssitzung in Stockach in Baden-Württemberg. Als *„doofe Putzfrau“* [5] verspottete sie intersexuelle Toiletten, die Feinstaubdebatte und das Gewicht des Bundesministers für Wirtschaft und Energie Peter Altmeier. Sie wurde der Feigheit beschuldigt, als sie sich hinter der Rolle einer Putzfrau versteckte: *„Das hat etwas Feiges“* [5].

Viele Veröffentlichungen der zweiten Periode widmen sich einer weiteren schwerwiegenden Fehleinschätzung der Politikerin – der Thüringer Krise. Nach den Wahlen zur Regierung des Landes Thüringen unter der Führung von Thomas Kemmerich, einem Anhänger der liberal-frei-demokratischen Partei, stieg die Stimmung. Sie wurde bei den Wahlen von der konservativen CDU und der rechtsextremen Alternative für Deutschland (AfD) unterstützt.

Das Hauptproblem war, dass die rechtsextreme AfD-Partei an der Machtverteilung beteiligt war. Viele Politiker und Persönlichkeiten des öffentlichen Lebens nannten es einen Versuch, den Nationalsozialismus wiederzubeleben. In diesem Konflikt wählte AKK eine Position der Nichteinmischung, für die sie in der Presse kritisiert wurde. Der Korrespondent schreibt: „*Klar ist: Kramp-Karrenbauer hat die Lage in Thüringen völlig unterschätzt“* [10]. Wenn in der ersten Periode der Schwerpunkt auf der äußeren Ähnlichkeit zweier Politikerinnen lag, tritt jetzt der Unterschied in den inneren Qualitäten in den Vordergrund auf. Annegret wird nicht länger als Anführerin angesehen, wie die folgenden Ausdrücke belegen *„…Verlust von Führungsstärke und Durchsetzungsvermögen…“* [6], *„…Von Führungsstärke zeugt sie nicht“* [11].

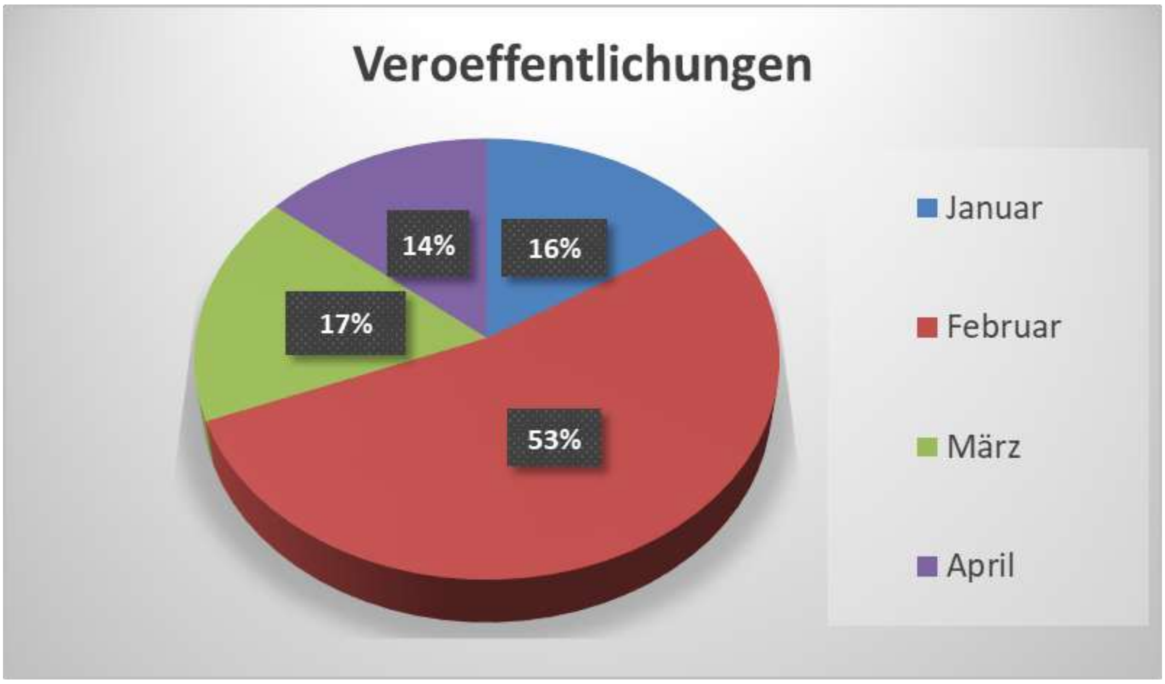
In vielen Veröffentlichungen wurde ihr Versagen als Führungskraft erwähnt. Der Karnevalswitz war ziemlich schnell vergessen, aber die Thüringer Frage trübte den Ruf der Politikerin: *„…Autorität in der Partei schwer angekratzt…“* [9]. In einer Publikation stellt ein Journalist eine Frage: *„Wenn sie diese Krise nicht bewältigen kann, wie soll sie dann Krisen als Kanzlerin beherrschen können“* [5]. So erleben wir die Veränderung des Medienbildes des Kandidaten für das Amt des Bundeskanzlers der Bundesrepublik Deutschland. Das Bild einer vielversprechenden Führerin, die sich der Wählerschaft als „zweite Merkel“ präsentiert, ist gegen die Kritik an Fehlern gebrochen. In dieser Phase wird A. Kram-Karrenbauer als „unvollkommenere“ Politikerin ohne Führungsqualitäten und mit einem beschädigten Ruf dargestellt.

Die dritte Welle von Publikationen über das AKK ist ihrem Rücktritt von der Position des Vorsitzenden der CDU und ihrer Teilnahme am Wahlkampf gewidmet. Es gibt auch negative Konnotationen, die Annegret charakterisieren: *„angeschlagen“* [11], *„gekürter Kanzlerkandidat“, „AKK gibt auf“* [12], *«angekündigte Rückzug»* [16]. Einige beschreiben diesen Schritt als Schwäche, während andere glauben, dass nur sehr wenige in der Lage sein werden, ihre Fehler zuzugeben und sich rechtzeitig zurückzuziehen. Hier erscheint erstmals eine positive Eigenschaft des Bildes. Zum Beispiel, *„Stattdessen verklärt sie ihren Rückzug als „Dienst an der Partei“* [8]. Eine solche Interpretation von Annegrets

Rücktritt ergänzt das Bild erheblich und humanisiert sie. Jetzt ist sie keine „ewig irrendere“ Politikerin, sondern eine Person, die ihren Überzeugungen und ihrer Partei treu bleibt. Viele Persönlichkeiten des öffentlichen Lebens akzeptierten ihre Entscheidung positiv. So schreibt der Korrespondent der Zeitschrift, dass Annegret nach dem Selbstentzug gefallen ist *„ ... ein warmer Regen von Respekts-, Solidaritäts-, und Betroffenheitsbekundungen nieder“* [13].

Die vierte Periode ist endgültig. Es gibt immer weniger Veröffentlichungen über Annegret. Darunter befinden sich mehrere analytische Materialien, in denen die Leistung des AKK im föderalen politischen Bereich eingehend untersucht wird. Die Autoren vermeiden direkte Bewertungen der Aktivitäten und der Persönlichkeit der Ex-Kandidatin selbst.

Die negative Konnotation ist jedoch in allen vier Perioden unsichtbar vorhanden. Zum Beispiel beschreibt ein Journalist die Selbstzurückweisung wie folgt *„…das tragische Scheitern einer Frau, die der Bundespolitik mit ihren Härten und Fallen nie gewachsen war“* [1]. Darüber hinaus treten Materialien über andere Kandidaten in den Vordergrund, die ihr Wahlkampf fortsetzen.



Empirisches Material. Während des Untersuchungszeitraums wurden insgesamt 339 Veröffentlichungen überprüft. Veröffentlicht im Januar – 16%, 51, Februar – 53% 180, März – 17%, 56 und April – 14% 47 Materialien.

So fällt der Höhepunkt der Veröffentlichungen über Annegret auf die Zeiträume ihrer Nominierung als Kanzlerin und der Begehung schwerwiegender Fehler. Dieser Zeitraum macht mehr als die Hälfte der Texte aus der Gesamtzahl der untersuchten Werke aus (53%). Nachdem sie sich geweigert hat, an den Wahlen teilzunehmen, nimmt das Medieninteresse an ihrer Person stark ab (17%). Bereits im März wurden dreimal weniger Texte gewidmet – 56. In einer relativ kurzen, aber ereignisreichen Zeit hat sich das Bild der „zukünftigen Kanzlerin“ Annegret Kramp-Karrenbauer auf den Seiten der Publikation verändert. Dies ist ein Weg von einer „Kopie“ von Angela Merkel zu einer Politikerin, die nicht bereit ist, die Pflichten eines Kanzlers zu übernehmen, die Fehler macht, diese aber zugeben kann.

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SECTION 2. SOCIAL SCIENCES, ECONOMICS

IMPROVEMENT OF LABOR MOTIVATION IN THE SYSTEM OF ORGANIZATIONAL BEHAVIOR OF EMPLOYEES OF BELCOLOR LLC

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The article deals with the prospects helping stimulate staff and highlights the importance of the effectiveness of organizational behavior, analyzes the economic indicators of a particular organization to improve employees' *motivation in accordance with the system of organizational behavior. LLC "Belcolor" is revealed from the point of view of its improving the motivation of labor in the system of organizational behavior of employees. Various measures aimed to create a system for stimulating organizational behavior among employees in "Belcolor" LLC are analyzed.*

Keywords: *limited liability company (LLC), organizational behavior, personnel management, management efficiency, total revenue*

Today, the degree of well-being of the company depends on the degree of labor motivation in it, and it directly corresponds to the way the company's management succeeds to transform the organizational behavior of employees. It is important to build an organizational system in such a way as to continuously increase staff commitment to the company and encourage employees to make the maximum contribution to the company. That is why the topic of improving labor motivation in the system of organizational behavior is relevant for managers and researchers involved in personnel management.

In this article, the object of the study is LLC "Belcolor", tending to improve the motivation of employees according to the system of organizational behavior. "Belcolor" Limited Liability Company is one of the leading companies in the paint and varnish materials market in Russia. It is specialized in the production of paint products and their sale policy.

Improving organizational behavior in "Belcolor" LLC is aimed to develop the efficiency of each employee's activity, so it's possible to consider the economic indicators per employee of the organization in the way it is presented in Table 1.

Table 1. Economic indicators per employee of "Belcolor" LLC

№	Indicators	Years			Deviation			
		2017	2018	2019	Absolute		Relative	
					2018/ 2017	2019/ 2018	2018 2017	2019 2018
1	Total revenue from sales of products, works and services, thousand rubles/person	6403,46	6981,95	6811,06	578,49	(170,89)	109,03	97,55
2	Gross profit (loss), thousand rubles/person	1164,68	1119,11	1143,86	(45,57)	24,75	96,06	102,21
3	Net profit (loss), thousand rubles/person	2,13	273,09	337,09	270,96	64	12821,13	123,44

The table shows that the amount of total revenue from sales of products, works and services for the period under study, calculated for each employee, did not have sharp declines in an increase that is, in general, it was stable, as was the size of gross profit. The amount of net profit per employee tends to increase sharply in 2018, as well as in 2019. The increase in net profit indicates the growth of production and sales, the proper use of production space and available human and other resources.

It is possible to analyze the effectiveness of organizational behavior in "Belcolor" LLC through the formulas for calculating Management efficiency, the Coefficient of management expenses per unit of product sold, the Coefficient of management efficiency due to labor productivity growth, and Dynamic management efficiency. The necessary indicators are shown in Table 2.

Table 2. Indicators for determining the effectiveness of organizational behavior in "Belcolor" LLC

Indicator	**2018 year**	**2019 year**
Profit in thousands of rubles	36 038	39 446
Total expenses of the organization in thousands of rubles	72 742	74 351
2019 year		
Management expenses in thousands of rubles	27 246	
Labor productivity in thousand rubles	6 811,06	
Volume of products sold in thousand rubles	74 351	

The calculation results of organizational behavior performance indicators are shown in Table 3.

Table 3. Performance indicators of organizational behavior in "Belcolor" LLC

№	Indicator	Exponent value
1	Management efficiency	1,45
2	Coefficient of management expenses per unit of products sold	0,53
3	Coefficient of management efficiency due to labor productivity growth	0,25
4	Dynamic management efficiency	4,28

Based on the results of the calculations, the system for forming organizational behavior in "Belcolor" LLC needs to improve the system for stimulating organizational behavior, which will affect the increase in labor productivity and the functioning of the organization as a whole.

