MINISTRY OF EDUCATION
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VITEBSK STATE
TECHNOLOGICAL UNIVERSITY

EDUCATION AND SCIENCE IN THE 21st CENTURY

Articles of the V International Scientific and Practical Conference

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[1]Vitebsk State Technological University, Vitebsk, Republic of Belarus

[2] JSC "Obolsky Ceramic Plant", Obol, Republic of Belarus

[3]Vitebsk State University named after P.M. Masherov, Republic of Belarus

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[1]Tashkent Institute of Textile and Light Industry, Republic of Uzbekistan
[2]"Paxtasonoat Ilmiy markazi" Joint stock company, Republic of Uzbekistan

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Section 1. INDUSTRIAL TECHNOLOGIES AND EQUIPMENT

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DESIGN OF THE LEVER MECHANISM OF THE EDGE FORMING OF THE WEAVING MACHINE

ПРОЕКТИРОВАНИЕ РЫЧАЖНОГО МЕХАНИЗМА КРОМКООБРАЗОВАНИЯ ТКАЦКОГО СТАНКА

Butkewich W.[1], Piotuch A., Dubanewich D., Kulandin A.
Vitebsk State Technological University, Republic of Belarus
E-mail: [1]Butkevich@mail.ru
Буткевич В.Г.[1], Пиотух А.А., Дубаневич Д.Т., Куландин А.С.
Витебский государственный технологический университет, Республика Беларусь

ABSTRACT

MECHANISM, MACHINE TOOL, FABRIC, RESEARCH, WORK, SCHEME, CAM

The paper deals with the design of the lever mechanism of the edge former of the Dornier weaving machine with an anti-four-link. The kinematics of the lever part of the mechanism is investigated depending on the crank rotation angle.

АННОТАЦИЯ

МЕХАНИЗМ, СТАНОК, ТКАНЬ, ИССЛЕДОВАНИЕ, РАБОТА, СХЕМА, КУЛАЧОК

В работе рассмотрены вопросы проектирования рычажного механизма кромкообразователя ткацкого станка фирмы Dornier с античетырехзвенником. Исследована кинематика рычажной части механизма в зависимости от угла поворота кривошипа.

Improving the quality and expanding the product range in the textile industry is closely linked with the use of new progressive technologies and new technological equipment. High-performance weaving machines with various ways of weft thread laying are used in the textile industry. Rapier and pneumatic weaving looms, as well as looms with small-size thread guides, allow to produce a wide range of high-quality fabrics. The machines are distinguished by a high level of automation of the

fabric production process, a wide range of threading widths, the possibility of using various shedding mechanisms, heald lifting carriages etc.

It is necessary to pay attention to edge structure choice by threading of cloth wear in the weaving machine. The edge former serves to form the fabric edge of various structures and is a connection of lever mechanisms with cams [1–3]. Research is devoted to the calculations of an edge formation mechanism. There is a significant number of works in which the problem of wearing of the cams working surfaces and the mechanical systems parts of the weaving machines are presented. For the sample estimation of the rational arrangement of the kinematic pairs, the scheme of the diaxial crank-rocker-mechanism of the edge knives of the Dornier weaving machines with anti-four-link mechanism was considered, that is, when the pusher and rocker arm are located opposite to each other (Fig. 1).