To improve organizational behavior in "Belcolor" LLC, non-material forms of labor incentives are used. Therefore, measures are needed to improve the socio-psychological climate in the organization. They allow increasing the attachment of employees in the company, thereby increasing the productivity of each employee and the entire company. These activities are shown in table 4.

Table 4. Measures to improve the organizational behavior of employees in "Belcolor" LLC

№	Name of event	Responsible persons
1	Training on strengthening business and interpersonal relationships at the enterprise	Head of HR Department
2	Information meeting "Results of the year"	General Director
3	Improving the workplace of management personnel	Head of sales
4	Holding a week of "Delegation of authority"	Deputy General Director
5	Master class of specialists from different departments	Head of HR Department
6	Training "New technologies in the production of paint materials"	Chief specialist in paint products

Conducting training on strengthening business and interpersonal relationships at the enterprise can give employees the chance to gain knowledge about the rules of communication in the team and the importance of favorable business relationships, and increase employee motivation for effective organizational behavior. The "Results of the year" information meeting allow establishing a dialogue with various employees of the divisions and preparing them for future events. And with the help of delegation of authority, managers will be able to establish effective formal relationships between people in the organization, involve employees in the management decision-making process, and strengthen the organizational culture. A master class of specialists will allow employees to realize their creative potential, thereby increasing their attachment to the organization. Conducting training of specialists through new technologies in the production of paint and varnish materials will increase the professionalism of employees; unite employees on a professional basis.

Thus, all of the above measures are aimed to create an incentive system for stimulating organizational behavior among employees in "Belcolor" LLC.

The social performance assessment of the following results is shown in Table 5.

Table 5. Social effects of improving the system of stimulating organizational behavior of employees in "Belcolor" LLC

The subsystem of personnel management	**Results**	**Indicators**
Subsystem of working conditions	Ensuring compliance with the requirements of technical aesthetics	Increase in the proportion of employees who are satisfied with their working conditions
The subsystem of labour relations	Ensuring compliance with the rules of relationships	Percentage of employees who are satisfied with their relationship with management
The subsystem of social development	Implementation and development of individual abilities of employees	Increasing the share of employees who improve their skills
	Ensuring mastery of the organization's sociocultural norms	Reduced turnover due to dissatisfaction with development opportunities
The subsystem of motivation personnel behavior	Ensuring the link between performance and pay	Increasing the proportion of employees who express satisfaction with the awareness of the usefulness of work
	Providing personal development opportunities for employees	Percentage of employees who expressed satisfaction with the conditions for self-expression
	Creating a sense of employee involvement in the organization	

Thus, on the basis of some economic indicators of "Belcolor" LLC and the composition of the organization's staff it has become possible to analyze the effectiveness of organizational behavior among employees and, using the calculation of organizational behavior performance indicators, it was found that the organization needs to improve the incentive system for stimulating organizational behavior, which will affect the level of labor motivation.

To solve the above problems, a number of measures were developed to form an incentive system for stimulating organizational behavior among employees in "Belcolor" LLC. The proposals were evaluated for effectiveness. It was revealed that communication competence in the team will increase, that will have a positive impact on business relationships; employee involvement in the management decision-making process will increase; and attachment to the organization will increase. All the proposed activities will strengthen the organizational culture, thereby improving the motivation of employees in "Belcolor" LLC.

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INNOVATIVE CHANGES IN THE FIELD OF PERSONNEL MANAGEMENT

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The article touches upon some innovative technologies and the application of them in the field of personnel management, highlights the relevance of innovations in the personnel management system. If the Manager competently builds the work of the staff, introduces timely changes that further develop the company and thereby increase profits, increase the status, then this is a multifunctional and effective organization.

Keywords: *innovations, personnel management, innovative technologies, consumer, skills and abilities*

Today, the degree of well-being of an organization depends directly on the company's management. The Manager must have such competencies as: creativity, ability to solve complex problems, critical thinking, emotional intelligence, flexibility of thinking, and so on. In the 21st century, competition between "pumped" organizations is increasing every day. The trend of creating innovative approaches is very important, as it becomes a crucial factor for the company's success. That is why the topic of innovative changes in the field of personnel management is relevant and can become an example for many managers of those organizations who are afraid to introduce something new, do not take risks and lead an outdated, unclaimed organization.

The present article analyzes the term *innovation* in more detail. Innovation should be understood as an innovation that is in demand by the market and allows people to make their lives more comfortable, and their daily activities easier and more technologically advanced [5]. This is all because a person has become a consumer who needs something new every day. But in order to develop any innovations and successfully implement them, taking into account the conditions of an innovative economy, employees with certain knowledge, skills and abilities are needed. They need to understand, want, and be able to implement the changes that will benefit them in the future.

In today's society, innovative strategies play an important role in doing business. The way the manager will prove himself from the first days of work, defines the situation that is expected throughout the entire work activity. The types of innovative strategies are shown in table 1 [2].

Table 1. Types of innovative strategies

Strategy	**Competitive position of the enterprise**	**Characteristics strategy**
Offensive	High level of risk and effectiveness; Focus on research (even basic research) combined with the use of the latest technologies	Development of high-tech innovations
Protective (defensive)	Low level of risk; High level of technical (design and technological) developments; A certain stable market share	Expanding the product range in order to maintain market positions
Intermediate	A small fraction of the market; The lack of direct confrontation with competitors	modification of basic models
Absorbing (licensing)	A certain market share; Free resources for purchasing and implementing new technologies	Use of innovative developments made by other organizations
Simulation	High production standards; Significant organizational and technological potential; Knowledge of market requirements	Copying innovations released to the market by other organizations with some improvements and upgrades
Predatory	Businesses that are just beginning to gain a share in an established market	Release to the market a large number of familiar products with the use of innovations that will extend technical and operational parameters

After the company's management had weighed all the pros and cons of introducing innovations, provided for the solution of difficult tasks at the management level, then the most important aspect, the human factor, should be worked at. When the leader of the company, and most often the HR manager is in charge of proposing any innovations, develops a new project, along with this project, the employees of this organization also change [3]. It is necessary to observe how this happens:

1) People working there should always learn something new, because fashion does not stand still, every day they come up with different concepts, structures that can be used to "lure" those customers. Every company can achieve this if they make an effort and do not sit still.

2) Another Option is to eliminate old work habits. In order for employees to work more and get less tired, you can introduce such a concept as a coffee break into the company. Do you think this requires a lot of financial investment? This question can be answered right away with a short "NO". Select a small room and make it a recreation room, put there a small coffee machine, several sofas, a microwave oven, a refrigerator and a table. If you spend about 100 thousand rubles on this, then in the future this amount will multiply your capital by at least 5 times. Employees will not take lunch breaks, because they will bring food with them, and will be able to eat and work at the same time. But during this hour, which they would spend in cafes or restaurants, each employee can write several articles or shoot a cool mini-video about the company.

3) The Values and attitudes to the company's Affairs should be the same for both employees and management. They should want to make their company cool and "pumped" in all areas. The leader encourages his employees, both financially and morally. And they, in turn, provide very good results of their activities.

This is not all that can be done internally. Each Manager has their own views on their company and their own approaches to innovation.

The theory of changes in human behavior was developed by sociologist Kurt Levin. It includes three consecutive stages – "Defrosting", "Movement" and "Freezing", which are presented in table 2 [4].

Table 2. Kurt Levin's Model

The winners of the changes	The Constraints change
Reducing sales	The culture of the organization does not welcome initiatives
The decline in the quality of products	Managers are not aware of alternatives
Staff turnover	Rigid centralization of authority
Increasing costs, etc.	Lack of incentives for employees to engage in entrepreneurship, etc.

Each company needs only those innovations that meet the requirements of the modern business world. But it is equally important that they should be related to the economy and management needs of the organization. To do this, a number of problems that require immediate solutions should be identified. Then the options are analyzed, and then – the most suitable ones are selected. If this implementation is successful, the innovation can be implemented in people's lives.

To conclude, it is necessary to mention that innovation is not only the use of high technologies, but also the policy of management decisions making. The main aspect required for the successful development of the organization is the attitude of employees and managers [1]. Innovative changes are very important for the organization. To take a leading position and not give competitors a chance, the company should make changes in a timely manner and improve every day. Highly professional staff and competent management is the key to the success of the organization.

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MAKING MANAGEMENT DECISIONS IN THE MODERN WORLD

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The article reveals the importance of management decisions for each organization, analyzes the objective laws of functioning of a control-based system, *as well as the process of making them at the present stage of the development of society, and the sources for using informal methods. The main advantage of the Delphi method is considered. Three large stages of the process of making managerial decisions are analyzed.*

Keywords: *management decisions, adoption process, the Delphi method, internal component*

A managerial decision is any creative action of a manager based on the knowledge and understanding of the objective laws of functioning of a controlled system and analysis of information about its activities, consisting in choosing a goal, program and methods of the team's activities to resolve an existing problem or change a goal.

The external component of the organization can affect the organization directly or indirectly, and this impact is dynamic and uncertain, which seriously complicates decision-making; the internal component includes various resources, the organizational structure of the organization's management and communication. It is more or less manageable compared to the external one.

Until now, managerial decision making has been viewed as a rational process, i.e. a certain number of steps and stages through which the manager must go sequentially from the first stage to the last, in order to eliminate the problem. However, in real conditions, everything does not happen quite like that, because there are some limitations of the "real world" that prevent the use of a rational model in the process of making management decisions. These include:

Lack of awareness of the manager in the existence of the problem, due to their overload, or if the problem is well hidden; very often time constraints force us to make less effective decisions; sometimes there is the inaccessibility of all information about the problem for various reasons.

Nevertheless, the general mechanisms of decision-making in real life remain.

The process of making managerial decisions includes three large stages, which, in turn, also have some sub-points:

1) Preparation. At this stage, the problem is detected and analyzed; decision goals are formed; absolutely all information related to the existing problem is analyzed; alternatives to achieve the goal are developed; and finally, acceptable alternatives are chosen and the best one is chosen;

2) Acceptance. The second stage is a pilot assessment of alternatives; the only solution is chosen; then the decision is agreed with the performers; the decision is finally approved;

3) Implementation. At the final stage, the implementation of the decision is organized; work is provided to implement the decision; the decision is carried out.

Nowadays, at the stage of development of management as an economic science, the entire methodology for making managerial decisions can be subdivided into a number of methods. Three main classifications can be attributed to this kind of classifications, the whole essence of which boils down to the following.

1) Methods based on the intuition of a manager, which is due to the presence of acquired skills and sufficient knowledge in a certain area of activity, which helps to choose and make an economically profitable and effective decision.

2) Methods based on the concept of "common sense", when a manager, making decisions, substantiates them with evidence, the content of which is based on his accumulated practical experience.

3) Methods based on a scientific-practical approach, involving the choice of optimal solutions based on processing a large amount of information, and helping to justify decisions.

There are also three groups of methods for making management decisions:

– informal methods (also called heuristic methods);

– collective methods;

– quantitative methods.

Sources for using informal methods:

1) Verbal (oral) information. Sources include radio and television broadcasts, consumers, suppliers and competitors of the organization, meetings.

2) Written information. Sources are newspapers and magazines, newsletters, professional magazines, annual reports.

Brainstorming is the most common method of collective decision making. With this method, new ideas are jointly generated and subsequent decisions are made. It is used in cases where there is a minimum of information about the problem being solved and a short time frame for its solution is set.

Also, the Delphi method has proven its effectiveness in practice. The main advantage of the Delphi method is that it takes into account the opinion of all persons who are related to the issue in question, and this method is also very convenient to use.

Currently, it has already been proven that the efficiency of the activities of enterprises and organizations and the possibility of competitiveness of the company's products on the market directly depend on the quality of the decisions made by the manager. Therefore, knowledge and understanding of the processes and methods of making management decisions become an integral part and one of the main aspects of improving the professionalism of managers, managers of all ranks and levels of management.

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IMPROVING EMPLOYEE ENGAGEMENT AND COMMITMENT AS THE INDICATORS OF EFFECTIVE MOTIVATION POLICY IN ROLF LLC

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This article analyzes the involvement and commitment of employees to the organization as an indicator of effective motivational policy, as well as their improvement through certain activities. A number of measures is proposed to promote an effective motivational policy, to improve staff engagement and commitment to the organization, which will positively influence the quality of service, product quality and increase labor productivity.

Keywords: *motivational policy, staff engagement, commitment of employees, qualified personnel, efficiency, competitive advantages*

Currently, much is required for an organization to operate effectively, not only resources and technologies, but also the certain skills of people, as well as the ability to manage them correctly. After all, the effectiveness of the company's activities depends on the correctly selected personnel. However, to provide the organization with qualified personnel is impossible without the use of appropriate and effective staffing tools, which can also increase employee engagement and commitment to work.

Employees who are engaged in their work and committed to their organizations provide companies with crucial competitive advantages – including higher productivity and lower employee turnover. Thus, it is not surprising that organizations of all sizes and types have invested substantially in policies and practices that foster the involvement and commitment of their employees [3].

In this article the object of research is the limited liability company "Rolf", which is one of the largest retail and car dealerships, and a major importer of vehicles.

In order to assess the involvement and commitment of the employees of LLC "Rolf" to the work it is necessary to observe the financial and economic activities over the past three years, as the functioning of the organization is directly related to the work of the staff.

Table 1. Indicators of financial and economic activity of ROLF LLC

Indicators	Years			Deviations			
				Absolute (+;-)		Relative (%)	
	2017	2018	2019	2018/2017	2019/2018	2018/2017	2019/2018
Revenue, million rubles	180 153	229 667	237 543	49514	7 876	127,48	103,43
EBITDA, million rubles	8 790	11 929	9 307	3139	(2 622)	135,71	78,02
Net profit, million rubles	3 771	6 256	3 982	2485	(2 274)	165,9	63,65
Net Debt / EBITDA	2.39	1.70	2.39	(0,69)	0,69	71,13	140,59
Cost of sales, rub.	112 979 856	142 342 984	146 876 799	29 363 128	4 533 815	125,99	103,19
Gross profit (loss), rub.	8 538 785	11 319 079	15 423 824	2 780 294	4 104 745	132,56	136,26
Commercial expenses, rub.	5 519 914	6 178 935	6 718 919	659 021	539 984	111,94	108,74
Administrative expenses	2 497 152	2 770 713	2 807 530	273 561	36 817	110,95	101,33
Profit (loss) from sales, rub.	521 719	2 369 431	5 897 375	1 847 712	3 527 944	454,16	248,89
Other income, rub.	8 947 740	8 041 249	1 705 743	(906 491)	(6 335 506)	89,87	21,21
Other expenses, rub.	2 085 080	2 019 317	2 201 309	(65 763)	181 992	96,85	109,01
Net profit (loss), rub.	4 759 180	5 305 299	1 207 785	546 119	(4 097 514)	111,48	22,77

Thus, it's possible to conclude that the largest revenue came in 2019, but with the profit, expenses also grew, which also increased this year. All this suggests that the most productive work of the staff was in 2019. In the same year, there was also the greatest commitment of employees to the organization.

It's important to consider the involvement of staff in the activity of ROLF LLC.

Evidently, due to motivation, the employee devotes more time to work and tasks assigned to him. It also increases employee engagement and commitment to the organization. An example is a salary increase and monetary allowances (bonuses, advances). This is the most common type of motivation that helps the employer quickly engage an employee in the work.

As for ROLF LLC, according to data for 2019, the company has a high degree of involvement and motivation of personnel by building a decentralized management system with centralized control. This allows the organization to conduct effective activities every year and take a leading position among other car dealers.

However, despite the increasing costs of ROLF LLC (see table 1) we can conclude that the involvement and commitment of employees still needs to be improved. To do this, consider the components of staff engagement, which is formed by three elements:

1. Involvement in solving corporate problems;
2. Involvement in the work process, interest in the work as a whole;
3. Initiatives and focus on improving the efficiency of their work and development of the company.

Based on these components, a number of measures should be developed to help increase employee engagement and commitment to the organization.

Table 2. Measures to improve employee engagement and commitment in ROLF LLC

№	Event to solve the problem	Responsible person
1.	Corporate event	Personnel manager
2.	Training-a game aimed at testing employees ' knowledge about the company	Head of HR Department
3.	The bonus system	Personnel department
4.	Social package	Personnel department

Corporate events are aimed to bring employees closer and improve the social and psychological climate between them. Thereby, the staff will be more involved in their work, as they will be able to complete their tasks while working in a pleasant environment.

A training game aimed to test the employees' knowledge about the company, will help them learn more about the organization they work in and give them motivation to improve their knowledge through competition.

To motivate employees to work and increase their involvement in the work, it is necessary to introduce a bonus system between employees of the same field of activity. Thus, the award can be given to the best employee of each Department. A training game or/and a competition can give a chance to make the staff more active and persistent in achieving their goals.

In addition to bonuses, employees can receive a social package that includes certain benefits, for example, free meals, travel expenses, medical insurance, retraining and advanced training, Spa treatment, etc.

The proposed activities can not only increase employee engagement, but also become a motivation for productive work, responsible performance of their duties, and team building. The number of absenteeism and late work will also be significantly reduced.

Considering more global changes and these measures really help contribute to the growth of the organization's profit, reduce costs, and improve the quality of sales. Also, the goals set for 2020 will be achieved faster and a number of innovative ideas will be proposed to improve the import of products.

Thus, the article considered the financial and economic indicators of ROLF LLC, the analysis of which revealed the need to improve employee engagement in work, as well as the need to motivate them to work to achieve better results.

A number of measures can be also proposed to promote an effective motivational policy, to improve staff engagement and commitment to the organization, which help rise the quality of service, product quality and labor productivity. Therefore, the implementation of these measures naturally has a positive impact on the activities of employees of Rolf LLC.

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ALGEN ALS LEBENSMITTEL

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Die Frage, wie gesund die Algen für uns sind, lässt sich so einfach und klar nicht beantworten. Das hat vor allem einen Grund: Unter dem Begriff „Alge“ werden Tausende Lebensformen zusammengefasst, die eigentlich gar nichts miteinander zu tun haben. Der Begriff "Algen" kann eine populärwissenschaftliche Bezeichnung sein und für eine große vielfältige Gruppe von eukaryontischen und prokaryotischen Organismen verwendet werden. Die Algen lassen sich aus dem Meer geerntet und in Photobioreaktoren in großem Maßstab produzieren, aufbereiten und daraus werden hochwertige Lebensmittel hergestellt. Im Artikel berichtet man über die Nützlichkeit der Algen für den menschlichen Körper und über die Nachfolgen der Nutzung von Algen im Falle des unkontrollierten Essens.

Stichwörter: *die Algen, die Algennutzung, die Ernährung, die Nahrungsergänzungsmittel, die Spirulina-Algen, alternative Proteinquelle, die Wirkung der Algen für die Gesundheit*

Heute sind Algen vielen Menschen bekannt. In vielen Ländern wie China, Japan, Korea und pazifischen Inseln sind sie schon lange Zeit Essgewohnheit geworden. In Ostasien gelten sie seit Jahrtausenden als alltägliche Ernährung.

Die Algen werden frisch verzehrt, gekocht, gebraten oder eingelegt. Sie sind als Beilage in der Suppe, als Gemüse und Salat oder als Snack beliebt. Dabei machen sie den Geschmack von Fisch und Meeresfrüchten intensiver. Getrocknete Algen gebraucht man als Würze für das Essen oder bereitet man daraus Tee.

Man muss dabei kurz die historischen Tatsachen erwähnen, dass früher die Algen an den europäischen Küsten zur traditionellen Küche gehörten. Dann wurden sie für einige Zeit vergessen, aber heute werden sie in manchen Ländern wie Irland, Schottland, Frankreich oder Nordseeinsel Sylt kultiviert. So ist „Laver Bread“ ein Brot mit Algenbestandteilen, das ein traditioneller Teil der walisischen Küche ist. Der „Algenwein“ ist auch bekannt. Er entsteht durch die Fermentation bestimmter Braunalgen und schmeckt ähnlich wie Sherry.

Als Teil des Sushis stehen Algen heute weltweit auf der Speisekarte in vielen Restaurants und Cafés. Laut der Einschätzungen werden jährlich neun Millionen Tonnen Algen gegessen. Man ißt auch unbewusst Algen in vielen Lebensmitteln und hat daran keine Ahnung. Aus den Phykokolloiden, den

Zuckermolekülen in und zwischen den Zellwänden der Alge, werden Verdickungs- und Bindemittel sowie Stabilisatoren gewonnen. Als Bindemittel kommen sie in Puddings, Eiscreme und Joghurts vor, als Stabilisator in Margarine und Frischkäse.

Von den weit über 100.000 Algenarten sind mindestens 500 essbar. Dabei handelt es sich überwiegend um Grünalgen, Rotalgen und Braunalgen. Algen sind kalorienarm und liefern Proteine, Mineralstoffe, Vitamine und Omega-3-Fettsäuren. Jetzt betrachten wir ganz kurz einige Algenarten an.

Zuerst machen wir einen kurzen Blick auf Wakame. Wakame ist Braunalgen und wird getrocknet gerne als mineralstoffreiches Würzmittel eingesetzt. Wakame ist besonders bei Japanern beliebt.

Weiter folgt Nori. Nori ist mehr bekannte Alge. Die Noriblätter werden nicht nur zum Einwickeln von Sushi-Röllchen genutzt, sondern auch zum Würzen.

Danach folgt Kombu. Kombu sind meterlange dunkelbraune bis grünliche Braunalgen, die Glutaminsäure enthalten. Kombu wächst am besten in nördlichen Gewässern Japans und auch in Frankreich.

Schließlich sind die Spirulina-Algen zu erwähnen, die vor allem als Nahrungsergänzungsmittel bekannt sind. Die Spirulina-Alge ist eine Gattung der Cyanobakterien, die maßgeblich in warmen und tropischen Gewässern natürlich vorkommt. Die Spirulina-Algen haben eine lange Geschichte hinter sich. Sie wurden schon bei den Azteken verzehrt. Ihr Proteingehalt ist 60 Prozent bezogen auf die Trockenmasse und das ist sehr hoch. Der Fettgehalt beträgt von 5 bis 10 Prozent. Aber 20 Prozent des Fetts ist wertvolle γ-Linolensäure, die eine der wichtigsten mehrfach ungesättigten Fettsäuren für den Menschen ist. Phycocyanin ist der Farbstoff der Alge, dem man die antioxidative Eigenschaften zuschreibt.

Die obengenannten Algen haben eine positive Wirkung für die Gesundheit und boomen auf dem Markt der Nahrungsergänzungsmittel. In vielen Produkten können sie als alternative Proteinquelle zu Fleisch eingesetzt werden. Für die Herstellung von Fleischalternativen wird die Spirulinabiomasse mit konventionellem Proteinquellen wie Soja gemischt. Das macht man speziell um eine faserartige Textur und andere fleischähnliche Eigenschaften zu erhalten.

Der Geschmack von Spirulina ist definitiv etwas, woran man sich gewöhnen muss und auch kann. Um dies zu erleichtern, haben die Forscher den Geschmack der Alge mit anderen Zutaten kombiniert und haben vermutet diesen Geschmack zu maskieren. Unter Verwendung der Spirulina in bekannten, alltagsfähigen Produkten möchten sie die Akzeptanz der Alge jetzt nach und nach erhöhen. Spirulina eignet sich auch als Zutat für gepuffte Snacks sehr gut. Nebenbei kommt sie auch als Zutat der Pastafüllung an.

Aber die Forscher behaupten, dass ein regelmäßiger und hoher Verzehr von Meeresalgen mit Risiken verbunden ist. Der Grund für diese Behauptung ist, die Algen filtern nicht nur die guten Stoffe aus dem Wasser, sondern auch die schlechten. Sie können Blei, Quecksilber, Cadmium oder Arsen enthalten, die der Gesundheit schaden können.

Die Studien beweisen, dass die Algen, die im Meer sind, eine Vielzahl von Mineralstoffen enthalten, die sie im Meer anreichen. Aber es ist schließlich noch unklar bei manchen Nährstoffen aus Algen, wie gut sie tatsächlich für unseren Organismus sind. Einerseits ist der Jod für Funktionieren menschlicher Schilddrüse wichtig. Er kann vor allem in Braunalgen wie z.B. Kombu in sehr hohen Konzentrationen vorkommen. Aber andererseits führt er bei den Algenliebhabern zur Überdosierung, was auch nicht gut im Sinne der Gesundheit ist. Noch ein Beispiel – das Salz. So bereitet das Salz in seinem hohen Mengen in Algen Probleme den salzsensitiven Menschen.