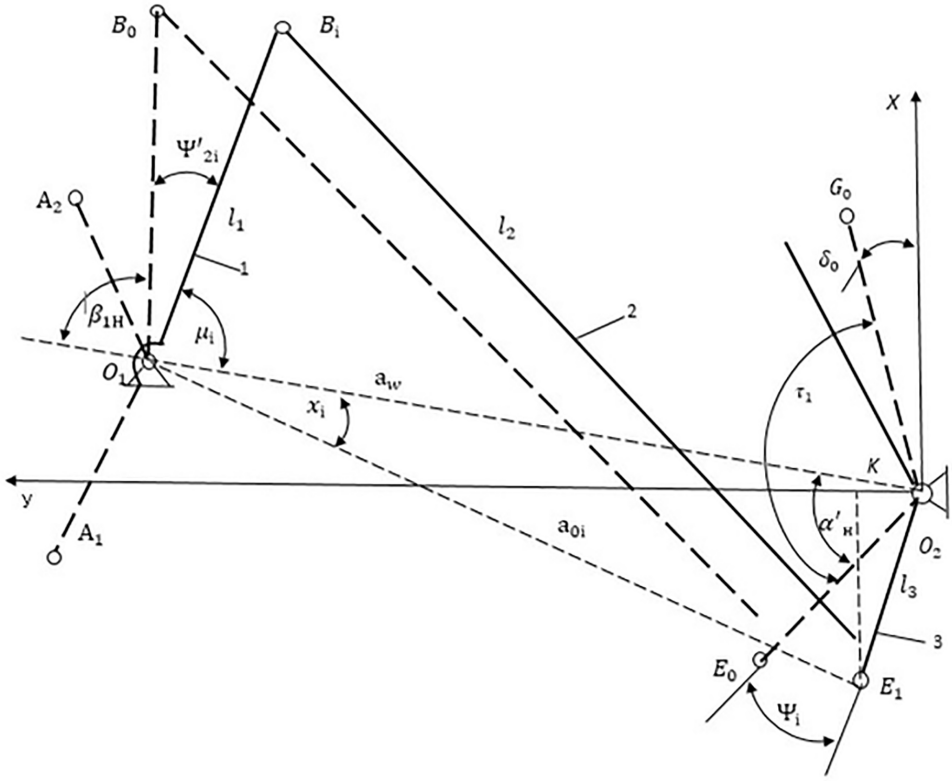

Figure 1 – Diaxial crank-rocker mechanism with anti-four-link unit

The scheme (Fig. 1) assumes a change in the direction of the cam rotation to the opposite.

The initial data include the following values: design angle T_1, α'_0 – the angle between the y and a_W axes where y is the coordinate axis, a_W – is the center distance, β_{1H} is the initial coordinate of the pusher in relation to the line of centers

O_1, O_2, is the initial coordinate of link 3 3(l_3) relative to the center distance, δ_0 is the angle between the X-axis (vertical axis) and the link of two-shoulder levers $E_0O_2G_0$. Point K – projection of point E_i – on the line of centers O_1.

$$\mathrm{tg}X_\mathrm{i}=\frac{E_\mathrm{i}K}{O_2K}=\frac{l_3\sin(\alpha'_\mathrm{н}+\Psi_\mathrm{i})}{a_w-l_3\cos(\alpha'_\mathrm{н}+\Psi_\mathrm{i})}. \quad (1)$$

Of $\Delta O_1B_iE_i$: $(l_2)^2 = l_1^2 + a_{0i}^2 - 2l_2a_{0i}\cos(\mu_i + x_i)$

$$\mu_\mathrm{i}+x_\mathrm{i}=\arccos\frac{l_1^2+a_{0\mathrm{i}}^2-(l_2)^2}{2l_2a_{0\mathrm{i}}}. \quad (2)$$

Of $\Delta O_1B_iE_i$: $a_{0i}^2 = a_w^2 + l_3^2 - 2l_3a_w(\alpha'_н + \Psi_i)$

$$\mu_i = 180° - \beta_{1H} - \Psi'_{2i} \text{ or } \Psi'_{2i} = 180° - \beta_{1H} - \mu_i \quad (3)$$

It follows from (1) and (2) that

$$\mu_\mathrm{i}=\arccos\frac{l_1^2+a_{0\mathrm{i}}^2-(l_2)}{2l_1a_\mathrm{i}}-\mathrm{arctg}\frac{l_3\sin(\alpha'_\mathrm{н}+\Psi_\mathrm{i})}{a_w-l_3\cos(\alpha'_\mathrm{н}+\Psi_\mathrm{i})} \quad (4)$$

After substituting (3) and (4), we get

$$\mu_\mathrm{i}=\arccos\frac{l_1^2+a_w^2+l_3^2-2a_wl_3\cos(\alpha'_\mathrm{н}+\Psi_i)-(l_2)^2}{2l_1\sqrt{a_w^2+l_3^2-2a_wl_3\cos(\alpha'_\mathrm{н}+\Psi_i)}}-\mathrm{arctg}\frac{l_3\sin(\alpha'_\mathrm{н}+\Psi_\mathrm{i})}{a_w-l_3\cos(\alpha'_\mathrm{н}+\Psi_\mathrm{i})} \quad (5)$$

Finally, the analogue of the motion law of the cam mechanism pusher $\Psi'_{2i}(S, \varphi)$ will be:

$$\Psi'_{2\mathrm{i}}=180°-\beta_{1H}-\arccos\frac{l_1^2+a_w^2+l_3^2-2a_wl_3\cos(\alpha'_\mathrm{н}+\Psi_i)-(l_2)^2}{2l_1\sqrt{a_w^2+l_3^2-2a_wl_3\cos(\alpha'_\mathrm{н}+\Psi_i)}}+ \quad (6)$$
$$+\mathrm{arctg}\frac{l_3\sin(\alpha'_\mathrm{н}+\Psi_\mathrm{i})}{a_w-l_3\cos(\alpha'_\mathrm{н}+\Psi_\mathrm{i})}$$

This solution method can be applied to other variants of the link design $E_0O_2G_0$.