Das nächste Beispiel – die grünen Spanalgen, die auch als AFA-Algen bekannt sind. Sie zählt man zu den Cyanobakterien. Diese Algen werden als Nahrungsergänzung oft vertrieben. In diesem Zusammenhang ist hinzuweisen: der gesundheitsfördernde Effekt von diesen AFA-Algen ist wissenschaftlich nicht im Ganzen belegt. Die Studien haben gezeigt und zeigen, dass sie neben einem bedenklich hohen Jodgehalt auch nerven- und leberschädigende Gifte enthalten. Ihre tolerierbare Menge wird schon bei zwei Gramm Algen am Tag überschritten. Man muss deshalb Algen nur in mäßiger Menge und vorsichtig essen.

Fazit

Die Weltbevölkerung wird in wenigen Jahren auf acht Milliarden Menschen anwachsen. All diese Zahl der Bevölkerung muss man ernähren. In dieser Situation, die mit dem Nahrungsmangel verbunden ist, haben die Algen einen offenbaren Vorteil. Der besteht darin, dass sie 10 bis 20 Mal so schnell wachsen als die Landpflanzen. Bestimmte Algenarten bieten ein großes Portfolio unterschiedlicher Nährstoffe.

Zurzeit wächst das Angebot von Algenprodukten immer wieder. Mit der Verbreitung von vegetarischer und veganer Ernährung steigt auch die Bedeutung bestimmter Algenprodukte. So zum Beispiel ist Agar-Agar zu erwähnen, die eine Art von pflanzlicher Gelatine ist, die aus den Zellwänden von Algen hergestellt wird.

Man muss auch daran erinnern, dass einige Algen gewaltige Vor- und Nachteile für unsere Gesundheit mit sich bringen können. Dementsprechend gibt es viele nützliche und gesundheitsfördernde Algen, die man mit Vorsicht genießen muss.

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BIOTECHNOLOGISCHE NUTZUNG VON MIKROALGEN: FORSCHUNG UND PERSPEKTIVEN

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Mikroalgen sind ein zukunftsträchtiger Rohstoff für die Industrie. Diese winzigen Pflanzen haben eine große Bedeutung für den Aufbau der „Grünen“ Wirtschaft. Mikroalgen gelten aufgrund ihrer wertvollen Inhaltsstoffe als Hoffnungsträger unter den nachwachsenden Rohstoffen. Es ist bekannt, dass diese Mikroorganismen eine große Menge an wertvollen Proteinen, mehrfach ungesättigten Fettsäuren, Ölen, natürlichen Carotinoiden und Vitaminen enthalten. Dank dieser Zusammensetzung von Mikroorganismen sind die Rohstoffe für die Nahrungsmittelindustrie, Kosmetik, Pharmazie, Chemie und die Bioenergiebranche interessant. Trotzdem steht die Algenforschung zurzeit noch am Anfang. Im Artikel berichtet man über die Nutzung der Mikroalgen und über die wissenschaftliche Forschung zum Thema der wirtschaftlichen Algenproduktion.

__Stichwörter:__ die Mikroalgen, die Algenforschung, die Algenzuchtanlage, nachwachsende Rohstoffe, wirtschaftliche Bedeutung der Mikroalgen, die Algennutzung, die Anwendung der Algen, die Algenextrakte

Mikroalgen sind einfach und schnell zu vermehrende pflanzenartige Produktionssysteme. Sie leben im Salz- und Süßwasser, auf tropischen Waldböden sowie in der Antarktis. Die Mikroalgen können ein- oder mehrzellig sein, einzeln leben oder bis zu 60 Meter lange Vegetationskörper bilden.

Laut der durchgeführten Studien sind heutzutage 80 000 verschiedener Algenarten Biologen bekannt, aber ungefähr 400 000 Arten von Algen sollen es geben. Etwa 160 davon werden von Menschen benutzt. Einige Arten von diesen Algen benötigt man seit mehr als 4500 Jahren.

Das wissenschaftliche Interesse zum Thema der Algennutzung steigt weltweit immer wieder an. Die Rolle der Algen als Gesundheitsfaktor und empfohlene Ergänzungsweise wird im Moment von den besten internationalen Nahrungswissenschaftlern anerkannt. Es gibt zahlreiche Untersuchungen der angesehenen Forscher, die den hohen Nährwert von Algen bestätigen.

Die Anwendung der Algen ist heute in vielen Bereichen vielseitig. Sie dienen als frisches Gemüse zum Essen oder als Extrakte für unterschiedliche Anwendungen.

Viele Lebensmittel, z.B. Eis, Pudding, Milcherzeugnisse, Pasteten, Misch- oder Schokoladengetränke, Marmelade, Brei, Majonäse, Margarine, Sahne haben Algenextrakte, derer Zutaten die Konsistenz verbessern und das Erzeugnis stabilisieren. Es gibt Fabriken, die speziell die Algenextrakte (Agar, Alginate, Karrageen) gewinnen. Die größten Agarhersteller in der Welt sind Japan, Spanien, Galicien.

In der Industrie werden die Algen zur Herstellung von Farben und Färbemitteln, Klebemitteln, Plastik und viel mehr verwendet. Durch die Algen bekommen diese Produkte Festigkeit, Fixierung, Elastizität und Glanz [Sáa 2019: 17].

Algen werden auch in der Medizin als Vehikel und aktive Bestandteile bei der Behandlung verschiedener Krankheiten benutzt. Japanische Forscher führen mit den Tieren Experimente, anhand deren konnten sie nachweisen, dass zwei in Japan häufig verzehrte Braunalgenprodukte (Wakame und deren Wurzel Mekabu aus der Braunalge Undaria pinnatifida) die Brustkrebszellen zum Absterben bringen.

Ein amerikanisches Forscherteam vom Institut für genetische Medizin der Universität Southern Carolina hat auch in Tierversuchen herausgefunden, dass mithilfe von Algen-Genen defekte Lichtrezeptoren der Netzhaut repariert werden können. Klinische Versuche würden in den nächsten Jahren folgen.

In der Landwirtschaft dienen die Algen als Viehfutter und trockene oder flüssige Düngemittel.

Die Forscher arbeiten daran, die Mikroalgen noch besser und vielseitiger nutzbar zu machen. Aber, man muss sagen, dass nicht alle Mikroalgen- und Cyanobakterienarten wissenschaftlich untersucht sind. Nur die chemische

Zusammensetzung weniger hundert Arten ist heute bekannt. Nach Sastre und Posten Untersuchungen (2010) werden 15 Stämme der Algen im Moment kommerziell genutzt. Gegenwärtig steht vor der Wissensschaft eine Aufgabe, die Mikroalgen mehr wissenschaftlich zu untersuchen.

Man vermutet wissenschaftlich, dass die Algen noch völlig unbekannte Inhaltsstoffe produzieren und aus denen ganz neue Produkte der Synthesechemie entwickelt werden könnten. Zum Beispiel werden neuartigen Wirkstoffen für die Pharmaindustrie durchsucht.

Weitergehend muss man sagen, dass die wirtschaftliche Bedeutung der Mikroalgen in der Welt noch gering ist. Der Grund dafür ist, die Produktionskosten von Mikroalgen sind häufig zu hoch, die Produktionsmengen ist zu gering, um mit Herstellungsverfahren für hochwertige Wertstoffe oder auch als Energiequelle mithalten können. Weil die Algen Licht für die Photosynthese benötigen, braucht man in erster Linie ausreichend Licht für die wirtschaftliche Algenproduktion. Noch viele Probleme der Produktion von Mikroalgen warten auf ihre Lösungen, so zum Beispiel, wie man Mikroalgen kostengünstig produzieren und effizient verarbeiten kann.

In der Wissenschaft gibt es zwei grundlegende Arten von Algenzuchtanlagen: die Kultivierung der Algen in offenen Becken und die Zucht in geschlossenen Bioreaktoren aus Glas- oder Plastikrohren. Die erste (die Kultivierung der Algen in offenen Becken) ist nicht effektiv, hat dabei geringere Produktivität und die Gefahr von Kontaminierungen als auch höherer Wasserbedarf. Die zweite (die Zucht in geschlossenen Bioreaktoren aus Glas- oder Plastikrohren) zeigt eine gute Produktivität aber diese Bioreaktoren heizen sich jedoch bei zu viel Sonnenlicht leicht auf. Es entsteht eine große Gefahr, dass die Algen absterben. Zudem sind noch relativ hohe Anfangsinvestitionen in diese Bioreaktoren nötig. Die meisten Forscher sehen die zweite Algenzuchtanlage als bessere. Aber die optimale Art von Algenzuchtanlagen wird bis heute noch erforscht.

Fazit

Die Anwendung der Algen ist ganz unterschiedlich. Sie werden in der Nahrungsmittelindustrie, in der Kosmetikindustrie, in der Landwirtschaft breit verwendet. Die Algenforschung steht noch vor verschiedenen Herausforderungen und am Anfang. Und auch die wirtschaftliche Produktion von Algen-Wertstoffen und Algen-Energie muss noch eine bestimmte Zeit warten. Algen gewinnen ihre Energie allein aus der Sonne und erzeugen damit eine Vielzahl bedeutender Wertstoffe und Energie auf besonders nachhaltige Weise.

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MTT ASSAY AS A METHOD OF DRUG SCREENING

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The article analyses drug screening as an important step in drug design which allows determining biological activity of a drug in vivo and in vitro. It can be performed by means of different biochemical methods, and the author emphasizes one of them, which is the MTT assay. It is presented as a colorimetric assay based on measurement of cell metabolic activity. The article attempts to contribute to the debates upon application of the method, as well as intracellular mechanisms of the assay. Besides, the advantages and the disadvantages of the examined method are highlighted in the article.

Keywords: *cell culture, cell viability, colorimetric assay, drug screening, MTT assay*

The MTT (*3-[4,5-dimethylthiazol-2-yl]-2,5-diphenyltetrazolium bromide)* assay is one of the most common methods for measuring cell viability, radiosensitivity and cytotoxicity of compounds in studies *in vitro* [Stockert et al. 2018]. These parameters are used while screening chemical agents for inhibitory effect towards different types of cells and determining antineoplastic drugs and their doses for chemotherapeutic purposes [Tominaga et al. 1999].

The MTT reagent is a tetrazolium salt, reduced by enzymes of metabolically active cell to water-insoluble purple formazan. After crystal formation, the culture medium is replaced with an organic solvent and extraction takes place with a measurement of the solution optical density following after. The procedure described by Mosmann in 1983 suggests that the amount of the formed formazan is proportional to the number of viable cells with functioning mitochondria. Thus, high purple color intensity indicates a high rate of cell survival, whereas low intensity reflects a decrease in cell number and therefore cytotoxicity of tested compounds [Mosmann 1983].

The first hypothesizes, explaining the mechanism of enzymatic reduction of the tetrazolium salt, associated its transformation with localization in mitochondria and mitochondrial dehydrogenase activity. Thereby the MTT assay was considered as a method of mitochondrial activity determination. Slater et al. contributed to the establishment of the theory by studying interaction between tetrazolium salts and the respiratory chain. They showed that the reduction of MTT is carried out by enzymes of the inner mitochondrial membrane using succinate as an electron donor [Stockert 2018].

However, according to more recent researches, only part of the final product is associated with mitochondria, and most of the formazan accumulation is observed in other organoids, cytoplasm and in a cell membrane. For instance, formazan granules were found in lipid droplets, which can be an evidence of them being the place of formazan final intracellular localization [Berridge, Tan 1993].

Endosomes/lysosomes also were considered as the place of MTT-formazan accumulation, but the hypothesis hasn't been verified by data derived from studying cell ultrastructure during the process of formazan formation and from the fluorescent analysis [Stockert 2018].

Currently, the enzymatic reduction of MTT-reagent is viewed as a result of NADH (*nicotinamide adenine dinucleotide (reduced form)*) (and NAD(P)H-*(nicotinamide adenine dinucleotide phosphate (reduced form))* dependent oxidoreductases activity in the endoplasmic reticulum (ER), but the exact mechanism of formazan granules formation remains unknown[Berridge, Tan 1993].

Like any other method, MTT-assay has its own advantages and also application restrictions concerning both reagent properties and protocol steps.

Currently, the MTT assay is known to be a simple and safe method for determining drug cytotoxicity and cell viability with high accuracy comparing to the dye exclusion test that has been used before [Riss et al. 2016].

MTT assay can be performed using stable cell lines as well as primary cell cultures [Van Meerloo et al. 2011].

The potential application of MTT-assay in a drug screening can lie in determining the following characteristics:

1) cytotoxic/cytostatic effect of a drug on different cell lines;
2) in vitro drug sensitivity;
3) in vitro drug resistance [Bahuguna 2017; Morgan 1998].