As a result of the work the following conclusions can be drawn:

1. The study of the kinematics of the lever part of the edge-forming mechanism

depending on the angle of crank rotation makes it possible to design the cam profile at different lengths of the links.

2. The backing of the lengths of the links of the mechanism lever part allows to create this mechanism with the most rational transmission angles, providing the lowest loads in the kinematic pair of cam-pusher.

Reference

1. Гордеев, В. А., Волков, П. В. Ткачество: учебник для ВУЗов. – 4-е изд., перераб. и доп. – М.: Легкая и пищевая промышленность, 1984. – 488 с.

2. Технологические оборудования для ткацкого производства: пособие / В. С. Башметов [и др.]. – Витебск: УО «ВГТУ», 2009. – 145 с.

3. Технологическое оборудование для ткачества / В. С. Башметов [и др.]. – Витебск: УО «ВГТУ», 2018. – 472 с.

4. Артоболевский, И. И. Теория механизмов и машин. / И. И. Артоболевский – М.: Высшая школа, 1967. – 638 с.

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DETERMINATION OF RATIONAL MODES OF OBTAINING NANOFIBROUS MATERIALS BY ELECTROSPINNING ON THE FLUIDNATEK LE-50

ОПРЕДЕЛЕНИЕ РАЦИОНАЛЬНЫХ РЕЖИМОВ ПОЛУЧЕНИЯ НАНОВОЛОКНИСТЫХ МАТЕРИАЛОВ МЕТОДОМ ЭЛЕКТРОФОРМОВАНИЯ НА УСТАНОВКЕ FLUIDNATEK LE-50

Demidova M.[1], Ryklin D.[2]

Vitebsk State Technological University, Republic of Belarus

E-mail: [1]demidova.mariya00@gmail.com, [2]ryklin-db@mail.ru

Демидова М.А.[1], Рыклин Д.Б.[2]

Витебский государственный технологический университет, Республика Беларусь

ABSTRACT

ELECTROSPINNING, NANOFIBERS, POLYMERS, POLYVINYL ALCOHOL

The work is devoted to the determination of rational modes of obtaining nanofibrous materials on the Fluidnatek LE-50 installation, in which the electrospinning process proceeds stably and with the highest efficiency. The criterion for the effectiveness of the electrospinning process was established. The features of the electrospinning process are investigated at different values of voltage, the distance between forming electrodes, and consumption of fiber-forming solution.

АННОТАЦИЯ

ЭЛЕКТРОФОРМОВАНИЕ, НАНОВОЛОКНА, ПОЛИМЕРЫ, ПОЛИВИНИЛОВЫЙ СПИРТ

Работа посвящена определению рациональных режимов получения нановолокнистых материалов на установке FluidnatekLE-50, при котором процесс электроформования протекает стабильно и с наибольшей эффективностью. Был установлен критерий эффективности процесса электроформования. Исследованы особенности процесса электроформования при различных значениях напряжения, расстоянии между формующими электродами и расходе волокнообразующего раствора.

Electrospinning is one of the most promising methods for the production of new types of textiles allowing to develop fibrous webs from submicron diameters to nanometer diameters using a high-potential electric field [1–3]. Electrospinning from polymer solutions and melts is of interest because of wide range of applications. The nanofibers obtained by electrospinning method are successfully used to solve different problems: for filtering highly dispersed aerosols in systems of purifying gas-air emissions, creating filters in respiratory protective equipment, providing antimicrobial and antiviral properties, regulating water and vapor permeability, creating dressings in the treatment of extensive burn surfaces, long-term non-healing wounds and trophic ulcers. These materials are also used in tissue engineering, for systems of controlled drug delivery, for the regeneration of cartilaginous, bone, nerve tissues, skin, and walls of blood vessels [2, 3]. Electrospinning is distinguished by a combination of high efficiency, instrumental simplicity and high flexibility that makes it possible to obtain fibrous materials with a wide range of properties and sizes of a single fiber from 50 to 500 nm [4].

The object of the study was a machine Fluidnatek LE-50 for electrospinning nanofibrous materials in the Vitebsk State Technological University in the laboratory of the DepartmentTextile Technology. The electrospinning machine Fluidnatek LE-50 is equipped with a syringe that fits into the pump. The solution flows through the capillary from the syringe to the electrospinning head, to which a positive voltage is applied. The flow rate of the solution can be adjusted by the speed of the piston lowering by the pump. The nanofibers are deposited on a non-woven material attached to a drum (collecting electrode), to which a negative voltage source is applied.

The aim of this work was to determine the rational modes of obtaining nanofibrous materials from aqueous solutions containing 15 % and 20 % polyvinyl alcohol (PVA) grade Sevol 205 by Sekisui Specialty Chemicals Europe S.L. (USA) in which the electrospinning process is stable at different distances between electrodes of the Fluidnatek LE-50. The variation intervals for the experimental factors are presented in Table 1.

Table 1 – Ranges and intervals of variation of experimental factors

Factor	Range of variation		Variatio-ninterval
	Min. level	Max. level	
Solution consumption Q, µl/h	150	850	50
Emitter voltage (P+), kV	13	29	1
Collector voltage (P-), kV	-5	-9	1
Distance between spinning electrodes, cm	8	12	2

We decided to consider the process electrospinning as stable in which the drop at the tip of the needle of the spinning head does not change over time and the processes of forming and pulling the jet occur continuously.

The productivity of the machine depends on the consumption of the polymer solution. In this regard, the maximum solution consumption was taken as a criterion for the efficiency of the electrospinning process.

Analysis of the experimental results showed that stable electrospinning of nanofiber materials from a solution containing 15 % polyvinyl alcohol occurs at a minimum voltage of 14 kV, while the solution consumption is 150 μL/h. On average, with an increase in voltage by 1 kV the rise of the solution flow rate of by 25 μL/h is observed.

The maximum consumption of the polymer solution during a stable electrospinning process was 850 μL/h. It was achieved at a distance between the spinning electrodes of 8 cm and a voltage of 25 kV.

A solution containing 20 % polyvinyl alcohol has the same tendency. The maximum consumption of the solution with a stable electroforming process was 400 μL/h with a distance between the forming electrodes of 12 cm and a voltage of 26 kV.

Based on the analysis of experimental data taking into account the criterion of the efficiency of the process it was found that it is rational to use the solution with 15 % polyvinyl alcohol for the electrospun material manufacturing. Its dry matter mass consumption with the maximum flow rate of 850 μL/h was by 1.6 times higher than for a 20 % polyvinyl alcohol solution the maximum flow rate of which was 400 μL/h.

Reference

1. Huang, Z. M.; Zhang, Y. Z.; Kotaki, M. &Ramakrishna, S.: A review on polymer nanofibers byelectrospinning and their applications in nanocpomposites, Composites Science andTechnology, 63 (2003), pp. 2223–2253.

2. Cipitria, A., Skelton, A., Dargaville, T.R., Dalton, P.D. &Hutmacher, D.W.: Design, fabrication and characterization of PCL electrospun scaffolds – a review, Journal of Materials Chemistry, 21 (2011), pp. 9419-9453.

3. Ji, W., Sun, Y., Yang, F., Van den Beucken, J.J.J.P., Fan, M., Chen, Z. & Jansen, J.A.: Bioactiveelectrospun scaffolds delivering growth factors and genes for tissue engineering applications, Pharmaceutical Research, 28 (2011), pp. 1259–1272.

4. Bhardwaj, N. &Kundu, S.C.: Electrospinning: A fascinating fiber fabrication technique, Biotechnology Advances, 28 (2010), pp.325–347.

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STUDY OF THE ISSUE OF DESIGNING CLOTHES WITH THE FUNCTION OF PROTECTION AGAINST THE VIRUS

ИЗУЧЕНИЕ ВОПРОСА ПРОЕКТИРОВАНИЯ ОДЕЖДЫ С ФУНКЦИЕЙ ЗАЩИТЫ ОТ ВИРУСОВ

Getmantseva V.[a], Bukashkina E.
The Kosygin State University of Russia, Russian Federation
E-mail: [a]getmantseva@inbox.ru
Гетманцева В.В.[a], Букашкина Е.А.
Российский государственный университет имени А.Н. Косыгина (Технологии. Дизайн. Искусство), Российская Федерация

ABSTRACT

SPECIAL CLOTHING, HARMFUL FACTORS, PROTECTIVE PROPERTIES, COMPLIANCE WITH THE QUALITY OF MATERIALS

The impact of the external environment adversely affects the state of a person, his/her life activity both at work and in everyday life. In order to develop clothing for protection against viruses, the issue of designing special-purpose clothing has been investigated, criteria for the effectiveness of the application of various solutions in the field of design, the use of constructive and technological solutions, the assembly of materials and additional finishing have been determined.