The main disadvantage of the MTT assay is the necessity to consider many factors while using the method for purposes of a specific experiment and some data inaccuracies due to it. For instance, prolonged incubation with the MTT-reagent allows to increase the final optical density of the solution and achieve better sensitivity but in the same time, the total incubation time is limited by the cytotoxic effect of the reagent using the cell energy reserves for a signal generation. Furthermore, exocytosis of formazan crystals leads to the cell structure and activity disruption, causing an inability to use these cells in another assay [Riss et al. 2016].

Compared to other colorimetric methods based on water-soluble tetrazolium salts (MTS (*3-(4,5-dimethylthiazol-2-yl)-5-(3-carboxymethoxyphenyl)-2-(4 sulfophenyl)-2H-tetrazolium*), XTT (*2,3-bis-(2-methoxy-4-nitro-5-sulfophenyl)-2H-tetrazolium-5-carboxanilide*), WST(*water-soluble tetrazolium salts*), the MTT assay requires more steps since the final product, formazan, has to be extracted with organic solvents such as DMSO(*dimethyl sulfoxide*)/isopropanol/etc. [Van Meerloo et al. 2011].

It is also important to consider the impact of medium components on formazan crystal formation. Transformation of the tetrazolium salt might be carried out not only by cell enzymes but also by antioxidants and vitamins present in a culture medium. Also, it's been shown that serum albumin, which addition is necessary for the growth of some cell lines, can cause obtaining false-positive results since its free cysteine residue is capable of reducing the MTT reagent [Tominaga et al. 1999].

The other parameter that needs to be controlled is the pH level of the medium when inserting MTT reagent into wells and extracting formazan with a solvent – the presence of acidic residues in the formazan /DMSO system leads to obtaining lowered absorbance values [Mosmann 1983].

Metabolically inactive cells produce formazan in undetectable quantitates, so the test objects need to be chosen thoughtfully according to their physiological characteristics [Morgan 1998].

While testing for cytotoxicity, the researches have to consider the fact that the substance might affect the formazan formation, e.g. by increasing non-specific MTT reduction or directly interacting with a tetrazolium salt. For that reason, some cases of MTT assay use require additional verification with other assays (CCK-8 (*cell counting kit-8*), ATP (*adenosine triphosphate*), etc.), and obtained results need to be interpreted with a certain level of caution [Riss et al. 2016].

Thus, MTT assay has been considered a golden standard for cell viability assays for a long time, being one of the first colorimetric methods allowing to measure metabolic activity rate of different types of cells, normal or malignant. This assay can serve as a useful tool in high-throughput drug screening and allows obtaining reliable data but has its own limitations and appliance restrictions that are important to know when choosing this method for specific research purposes.

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SYNTHESIS OF SIO_2 NANOPARTICLES FOR EVALUATION OF SORPTION CHARACTERISTICS ON CATIONIC AND ANIONIC SUBSTRATES

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The article is devoted to a discussion of the physicochemical properties of particles of silicon dioxide, which was synthesized by the Stober method (in situ). The author investigates and presents the susceptibility of these particles to cationic and anionic substrates and using the data obtained, the maximum sorption and specific surface area of the obtained adsorbent are calculated.

Keywords: *sol-gel method, amorphous silica dioxide, sorption, thetraetoxy silane, indicators, congo red, methylene blue*

Introduction

The development of work in the nanoscale is determined in such a way that it is necessary to know what processes occur during certain reactions (due to which the resulting product is formed with the desired properties). Therefore it is necessary to disassemble the process at the atomic level. One of these methods is sol-gel synthesis, which is increasingly being used to create nanomaterials. Currently, there are many different processes for obtaining nanomaterials, which are widely used in the creation of coatings, composites, sorbents and catalysts [Moshnikov 2012]. One of the important criteria for creating any material is the selection of optimal conditions for obtaining a product with the specified physical, chemical and mechanical characteristics [Moshnikov 2003]. For example, obtaining a high-quality sorbent becomes one of the main tasks in the implementation of sorption processes. One of the most commonly used sorbents is amorphous silicon dioxide [Brinker 1990].

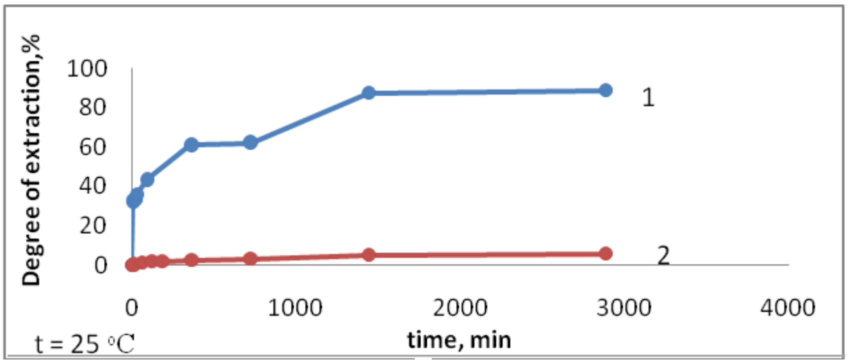
Practical part

1. For the synthesis of samples of amorphous SiO_2, alkaline hydrolysis of TEOS was performed using the Shtober method (in situ), where NH_4OH (35%) is used as the reagent [Shabanova 2006].

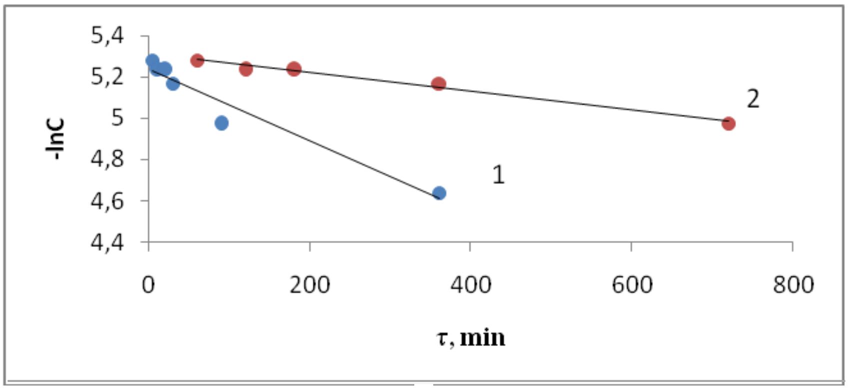
It is known from experimental data that the components necessary for obtaining Sol-gel products by the method are mixed in a certain molar ratio:

$$1\nu\ (TEOS) : 25\nu(C_2H_5OH) : 62{,}5\nu(H_2O) : 17{,}5\nu(NH_4OH)$$

2. To evaluate the sorption properties where the substrate is methylene blue (1) and congo red (2) relative to SiO_2, the following experimental data were obtained and presented in Figures 1 a, b:



a



b

Fig.1. Sorption of dyes on amorphous SiO_2 a-kinetic curves, b-linearization of kinetic curves

Linearization of curves (by substitution) is characterized by a pseudo-first reaction order [Starostin 2012].

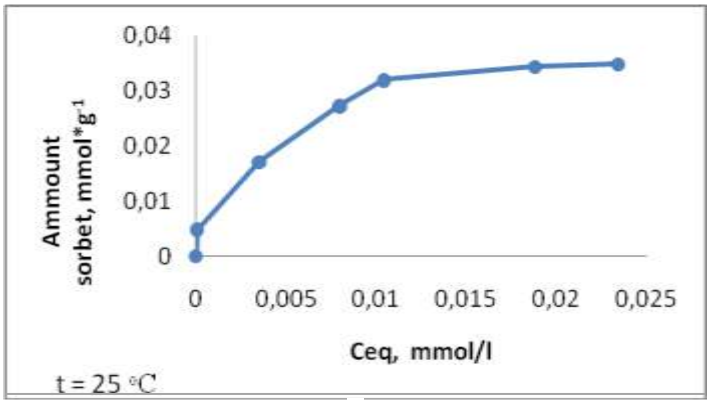
Data for the values of variables included in the regression equation and regression coefficients are shown in Table 1:

Table 1.Data from the regression equation

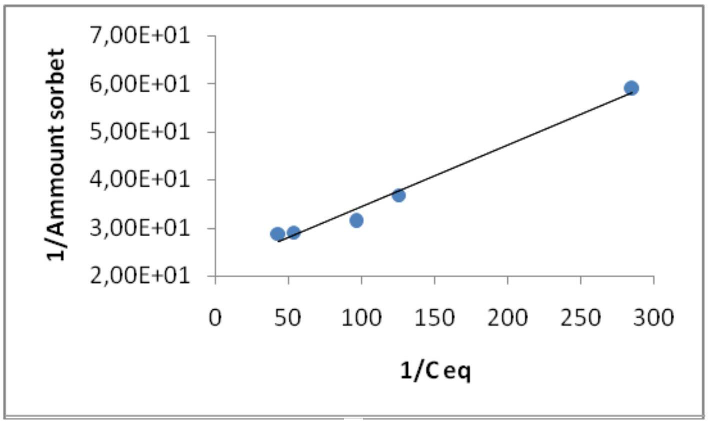
Substrate	tg α (k_{ads}), min^{-1}	R^2
Methylene blue (1)	$2*10^{-3}$	0,985
Congo red (2)	$4*10^{-4}$	0,947

As can be seen from the experimental data obtained (Figure 1) the sorption of dye 2 is very insignificant, this may be explained by the fact that the sample surface (SiO_2) is negatively charged and the Congo red ion in an aqueous solution also has a negative charge [Gubin 2011].

Therefore, the construction of the adsorption isotherm is carried out only in relation to the methylene blue. Experimental data are presented in Figures 2 a and b:



a



b

Fig. 2. Sorption of methylene blue on amorphous SiO_2
a – isotherm, b – langmuir linearization of the isotherm

Data for the values of variables included in the regression equation and regression coefficients are shown in Table 2:

Table 2. Data from the regression equation

Substrate	tg α (Const. of Langmuir)	b ($\frac{1}{S_{max}}$), g/mmol	R^2
Methylene blue (1)	0,128	21,5	0,983

From the obtained data for linearization of the curve, knowing the constant of Langmuir and S_{max}, it is possible to calculate the area occupied by 1 adsorbate molecule (S_0) and the specific surface of the sorbent ($S_{spec.}$):

$$S_0 = \frac{1}{N_A * S_{max} / RT}$$

$S_0 = 9*10^{-17}$м^2;

$S_{уд} = S_0 * \Gamma_{max} * N_A = 266$м^2/г

This result of the specific surface of the sorbent corresponds to the specific surface of amorphous SiO_2 obtained by Sol-gel method [Shilova 2012].

Conclusion

As the result of the experiment, a sample of amorphous SiO_2 was obtained by the Stober method. The study of the sorption properties of dyes of cationic and anionic nature allows proving that the obtained sample is susceptible to samples of cationic nature (methylene blue).

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SECTION 4. MEDICAL SCIENCE

CANCER DIAGNOSTICS AND TREATMENT METHODS

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The article shows different methods of scanning the human body in order to detect a cancerous tumor. Also the methods of surgical treatment and hormone therapy are analyzed. It is proven that the modern cancer diagnostics allows the use of sparing X-ray diagnostics, which does not have a serious negative effect on the body.

Keywords: *cancerous tumor, cancer diagnostics, method of treatment, mechanisms of development, hormone therapy*

Nowadays, according to statistics, the problems of oncological diseases occupy a leading place; every year, 7 million people worldwide have been diagnosed with cancer. Oncology is a field of medicine and biology that studies the causes, mechanisms of development and clinical manifestations of tumors. Oncology studies methods of diagnosis, treatment and prevention of tumors.

A tumor in oncology refers to the excessive pathological proliferation of tissues, consisting of qualitatively changed cells of the body that have lost their differentiation. Of the terms used in medicine, denoting a tumor process, the following are most often used: tumor - tumors, neoplasms - neoplasma, blastoma - blastomata – the latter most fully reflects the essence of the process. Blastoma comes from the Greek verb blastonein – to grow.

By the nature and rate of growth, tumors are divided into benign and malignant. Benign tumor – tumor benignum, grows slowly; it can exist for years without increasing. It is surrounded by its own shell. During growth, increasing, the tumor pushes the surrounding tissues, without destroying them. Malignant tumor – tumor malignum, grows much faster. It has no shell. Tumor cells and their cords penetrate into surrounding tissues (infiltrative growth), damaging them. Germinating a lymphatic or blood vessel, they can be transported by blood or lymph flow to the lymph nodes or a distant organ and form there a secondary focus of tumor growth – metastasis. Its cells are atypical, polymorphic, with a large number of mitoses. A characteristic feature of tumor tissue is anaplasia – a return to a more primitive type. Morphologically, this is manifested by the loss of differentiation, functionally – by the loss of a specific function.

Methods of treatment

Cancer surgery: with the surgical method of treatment, part of the tumor, metastases, or the whole neoplasm is removed. With a large lesion area, the entire organ can be removed, which can subsequently be replaced with a prosthesis or implant. Chemotherapy: treatment of oncological diseases with the help of chemotherapy is delivered to the patient's body by various means: with the help of tablets, injections, capsules, etc. In this method, tumor cells are destroyed by chemicals. Hormone therapy: if oncology is detected, treatment can be hormonal. Usually, this method is used if the disease affects organs such as the mammary gland in women and the prostate gland in men. This therapy is used in conjunction with other methods and serves to suppress and normalize the production of hormones that affect tumor growth. Immunotherapy: when diagnosed with "oncology" and "cancer", treatment with immunotherapy allows not only to identify cancer cells, but also to "force" the body to fight the pathology on its own. This treatment is most effective in the early stages of the disease. Targeted therapy: treatment with special drugs that destroy cells.

Methods of cancer diagnostics

The following methods are used to scan the human body in order to detect a cancerous tumor:

- Screening for the presence of tumor markers
- Mammography (if a breast tumor is suspected)
- Diagnosis by endoscopy
- MRI
- ultrasound
- X-ray diagnostics
- Histology

A blood test for tumor markers is performed as follows: a special substance is injected into the patient's blood that can isolate onco cells among all others, then blood is taken and the sample obtained is examined for the presence of tumor markers. Mammography is a scan of the mammary glands with a small dose of X-ray. Diagnosis of cancer using endoscopy is carried out by introducing a flexible endoscope into the body, which can be equipped with a photo and video camera and a biopsy device. The principle of ultrasound is based on the possibility of reflection of sound waves by tissues of different types. Modern cancer diagnostics allows the use of sparing X-ray diagnostics, which does not have a serious negative effect on the body, but helps to clarify the contours of the tumor. Histology allows you to examine samples of tumor tissue taken using a biopsy, and establish the nature and type of neoplasm. Also, this method allows you to assess in advance how effective the selected methods of treatment will be, and to adjust the therapy program even before it starts.

Summing up, it should be noted that in the modern world there are multiple methods for the diagnosis and treatment of cancer. Different methods of diagnosing cancer in order to detect a cancerous tumor can help choosing the necessary treatment. Science and medicine never stand still, so this area is still being studied, more advanced methods of treatment are planned in the future.

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UMBILICAL CORD-DERIVED MULTIPOTENT MESENCHYMAL STROMAL CELLS

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The article is aimed to explore new ways to deal with the complications of myocardial infarction. The author reviewed the theoretical basis and concluded that mesenchymal multipotent stromal cells are one of the most promising areas for the treatment of these complications. This article examines all the stages of collecting and storing cells and expresses the personal opinion of the author for further practical application.

Keywords: *human umbilical cord, multipotent mesenchymal stromal cells, clinical application of stem cells, cells from Wharton's Jelly, cryopreservation of MMSC, using MEM and DMEM, complications of heart attack*

Every year, humanity faces many medical problems, such as stroke, heart attack, and others. One of the urgent solutions to these problems is the use of drugs containing stem cells. Their targeted action on the area of infarction will help the formation of new cardiomyocytes. This action will avoid the formation of scars, and, as a result, will avoid the complications of a heart attack. The best way to produce stem cells is to isolate them from a human umbilical cord.

The umbilical cord of a person is a derivative of the amniotic stem, through which the embryo from the 15th day of development is associated with the chorion. In addition to the amniotic foot mesenchyme, allantois with their vessels and the yolk stalk take part in the formation of the cord. Outside, the amniotic leg is covered with an amniotic membrane, the single-layer cubic epithelium of which in the area of the umbilical opening grows together with the epithelium of the fetal skin. The stroma of the umbilical cord is connective tissue with special properties that are not found in the human body after birth. It is a mucous connective tissue, also called Wharton's Jelly by the name of the English anatomist Thomas Wharton (Thomas Wharton, 1614–1673), who described the tissue. The source of development of Wharton's Jelly is the extraembryonic mesoderm of the embryoblast. The basic substance of the tissue contains a significant amount of glycosaminoglycans, especially hyaluronic acid and chondroitin sulfate.

Multipotent mesenchymal stromal cells (MMSC) are polypotent cells with a number of properties important for clinical use. In numerous experimental studies, their ability to osteogenic, chondrogenic and adipogenic differentiation has been proven, which by now is one of the obligatory MMSC criteria. In addition, according to some data, they are capable of differentiation into cardiomyocytes, cells of the skeletal, muscular and nervous tissues.

In 1974, it was shown that umbilical cord blood is a source of hematopoietic stem cells, while the remaining tissues of the umbilical cord remained simply a biological waste that did not represent scientific value. The attitude to the umbilical cord was radically revised when, in 1991, a number of scientists described a culture of fibroblast-like cells isolated from Wharton's Jelly. The identity of these cells to MMSC was proven in 2004. The presence of receptors for extracellular matrix proteins CD44 (cluster of differentiation) and CD105, integrins CD29 and CD51, production of CD73, lack of expression of hematopoietic markers CD34 and CD45, the possibility of induced differentiation into osteocytes, chondrocytes, adipocytes and cardiomyocytes.

In the work of X. Wang (2008) it was shown that hemopoietic cells and MMSC from the yolk sac and the aorta-gonad-mesonephros region migrate along the umbilical cord to the placenta, and then back to the liver and bone marrow of the embryo. During these two waves of migration, a part of the cells lingers in the Wharton's Jelly and remains there throughout the gestation period. At the same time, the new microenvironment changes the properties of migrating cells, which, perhaps, explains their difference from the MMSC of the bone marrow.

Available for clinical use tissue sources MMSC can be divided into adults and neonatal. The first group includes bone marrow, peripheral blood, adipose tissue, there are also reports of expansion of MMSC from lung tissue and heart. In fact MMSC are isolated from all sources with a connective tissue component.

The neonatal sources of MMSC include umbilical cord blood, amniotic fluid, placenta, fetal membranes, umbilical cord, Wharton's Jelly.

For the cultivation of MMSC we used two anatomical parts of the umbilical cord is used, which can be distinguished in one experiment. It is necessary to take blood from Wharton's Jelly or vessels.

The following conclusion was made during the experiment. Despite the same functions and degree of differentiation, the cell morphology is very different. Cells obtained from vessels have an elongated, elongated shape. The length strongly prevails over the width. Their ratio is 9.86:1.

In the case of isolation of cells from Wharton's Jelly, the length also prevails over the width, but their ratio is less significant and amounts to 3.19:1.

Knowing these features, you can accurately determine the area of receipt of MMSC, as well as predict their further growth.

It is necessary to tell about the cultivation methods when we are talking about cultivating MMSC.

Cell cultivation is the process by which individual cells are grown in vitro under controlled conditions. In practice, the term "cell culture" refers mainly to the cultivation of cells belonging to the same tissue, derived from multicellular eukaryotes.

The MMSC cells are placed in special culture flasks or Petri dishes with growth medium. As a nutrient medium using standard synthetic medium based on phosphate-saline buffer solutions: alpha-MEM (Eagle's Minimum Essential Medium), DMEM (Dulbecco modified Eagle's Medium) and others, which were mentioned earlier. Cultivation is carried out in thermostats with a supply of 5% CO_2 at 37 ºC. 10 days later MMSC cells are divided and form new groups of cells. After that, they are collected, broken down into individual cells by pipetting and transferred to new plates with the same medium composition, cultivated, homogeneous colonies are visually selected and transferred back to new plates. After several passages it is possible to obtain cell lines. After the accumulation of the necessary cellular biomass under cell culture conditions, they are used both for immediate transplantation, as well as selective differentiation and their subsequent transplantation. If necessary, they are stored in deep freezing conditions (liquid nitrogen) for further use.

Cryopreservation is a low-temperature storage of living biological objects with the possibility of restoring their biological functions after thawing. The essence of the cryopreservation method is to stop all biological processes in cells and tissues.

Freezing and storage is carried out in liquid nitrogen. The temperature of liquid nitrogen is -196 °C. At this temperature, the cells do not show metabolic activity. The main danger during cryopreservation is intracellular fluid, because when it freezes, water turns into ice crystals, which can damage cell and tissue structures. Thus, the main task in cryopreservation is to reduce the risk of formation of intracellular ice.

Thus, the clinical significance of these methods will be the creation of a particular technology. This technology of isolating MMSC from the umbilical cord will be one of the most sought-after medical clinics. Measurement of cells will allow selecting individual populations among MMSC for a more accurate prediction of their growth and development.

Mass production of drugs based on MMSC will help to eliminate the problem of low proliferative activity. The technology makes it possible to replace dead neurons, cardiomyocytes, endocrine pancreatic cells. This will allow solving the problems of heart attacks, strokes and diabetes.

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BIRTH INJURY

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The article deals with the problem of birth injury. Taking into account the work done and analysis of 9 scientific sources, types of birth defects, the causes contributing to their development, diagnostic methods and types operative treatment are defined. Some anatomical features of the skull structure and the brain explaining the formation of birth injuries have been described. The ways of prevention the development of consequences of birth injuries are also revealed.

Keywords: *cerebral paralysis, birth injury, birthing process, perinatal asphyxia, cephalhematoma, oxygen deprivation, spinal cord injuries*

Nowadays, the problem of birth injury is less often discussed among obstetric officers and pediatricians all over the world. The rate of birth injuries rates are now much lower than in previous decades, due to improved prenatal ultrasound assessment, limited use of forceps, and the fact that doctors often deliver caesarean sections if they anticipate an heightened risk of labor injuries.

The same is not true for birth injuries with hemorrhage which do not lead to death, but become more complicated by cerebral deficiency and infantile cerebral paralysis. Thus, congenital trauma dominates among modern problems of perinatal medicine.

Birth injury is defined as damage or injury of a child before, during, or immediately after delivery. It is used in a more general sense compared to mechanical injuries incurred during childbirth (such as nerve damage and broken bones). Some most common birth injuries can be distinguished: Brachial Plexus Palsy (Erb's Palsy), cephalohematoma, caput succedaneum, perinatal asphyxia, intracranial hemorrhage, subconjunctival hemorrhage, facial paralysis; spinal cord injuries; and cerebral palsy, bone fractures.

Statistics has shown that the frequency of birth injuries ranges from 2 to 7% at the present time. It doesn't exceed 3.2% of fetal causes of death, but among the causes of death in the early neonatal period it reaches 2.5%. As for the United States, for every 1,000 children born there, about 7 birth injuries occur.

Birth Injury Types. There are several kinds of birth traumas. Sometimes congenital injuries are temporary, but more often they are permanent, lasting for the whole life. Symptoms often depend on the baby.

According to the damage level we can point out the following types of birth injuries:

– of the nervous system (brain injury, spinal cord injury, peripheral nervous system);

– of soft tissues (labor tumor, cephalhematoma, intracerebral hemorrhage, torticollis);

– of skeletal system;

– of internal organs.

Brain-Related Injuries. Brain-related injuries may manifest themselves in different ways. Brain damages often result from oxygen deprivation, such as anoxia, hypoxia, congenital asphyxia, and perinatal asphyxia. Hypoxic ischemic encephalopathy is a congenital injury caused by oxygen deprivation.

The most common brain-related injury in relation to birth trauma is *Cerebral Palsy (CP).* CP is estimated in about 800,000 children, with 8,000-10,000 new cases diagnosed each year. CP can be established after maternal infections, oxygen deprivation, infant stroke, and infant infection. In many instances, CP is connected with the corrective preventative measures of a physician. For example, if a physician succeeds to monitor fetal distress and take the appropriate actions, the infant may avoid CP.

Head injuries to newborn or unborn children can cause the child to develop brain damage. *Brain damage* can either come from physical trauma (due to blunt force, vacuum extraction or pulling on their head) or from other complications (asphyxia, umbilical cord choking or an infection that attacks the brain).Brain damage in newborns causes many problems, because it affects the most complex organ of the body. Moreover, brain damage is often permanent, meaning the child may never recover from the injury. Children with brain damage may have physical and/or mental disabilities that will require specialized medical care for the rest of their lives.

Spinal cord injuries are very dangerous. This is because the spine is very sensitive and serves as the central controller for the rest of the body's nervous system. Damage to the spine can prevent a child from using one or more of their limbs. What makes spinal cord injuries even more difficult is that their symptoms can mimic the symptoms of cerebral palsy.