АННОТАЦИЯ

СПЕЦИАЛЬНАЯ ОДЕЖДА, ВРЕДНЫЕ ФАКТОРЫ, ЗАЩИТНЫЕ СВОЙСТВА, СООТВЕТСТВИЕ КАЧЕСТВА МАТЕРИАЛОВ

Воздействие внешней среды неблагоприятным образом сказывается на состоянии человека его жизнедеятельности как в производственных, так и в повседневных условиях. С целью разработки одежды для защиты от вирусов исследован вопрос проектирования одежды специального назначения, определены критерии эффективности применения разных решений в области вопросов дизайна, использования конструктивных и технологических решений, конфекционирования материалов и дополнительной отделки.

The main function of industrial clothing is to ensure the safety of working conditions, protection from the effects of harmful production factors, preservation of the normal functional state of a person, his/her working capacity during the entire working time [1].

The difficult ecological situation, which has developed both in people's working and everyday life, requires a revision of the issues of assessing the quality of special-purpose clothing [2]. In addition to the main functional purpose, clothing should be non-toxic, not irritating to the human body, and comfortable in terms of ergonomics [3].

Overalls must correspond to the work performed and the external conditions of the environment; the weight should not exceed 10 % of the person's weight; the cut should not impede blood circulation, not constrain breathing, not cause displacement of internal organs; ensure ease of cleaning from contamination; strength. Clothing that protects workers from exposure to hazardous and harmful factors, depending on the purpose and in accordance with GOST 12.4.103.83 "Special protective clothing, personal protective equipment for hands and feet. Classification", is divided into 15 groups and subgroups.

The classification is based on the protective properties of clothing, allocated depending on the impact on a person of harmful production factors.

When designing special-purpose clothing, it is important to take into account that the provision of protection functions must be provided at all stages of clothing design: when developing a design, a constructive and technological solution, and assembling a package of materials [4].

To confirm the choice of the list of properties, it is necessary to assess the possibility of using various materials in a clothing package, as well as to determine the criteria for the effectiveness of their use for the manufacture of a specific type of product. It is advisable to form a system of quality indicators that meet certain requirements [5].

Clothing for protection against viruses was selected as the object of research. A large number of industrial protection kits are currently being produced. However, with many of the advantages of these suits, they cannot be used as casual wear, however, the solutions used in these garments can be used to design household clothing.

Three aspects for research have been identified: characteristics of materials [6] recommended for use in household clothing with a function of protection against viruses; features of the constructive solution of these kits; features of the technological solution.

The properties of the fabric from which the clothes are made affect the likelihood

of contracting the virus. The higher the density of the material is, the fewer chances there are for the pathogen to leave it, being in the air. The material from which the clothes with the function of protection against viruses are made must retain moisture on the surface, be pleasant to the touch, resistant to mechanical influences such as tearing, puncture, cut, and drape well. Recent research suggests cotton as the best protection. For the special purpose clothing, materials with a defenseless feature are used, including:

- spunbond SMS, which is a combination of two outer layers of spunbond and inner meltbluane due to which a fabric is formed with high rejection rates of foreign elements and impurities and high protective properties;
- sontara or Softes, which are non-woven hydrophobic membranes consisting of cellulose and polyester, due to which they perfectly repel moisture drops, trap microorganisms and allow air to pass through;
- tyvek – the material is characterized by a large number of micropores, is made of polyethylene fiber, has the function of containing viruses and absorbing harmful fumes;
- saprel is a material that is a combination of polypropylene and polyethylene fibers, polypropylene fibers improve the tactile perception of the material, due to the polyethylene fibers, the function of barriers from harmful substances is enhanced.

The features of the constructive solution are:

- completeness of the suit, including overalls, dressing gown, shoe covers, cap, gloves, respirator, glasses, aprons, armbands, gas masks;
- the need to cover all open areas of the body;
- the presence of clamps, adjacent cuffs; stoppers for locks and other protective elements;
- correspondence to the size of a person, convenience in statics and dynamics.

From the point of view of technology, an important point is the presence of welded sealed seams.

The information obtained will be used in work aimed at creating clothing with the function of protection against viruses. Particular attention will be paid to the constructive solution. When designing products, structural details will be included to prevent viruses from entering the underwear, methods of fastening without buttons will be developed, folds will be excluded in smooth fabrics to prevent the accumulation of viruses.

The developed samples of clothing, the additional function of which is a means of protection, will not only protect a person from viruses but will also help to "purify" the environment.