Spinal cord injuries are divided into two types: incomplete spine damage (it means you can control or feel under the damaged area), complete spinal cord injury (it indicates no control or feeling). Despite the fact that spinal cord injuries do not cause mental health complications such as brain injuries, they can still cause permanent problems in a child with control over his body.

Cephalhematoma is blood accumulation below the periosteum. Cephalohematomas is soft and can increase in size after birth. Cephalohematomas disappear on their own in some weeks and almost never require any treatment. However, they should be examined and treated by the pediatrician if they become red or start to give off liquid.

Brachial Plexus. Brachial plexus occurs when the upper joint of the arm is injured, usually during delivery. Symptoms include weakness in the damaged arm and the inability to use certain muscles. The shoulder and hands may also be affected. A burning sensation down the damaged arm is also common.

Erb's Palsy. Erb's palsy is a form of brachial plexus when the nerves of the upper arm are affected, usually after a birth injury. Infants with Erb's palsy may show the loss of feeling and weakness in the affected in the damaged arm. In severe cases, infants may be completely paralised in the area of the affected hand.

Birth Injuries Causes. Birth injuries have a variety of different reasons, and there is a number of factors that can lead to this problem: delayed birth, oxygen deprivation, abnormal presentation, big fetus, rigidity of maternal passages, pre- or post-mature delivery due to improper dating, failure to perform a timely c-section, Rh factor incompatibility, improper use of delivery instruments, failure to monitor fetus and respond to fetal distress, administration of improper medications during pregnancy and/or delivery, infections and medical problems in the mother, infections and medical problems in the fetus, and others.

Delayed Birth. One of the most common birth injury cause is delayed birth. The human brain exists to withstand a certain amount of pressure for a certain amount of time. However, labors that last over 18 hours are considered long, difficult labors, and after 18 hours, the compression on the brain becomes too big to withstand. This usually happens when a child shows signs of fetal distress, as the child's brain begins to react increasing the child's blood pressure.

Oxygen Deprivation. Depending on external forces (such as a kinked or prolapsed umbilical cord) or internal forces (such as low birth weight or underdeveloped lungs), oxygen deprivation becomes the most common reason for some of the most severe birth injuries. Almost all congenital brain injuries are connected with oxygen deprivation, and these congenital injuries can be mild or so severe that victims of these congenital injuries can suffer the consequences for some period of time, from a few days to possibly the whole life.

Medical Malpractice. Children usually suffer birth injuries because of malpractice because of the poor knowledge of medical staff persons. Doctors, nurses, hospital staff, emergency care specialists and midwives should know the complexities of prenatal, intranatal and postnatal care. Birth injuries can happen because of blatant misconduct of professionals, or because of simple miscomprehension of what is happening.

Risks of birth injury. Certain populations have a higher risk of birth injury. Exposure to toxins, physical injuries and genetic predisposition can all increase the risk of birth trauma for newborns and expectant mothers. It is important to recognize these risks timely:

- *Preterm Birth.* It is known that 9.8% of all newborns are premature births. Children born before the 37th week of pregnancy have an increased risk of birth trauma, as their brain, muscles and nervous system are not yet fully developed.
- *Genetic Predisposition.* Some children have a genetic predisposition to certain birth injuries such as cerebral palsy. Unfortunately, it can be difficult to identify or treat these cases prior to birth.
- *Exposure to Toxins.* Toxins such as methylmercury are extremely dangerous for expectant mothers, as they can damage the developing brain of the newborn child.
- *Physical Trauma.* Physical trauma, such as excessive force from a doctor during delivery, can cause severe damage to a newborn’s head, neck and shoulders. This can directly lead to brain damage or nerve injuries such as Erb’s palsy.

In conclusion, technological progress has reduced the percentage of births injuries in the world, but it does not mean that the problem has been solved. It depends on the economic and personal reasons. Low-income and rural communities usually have high rates of birth injuries. Lack of quality healthcare and maternal nutrition also raise birth injury rates. However, a large percentage of birth injuries are caused by medical malpractice each year. Physical trauma or inability to observe the mother or baby during pregnancy properly can lead to serious birth injuries with lifelong symptoms and expensive treatment.

Now more than ever parents should become the defenders of their children, knowing what to pay attention to in order to prevent some birth injuries.

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USE OF THE PROGRAM-TARGETED METHOD AS A MEANS OF INCREASING THE EFFICIENCY OF BUDGET EXPENDITURE

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The article deals with the peculiarities of using the program-targeted method of budgeting. The author focuses on some advantages of program-targeted budgeting. The given method calls to streamline the internal structure of expenditures of the state budget, as well as systematize expenditure items of the federal budget.

Keywords: *program-target method, financial resources, budget reform, state economy, state programs*

Rational use of budget funds is one of the priority problems in the distribution of financial resources of the state. The primary tasks here are naturally considered to be, firstly, setting priorities for budget spending with subsequent control over their intended use, and secondly, identifying sources of funding for public expenditures. High-quality solution of these tasks is possible by using the program-target method of budget formation and execution.

Evidently, a comprehensive and detailed study of the quality of use of this method is difficult without considering its application through the prism of history.

The application of the program-target method in Russia started in the 1970s, when some national programs appeared on the economic arena: transport development, scientific and technical development, etc. The country's economic growth was followed by a sharp decline. Its reasons were as follows: firstly, administrative methods of regulation were not capable of compromise when it came to achieving results at the expense of the set plan; secondly, the amount of material and technical resources was insufficient; thirdly, the lack of resource balance also negatively affected the economic growth of the state. Finally, state targeted programs were "curtailed" or implemented with minimal efficiency and quality. The domestic economy needed a radical restructuring.

As N. V. Zamyatina notes in the article "Target programs as a tool for improving the efficiency of expenditures of territorial budgets", the implementation of budget reform was determined by the need for planning and budget execution in a close relationship between the goals set and the results achieved [Zamyatina 2011: 39]. The reform began in 1995 with the adoption of the law "On state forecasting and programs of socio-economic development of the Russian Federation". The law that came into force established that future national budget planning would be carried out in the form of a Federal target program, a program for socio-economic development, as well as in the form of strategic documents adopted by the Government of the country that regulate certain categories of issues [3]. In the early 2000s, a number of policy documents were implemented that made changes to the state budget management, whose task was to focus on results rather than on process. These documents include the Program for the development of budget federalism in the Russian Federation for the period up to 2005 [5], the Concept of reforming the budget process in the Russian Federation in 2004-2006 [2], and others.

In 2006, among the tools of the program and target budget management, so-called national social projects appeared which were actively used in the fields of science and education, health, agriculture and housing construction.

The advantages of program-targeted budgeting are:

• providing the population with such public goods and services (by the state or a separate subject of the Russian Federation) that are in demand – that is, those that meet the needs of society and can be implemented within the existing budget funds;

•quality and cost revision of all components of the country's budget – the rejection of expenditures that are minimal or are carried out inertially, as well as focusing on socially significant needs;

•increasing the level of responsibility of persons who are managers and recipients of the budget – special attention is paid to the qualitative characteristics of the results of program implementation;

•a long planning period, which, however, does not exclude the possibility of elastic changes within the program, taking into account specific circumstances and available resources;

•transparency in the implementation of programs – everyone has the opportunity to get acquainted with its implementation.

We consider the main advantage of the program-target method to be the possibility to identify problems in the state economy, as well as to provide tools for their practical solution.

So, the state forms and sets certain goals, the achievement of which is built in a certain time frame. In the process of achieving goals, simultaneous monitoring takes place. The latter allows creating interim reports with a specific list of resources available to the program, on the basis of which it is possible to change or adjust activities designed to achieve the final results.

All state programs at the federal level are created and implemented within the framework of the directions set out in the Concept of long-term socio-economic development of the Russian Federation for the period up to 2020, as well as on the basis of other strategic documents approved by the President of the Russian Federation and the Government of the Russian Federation [4].

The desired effect of implementing targeted programs is expressed in the improvement of the country's industry, industry of region, as well as in an increase in GDP and private demand for products.

It is important to mention that tax revenues from newly created and developed infrastructure facilities are an additional help in achieving the goals.

It should be noted that sometimes targeted programs remain ineffective. The reason for this lies, in our opinion, in the insufficient legal relationship between Federal legislation and bylaws. A striking example is the norms of the Budget code [1] that stipulate general provisions on the financing of targeted programming. At the same time, detailed regulation is left to the ministries and departments.

In 2018 it was planned to implement 24 programs at the expense of the Federal budget. The amount of budget allocations, according to the Ministry of Finance of the Russian Federation, as of July 1, 2018 constituted 202,910,8 million rubles. In the first six months, only 26.7% of the total budget allocations were fulfilled. Among the planned priority projects can be mentioned the following:

"Increasing labor productivity and supporting employment" – 474.6 million rubles;

"Reform of Control and Supervisory activities" – 201.0 million rubles;

"Development of the export potential of the Russian education system" – 191.0 million rubles.

In the first half of 2018, the most effective projects in terms of their implementation were those which aimed to support small businesses and individual entrepreneurship – 86.9% of the planned amount for the year, as well as in the educational sphere – 40.8%. Low indicators remained in projects that reform the control and supervision area –3.5%, as well as in the sphere of labor and employment – only 2.1%.

Part of the difference in outcome characteristics between different ministries and agencies in the context of specific programs is due to the objective characteristics of the functions. But to some extent, this indicates a low level of use of program-target methods in their activities, which leads to low efficiency.

It can be concluded that in order to effectively implement funds intended for targeted programming, special attention should be paid to the managers of funds. For example, it is necessary to apply to investment planning and to approve the project documentation in a timely manner.

Another problematic issue at the planning stage is the development of clearly ordered and detailed target criteria within any program. It is obvious that this work is a complex mental task, and therefore it is necessary to involve experienced professionals to execute it. In the future, at the implementation stage, careful planning will lead to minimize the risks associated with the execution of the budget.

Turning to the analysis of the implementation of financial resources through the prism of their effectiveness, we can note that the total funding of target programs in the current year amounted to about 950 billion rubles. Almost 200 billion of these were directed to scientific research. More than half of the requested funds are raised from regional budgets, as well as replenished at the expense of organizations. The effectiveness of the implementation of Federal programs in the current year exceeds the previous level of a few percent, but is generally consistent.

Thus, the active use of the program-target budgeting method makes it possible to streamline the internal structure of state budget expenditures. On the one hand, the implementation of targeted programs depends on the allocated funds. On the other hand, it depends on the ability of specific ministries and departments to implement the program. Finally, systematization and ordering of expenditure items of the Federal budget can increase the percentage of targeted state expenditures.

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INVESTIGATOR AND FEATURES OF THE PROCEDURAL INDEPENDENCE

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The article deals with the issues of procedural independence of an investigator. The author gives the definition of the term "procedural status of an investigator" and analyses his responsibilities. The main powers of the subjects supervising and controlling the procedural activity are also considered.

Keywords: *investigator, prosecutor, head of the investigative authority, procedural independence, criminal proceedings*

Criminal procedural legislation of the Russian Federation defines the procedural status of an investigator as an official authorized to carry out a preliminary investigation within his competence.

An investigator, who acts as a participant of criminal proceedings on the part of the prosecution, exercises the function of criminal prosecution in a criminal case. In order to exercise this function, an investigator is vested with a number of powers. Thus, in accordance with part 2 of Article 38 of the Code of Criminal Procedure of the Russian Federation he has got the responsibilities to initiate a criminal case, to take a criminal case to his own proceedings, to independently direct the course of investigation, to give binding written instructions to the body of inquiry, to carry out certain investigative actions, to appeal against a number of strictly defined decisions of the prosecutor with the consent of the head of an investigative body [4].

The Criminal Procedural Law grants an investigator the right to exercise other powers, such as: to receive and verify a report of a crime (part 1 of Article 144 of the Code of Criminal Procedure of the Russian Federation); to detain a person suspected of committing a crime (Article 91 of the Code of Criminal Procedure of the Russian Federation); to examine petitions from the participants of the preliminary investigation with a ruling in case of refusal (Art. 159 of the CPC of RF); suspend and resume the preliminary investigation (Chap. 28 of the CPC of RF) [4].

The exercise of the above powers ensures the appointment of criminal proceedings. Therefore, an obligatory condition for the proper implementation of the investigator's functions is empowering him to get procedural independence, which acts as a factor of legality, as well as the validity of the actions performed and decisions taken.

However, in the process of investigation of a criminal case, it is often necessary to perform actions that restrict certain rights and freedoms of citizens.