Reference

1. Иващишина, А. С., Гетманцева, В. В. Анализ инновационных подходов проектирования и изготовления одежды с функцией терморегуляции // В сб. трудов Всероссийской научно-практической конференции «Дизайн и искусство – стратегия проектной культуры XXI века». – М.: РГУ им. А.Н. Косыгина, 2018. – С. 62–65.

2. Иващишина, А. С., Гетманцева, В. В. Инжиниринг в области дизайна современного костюма // В сб. трудов Международной научной конференции «Инновационное развитие легкой и текстильной промышленности (ИНТЕКС-2019)». – Москва, 2019. – С. 101–105.

3. Иващишина, А. С., Гетманцева, В. В. Аутдор – квинтэссенция технологичности, практичности и эффективности // В сб. трудов «Инновационные технологии в текстильной и легкой промышленности». – Витебск: Изд-во ВГТУ, 2018. – С. 138–140.

4. Иващишина, А. С., Гетманцева, В. В. Инжиниринг в области дизайна современного костюма // В сб. трудов Международной научной конференции «Инновационное развитие легкой и текстильной промышленности (ИНТЕКС-2019)». – Москва, 2019. – С. 101–105.

5. Гетманцева, В. В., Андреева, Е. Г. Обобщенная модель процесса параметрического проектирования одежды // В сб. научных трудов Международного научно-технического симпозиума «Современные инженерные проблемы промышленности товаров народного потребления» Международного научно-технического Форума «Первые международные Косыгинские чтения» (11-12 октября 2017 года). Том 1. – М.: ФГБОУ ВО «РГУ им. А.Н. Косыгина», 2017. – С. 86–90.

6. Гркикян, А. О., Иващишина, А. С., Ильинская, Л. А., Гетманцева, В. В., Андреева, Е. Г. Инновационные технологии применения нетканых материалов // В сб. мат. 53 Международной научно-технической конференции преподавателей и студентов. – Витебск: ВГТУ, 2020.

UDC 687

STAGES OF DEVELOPMENT OF A MULTIFUNCTIONAL COSTUME

ЭТАПЫ ПРОЕКТИРОВАНИЯ МНОГОФУНКЦИОНАЛЬНОГО КОСТЮМА

Getmantseva V.[a], Guseva M., Andreeva E., Gorkovenko L.
The Kosygin State University of Russia, Russian Federation
E-mail: [a]getmantseva@inbox.ru
Гетманцева В.В.[a], Гусева М.А., Андреева Е.Г., Горковенко Л.
Российский государственный университет имени А.Н. Косыгина (Технологии. Дизайн. Искусство), Российская Федерация

ABSTRACT

STAGE COSTUME, GARMENT DESIGNING, DESIGN, MODEL, DESIGN OF CLOTHES, PATTERNMAKING

The article presents a step by step process of creating the stage costume. The information gathering, analysis and systematization of this information were demonstrated by the example of the specific costume creation. The purpose of the product and the specificity of its exploitation were taken as the baseline information. Customer's preferences were identified, and the features of the consumer's appearance were analyzed. The result of the above-mentioned analysis is a product requirement which is formulated as statements of a work to be undertaken. The following characteristics were identified as the most important requirements to the

АННОТАЦИЯ

СЦЕНИЧЕСКИЙ КОСТЮМ, ПОШИВ ОДЕЖДЫ, ДИЗАЙН, МАКЕТ, ДИЗАЙН ОДЕЖДЫ, КОНСТРУКЦИЯ

В статье представлен пошаговый процесс проектирования сценического костюма. Процесс подбора, анализа и систематизации проектной информации продемонстрирован на примере персонифицированной модели. В качестве исходной информации принято назначение изделия и специфика его эксплуатации. Выявлены предпочтения потребителя, проанализированы особенности его внешности. По результатам анализа сгруппированы требования к изделию, сформулировано поэтапное описание предстоящего процесса проектирования. В качестве важнейших требований к дизайну костюма определены эрго-

design of the costume: an ergonomic comfort during the exploitation, an effortless transformation of the costume during the performance. The following features were determined as the most important requirements to the visual image of the outfit: conformity with a modern fashion trends, stunning look, providing visual correction of the customer's body.

номическое соответствие при эксплуатации, быстрое преображение костюма во время выступления. В качестве важнейших требований к визуальному образу изделия определены такие, как соответствие современным тенденциям моды, эстетичный внешний вид; обеспечение визуальной коррекции фигуры заказчика.

An exciting and creative work in the field of clothing design is the process of creating a new image and finding a new solution in the garment design. The creation of each look is accompanied by the solution of a whole set of tasks, both traditionally directed and non-trivial ones. Undoubtedly, new knowledge and experience can be used in the works of designers, patternmakers, and garment technologists.