M.A. Ivanov states: "Complete uncontrollability during the investigation of criminal cases is unacceptable. In order to prevent the abuse of an investigator and minimize investigative errors, to guarantee the legality, validity and timeliness of procedural decisions and actions taken by the investigator, the legislator has established the prosecutor's supervision, departmental and judicial control. Personal responsibility of an investigator, including criminal responsibility, is also a guarantee of legality, validity and timeliness of decisions made and actions taken" [Ivanov 2017]. In spite of the fact that an investigator is an independent subject of criminal proceedings and bears responsibility for his decisions, the role of the procedural control carried out by the head of an investigative authority, prosecutor and court remains essential.

Thus, analyzing the prosecutor's control over the procedural activities of bodies of preliminary investigation, we can take into account such powers as the right to approve an indictment (para. 14. part 2 of article 37 of the Code of Criminal Procedure of the Russian Federation), to give back a criminal case to an investigator having added written instructions concerning additional investigation, on the amendment of the scope of charges or qualification of the actions of the accused (para. 15, part 2, article 37 of the CPC).

Departmental supervision is embodied in the responsibility of the head of the investigative authority to carry out procedural management of the investigators. Thus Article 39 of the Code of Criminal Procedure of the Russian Federation states that the head of an investigative body has powers to: check the materials of checking reports of a crime or the documents of a criminal case; give instructions as to production of investigative actions, on choice of preventive measures against a suspect or an accused, on the qualification of a crime and on the scope of a charge.

However, to perform some investigative actions at the pre-trial stages of criminal proceedings, an investigator must obtain the consent of a court. To resolve this issue, an investigator shall initiate a petition to the court, which shall make the relevant decision on the production of investigative and other procedural actions. For example, an investigator must obtain permission from the court for the inspection of the home in the absence of consent of persons living in it (Art. 177 of the CPC), for the production of search (seizure) in the home (Articles

182, 183 of the CPC), for the recording of telephone and other communications (Art. 186 of the CPC).

But not all legal scholars support control over the activities of the investigator. V.S. Shadrin notes: "It is precisely because of the lack of procedural independence of an investigator that cases of unjustified and illegal bringing of citizens to criminal responsibility are becoming more frequent. Ensuring procedural independence is an important condition for the proper provision of rights and interests of the individual during the investigation" [Shadrin 1994]. V.Yu. Melnikov has a similar point of view: "Due to insufficient legislative settlement of the problem of procedural independence of an investigator, his actual departmental subordination to his direct superiors, there are often negative consequences such as violation of rights and freedoms of a person and a citizen during preliminary investigation and inquiry" [Melnikov 2008].

Thus, despite the fact that some scientists claim a certain "stiffness" of investigators in making procedural decisions in a criminal case, the legislator certainly needs to seek a balance between granting powers to investigators in the implementation of criminal proceedings and the establishment of prosecutorial, departmental and judicial control. It might ensure legitimate and timely proceedings in a criminal case. Otherwise, limitation of an investigator's independence will significantly reduce his initiative and activity, which can lead to an increase of criminal cases with negative results of investigation.

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PROVIDING THE CONVICTS WITH PENSIONS UNDER THE LEGISLATION OF THE RUSSIAN FEDERATION

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The article deals with the specifics of implementation of the right to pension provision for persons sentenced to imprisonment. The author focuses on the analysis of the current legislation in the field of criminal law and social security law in the Russian Federation. The stated provisions are illustrated with case files from judicial practice.

Keywords*: convicts, imprisonment, convicts' rights, retirement system, pension provision system, pension insurance system, monthly deductions*

Today a person who is found guilty of committing a crime is not deprived of the legal right to pension provision like any other law-abiding citizen [2].

The Federal law "On insurance pensions" establishes the right of convicts to receive an old-age pension: for women – at the age of 60, for men – at the age of 65, if they have at least 15 years of work experience [5].

It is important to mention that the retirement system of the Russian Federation goes back to 1918, but at that time a convict's term of work in prison was not considered to be the length of service at the legislative level.

Some changes took place in 1997 with the adoption of the current Criminal Executive code of the Russian Federation, which preserved this norm and consolidated it in the article 98 [Yablokova 2013].

Nowadays, upon reaching the specified age, the convict has the right to apply to the authorities of the correctional facility, which will draw up the necessary documents and send them to the territorial branch of the Pension Fund of the Russian Federation.

The Federal law of April 1, 1996 "On individual registration in the compulsory pension insurance system" states that organizations which employ convicted persons get the status of "policyholders" [Barbosynova, Ruzaeva 2018].One of their main duties is to gather information about the time periods during which persons sentenced to imprisonment are engaged in work.

Besides, in this area of legal relations there are specific Rules used for:

- payment of different types of pensions
- checking documents required for the payment
- calculating pension amounts
- finding out overpaid sums of money

These Rules were approved on November 17, 2014 by order of the Ministry of Labor and Social Security.

It is important to mention that monthly deductions from the pensions of convicts are made to reimburse, for example, the costs of food, utilities and products for personal use.

The Ruling of the Constitutional Court of the Russian Federation contains a provision that the burden of expenses incurred by convicted persons for their maintenance does not violate their rights and freedoms. This position is justified by the fact that the retirement system was created to compensate for previously stable but lost income [3].

It is necessary to focus on the fact that despite the provisions mentioned above judicial practice can present a large number of cases of this category of persons applying to the courts with the requirement to recognize such detentions as illegal ones.

It is possible to illustrate it by a case heard in 2011 in Zavolzhsky district court. It was a civil case on the claim of the citizen R.F. Nizamov to the Federal state facility "Correctional colony N 9 of the Department of the Federal penitentiary service for the Ulyanovsk region".

In his lawsuit the citizen demanded to invalidate the actions of the institution to retain 75% funds in order to reimburse the cost of meals and utilities. He also claimed to get back unpaid part of pension and moral damages. In support of his suit, the plaintiff indicated that he was disabled, and had no obligation to pay alimony under the writ of execution.

During the trial, the court examined the submitted evidence (certificates of deductions and accrued amounts to the personal account of the convict, settlement documents and reports on R.F. Nizamov’s statement concerning the appropriate dietary food).

According to these documents, the retention took place for the purposes established by the Criminal Executive law. The plaintiff's reference to article 107 of the Criminal Code of the Russian Federation is a misinterpretation of the norm, since this article regulates cases when deductions from the account of a convicted person are made in favor of claimants. However, this type of retain does not exclude the deductions for the maintenance of the convict, who has no obligations under the writ of execution.

The court found out that the retain was not illegal or unjustified. The plaintiff's claim was rejected [4].

At the same time, it is impossible not to mention the problematic issues that arise in this area. For example, a large number of convicts do not have money in their individual accounts, since the majority of them are not interested in work. This is probably a consequence of the legally established "right to work", and not the “obligation to work” [Barbosynova, Ruzaeva 2018].

Summing up, it should be noted that the proclamation and further implementation of the right of a convicted person to get pension provision is a form of the policy of the Russian Federation as a social state, which is responsible for the development of equal opportunities for every citizen.

The Russian Federation, being a democratic and legal state, guarantees protection to all categories of citizens in cases established by legislative acts. This guarantee is a result of the ratification of many international legal instruments, including the International Covenant on economic, social and cultural rights of 1996. This document enables every person from the participating countries to get pension provisions.

Despite the fact that a person commits an illegal act, it is possible to get not only an insurance pension but also a social one. It might ensure a decent life and full adaptation of the convicted person after release from prison.

However, the application of the principle of humanism does not eliminate the current problems in the mentioned area of legal relations.

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SECTION 6. ENGINEERING TECHNOLOGY

DATA SCIENTIST AS A SPECIALIST OF THE FUTURE

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The article describes the direction in computer technology, which is called data science. The similarities between data science specialists and chemists, are explained. Specific examples of data scientists' work are shown, such as a company's automated business system and chatbots. The procedure of the specialist's work is described, and the difference between a data scientist and an analyst is explained.

Keywords: *data science, machine learning, data model, natural language processing, artificial intelligence systems.*

In the modern world, the amount of information that a person produces every day is constantly increasing, and a person is no longer able to analyze this information. For this purpose, special programs are made. So, a new profession was formed, which automates the work that people used to do before. This profession has become especially relevant in the light of the rapid development of services that use machine learning technologies and artificial intelligence systems.

These programs can structure and analyze data to help various business entities develop and increase the number of sales of these companies, as well as optimize their work. Data analysis is also used in programs that predict the weather, traffic congestion, find images where traces of the necessary elementary particles may appear, issue loan decisions, and can recommend a product, book, movie, or music. It is the development of such programs that data science specialists are engaged in.

Data science specialists, who use various scientific methods, work with data to find the correct solution to the problem. It’s evident that the humanities use data science. A chemist makes experiments, analyzes the results to test the hypotheses. A chemist should generalize specific observations, rather than consider values obtained accidentally during analysis, and draw correct conclusions based on them.

A data scientist also works with data, and their work is like that of a scientist in any other field. Mathematical statistics, logical principles, and modern data visualization tools (graphs and diagrams) are used to get results. All of these methods help specialists in both fields.

Data science is an interdisciplinary field that uses scientific methods, processes, algorithms, and systems to extract knowledge and understanding from many structural and unstructured data [Dhar 2013: 64–73].

Data science is related to data mining, machine learning, and it is a "concept to unify statistics, data analysis and the related methods" in order to "understand and analyze actual phenomena". It uses techniques and theories drawn from many fields within the context of mathematics, computer science [Hayashi1998: 40–51].

First, a data scientist collects data. So, data collection is an opportunity to evaluate the processes happening around us. And scientific approaches allow deciphering large amounts of data, finding cause-and-effect relationships and solving problems.

The next step in the work of a data scientist is to process large data sets to find new connections and patterns in them. After that, he uses machine learning algorithms to build a data model.

There is some controversy over the term data model these days. Some believe that the abstract model of business structures should be called the entity/relationship model, and the term data model should be reserved for the drawing of the database schema.

However, common usage erases this distinction, and while it is important for analysts and designers to understand the difference between these things, it is also important to get the business structure models to the public. It is easier to suggest to a business-manager that a person would like to discuss company data than entities and relationships. For this reason, this article refers to the logical models it discusses as "data models" [Hay1996: 1].

A transport company model can illustrate the work of a data scientist. It can predict demand, choose the best route, and track the driver's health indicators. The financial sector of the model will help managers better understand whether to grant credit to a person based on data about this person.

These models are also used in recommendation services, voice assistants (Yandex's Alice, Apple's Siri), autonomous trains, and cars (Tesla cars), and face recognition services.

Another example is Facebook Messenger, where people can communicate with artificial intelligence or in other words chatbots. These chatbots analyze a person's phrase and then programmatically calculate what phrase they should write. This process is called natural language processing. Sometimes during the dialog with such a bot, it is difficult to understand that it is a bot and not a person. In the modern world chatbots communicate almost like people.

A data model is also used in various applications that pick up similar images. A person can upload an image and the program will find key elements on it, then select images with the same key elements from the database. These data models also help in business. If a person wants to open a cafe, he can create a model that will predict where in the city it is better to do it. In this case, the data model will analyze data about existing cafes, public transport, places where there are attractions, and the rental price in different buildings.

So, part of the job of a data scientist is to analyze information, which is sometimes done by another team member, and the result of his work is a model-code in some programming language. This is the main difference between a scientist and an analyst.

A data scientist solves a company's business problem as a technological one, which means that he finds the best way to organize the company's work. And the analyst is increasingly immersed in the business component of this task. For example, a scientist performs tasks using machine learning – such as image recognition or predicting material consumption in production.

To solve this problem, the data scientist at first finds out the customer's requirements and assesses whether machine learning algorithms can be applied. Then he creates code for the data model based on the analyzed data. During processing, the data is converted to a format that is convenient for machine learning.

For a data science specialist, knowledge of mathematical statistics and probability theory is important. This is necessary for proper data analysis and identification of the most important cause-and-effect relationships. They also need to know machine learning algorithms. After all, in such work, there are huge amounts of data that a person cannot analyze independently without a computer.

The most common programming language for data science is Python. It is quite easy to learn, there are no extra parentheses and semicolons, which makes the code more readable. It also has a lot of built-in functions that a person does not have to write (for example, built-in algorithms for sorting numbers). In addition, Python has tools that allow building graphs based on data in the development window, which greatly facilitates data analysis.

So, the programs and models developed by data science specialists help business companies discover hidden cause-and-effect relationships, predict events, and optimize the most important business processes.

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