Understanding the task of designing a stage costume presupposes the definition of the basic requirements for the costume, which are developed from the study and analysis of the initial information [4]:

- the main purpose of the product;
- operating conditions;
- consumer preferences;
- appearance features of the consumer.

The fundamental purpose of the product is a stage costume, which will be used for solo performance on a large stage with a coloured illumination. In the model developing process the characteristic of the venue, its colour and stylistic solution were taken into account. In our case, the venue is the ATMA 360 stage in the Stas Namin Theater.

The peculiarity of the ATMA 360 stage is that the hall was constructed in the form of a dome, which allows the viewer to be surrounded with visual interactive 360o effects. The color composition for the venue during the concert is a combination of bright colours, moving patterns and sparkling elements. The abundance of color on the site carries the danger of overturning attention as a center of composition, so the choice of colour solution for the costume is one of the important issues.

Also, an important noteworthy aspect is the season of stage performance. The concert is held in June, the event hall is not air-conditioned, but the performance is full of dancing elements [5].

Based on the review, the requirements for the costume are determined. Obviously, one of the main requirements to the product is to ensure ergonomic comfort during its use [6]. The product should provide ease of movement of the artist and be flexible (not to disturb the plastics of the moving artist's body), and keep esthetic properties even after 2 hours of active use.

During the decision of the costume composition, the basic requirements to the visual image of the model are determined:

- the conformity to 2019 fashion trends;
- a spectacular appearance;
- providing visual correction of the body [7];
- multifunctional.

The trends of the season are studied in the model creating process. Every year leading fashion houses demonstrate the latest combinations of fabrics, textures, and forms; the Panton Academy of Colour offers the most actual colour range.

Lightning trends and eternal classics became the central philosophy of costume creation. The ideas of the suit are based on a combination of black and white, and geometry inspired by black and white photography. At the stage of elaboration of the assortment series of costume models, a line of sketches was drawn. The line includes models with different compositional and proportional solutions. At the same time, the entire line is sustained in a single style (Fig. 1).

Figure 1 – Assortment series of models (by Gorkoveno L., 2019)

The main purpose of development of the assortment series of models is creation of some models line in which each model has the maximum variety of appearance. Diversity is achieved by using different variants of constructive and decorative elements such as a clasp, a collar, a pocket, a cuff, a belt, and others. In the developed line materials of several colours, but similar in fibrous composition are supposed to be used. They are also supposed to use a similar finishing, trim, and accessories. The developed assortment range allows to demonstrate to the customer several variants of a constructive and compositional solution of a stage costume and to give them the right to choose the most relevant solution, focusing on individual preferences.

The customer's attention was drawn to models presented on sketches No. 2 and 3 (Fig.1). It was decided to combine elements of these models were decided to combine and create a suit consisting of 4 elements of clothing: bodysuit, trousers, asymmetrical skirt and jacket. This solution allows performing the task of multifunctional costume.

Summary

1. On the example of creating a stage costume, the study of the process of collecting initial information, its analysis and systematization was carried out. The result of the study was the formulation of requirements for the product in the form of technical specifications. Detailed structured requirements served as a canvas for further design of the suit, its structural and compositional solutions.

2. The steps of designing the stage costume are presented in order to ensure that the product meets the necessary requirements: it meets the main purpose, it is convenient to use under specified conditions, it fully corresponds to the features of the external image and the preferences of the consumer.

References

1. Андреева, Е. Г., Мартынова, А. И., Галун, Д. А. Презентация одежды массового потребления / Швейная промышленность. – 2012. – № 2. – С. 26–31.

2. Иващенко, И. Н., Гетманцева, В. В. Искусство костюма: проектирование конструкций в САПР: – учеб. пособие – Краснодар, 2016.

3. Гетманцева, В. В., Андреева, Е. Г. Обобщенная модель процесса параметрического проектирования одежды // Сборник: Современные задачи инженерных наук сборник научных трудов Международного научно-технического симпозиума. – Москва. – 2017. – С. 86–90.

4. Мартынова, А. И., Андреева, Е. Г. Конструктивное моделирование одежды. – М., 2006. – 196 с.

5. Бутко, Т. В., Гусева, М. А., Андреева, Е. Г. Композиционно-конструктивный анализ моделей одежды промышленных и дизайнерских коллекций. Учебное пособие для бакалавров и магистров по направлению 29.03/04.05 Конструирование изделий легкой промышленности. – Москва, 2018.

6. Мартынова, А. И., Андреева, Е. Г., Максутова, М. Т. Разработка метода оценки динамической характеристики конструкции женской плечевой одежды // Швейная промышленность. – 2011. – № 1. – С. 47–48.

7. Кузнецова, А. М., Гетманцева, В. В. Исследование функциональных особенностей изделий, корректирующих осанку // В сб.: Инновационное развитие легкой и текстильной промышленности (ИНТЕКС-2017): сборник материалов Всероссийской научной студенческой конференции. – 2017. – С. 137–139.

UDK 691.4

INVESTIGATION OF CONTENT OF TECHNOGENIC PRODUCTS OF CHEMICAL WATER TREATMENT OF HEAT AND ELECTRIC POWER PLANTS IN CLINKER CERAMIC MATERIALS

ИССЛЕДОВАНИЕ СОДЕРЖАНИЯ ТЕХНОГЕННЫХ ПРОДУКТОВ ХИМИЧЕСКОЙ ВОДОПОДГОТОВКИ ТЕПЛОЭЛЕКТРОЦЕНТРАЛЕЙ В КЛИНКЕРНЫХ КЕРАМИЧЕСКИХ МАТЕРИАЛАХ

Kauchur A.[1], Hrachanikau A.[1], Manak P.[2], Liatas A.[3]

[1]Vitebsk State Technological University, Vitebsk, Republic of Belarus

[2] Obolsky Ceramic Plant, Obol, Republic of Belarus

[3]Vitebsk State University named after P.M. Masherov, Republic of Belarus

ABSTRACT

CERAMIC TILES, MAN-MADE PRODUCTS, CHP CHEMICAL WATER TREATMENt

The article presents the results of a study of the content of man-made products of chemical water treatment used at combined heat and power plants in clinker ceramic materials. The results of the research showed the possibility of using man-made products water treatment used at combined heat and power plants (CHP) in the production of clinker ceramic materials and the range of rational values of the content of inorganic waste in the composition of the ceramic mass and the temperature of sintering.

АННОТАЦИЯ

КЕРАМИЧЕСКАЯ ПЛИТКА, ТЕХНОГЕННЫЕ ПРОДУКТЫ, ХИМИЧЕСКАЯ ВОДОПОДГОТОВКА ТЭЦ

В статье приведены результаты исследования содержания техногенных продуктов химической водоподготовки ТЭЦ в клинкерных керамических материалах. В результате проведённых исследований установлена возможность использования техногенных продуктов химводоподготовки ТЭЦ в производстве клинкерных керамических материалов и определена область рациональных значений содержания неорганических отходов в составе керамической массы и значение температуры спекания.

The rational use of natural resources is currently of particular importance. Technogenic products are waste (sludges) of various types of production, suitable in their qualitative and quantitative composition for further industrial use [1]. One of the directions of their processing is the use of waste as man-made raw materials in the production of construction products. At present, Obolsky Ceramic Plant is expanding its product range by producing ceramic clinker products using man-made products of chemical water treatment of combined heat and power plants (CHP).

Clinker, or clinker brick, is a brick that is fired until the shard is completely sintered without glazing the surface and signs of deformation. Depending on the field of application, there is road clinker, construction, facing, and clinker for hydraulic structures. Of all its varieties, road clinker was the most widely used, which was primarily associated with the idea of this material as a construction material. The history of clinker began in Denmark in Bokhorn borough in 1743 with the appearance of a workshop for firing bricks (stones) for paving roads. In Russia, the first clinker plant was built in 1884 in Topchiivka village near Chernigov. In the framework of the project "Innovative, resource-saving production technology of paving slabs using industrial waste", carried out on the instructions of the state scientific research program "Physical materials science, new materials and technologies", Department of Ecology and Chemical Technologies jointly with Obol Ceramic Plant study the possibility of using man-made products and energy complex (sludges of chemical water treatment at the CHP) as an additive in the manufacture of ceramic paving materials.

A preliminary analysis of the literature sources showed that there is no information about the use of man-made products of chemical water treatment of the CHP as an additive in the manufacture of clinker ceramic materials. The studied precipitation of chemical water treatment of the CHP in its natural form is a wet mass of dark brown color [2]. The oxide composition of man-made products of chemical water treatment of the CHP was determined in the testing center of the state enterprise "Institute of NIISM" [3]. Table 1 shows the oxide composition of sludges of chemical water treatment of thermal power plants.

Table 1 – Oxide composition of sludges of chemical water treatment of the CHP

Component	SiO_2	Al_2O_3	Fe_2O_3	FeO	TiO_2	P_2O_5	CaO	MgO	Loss on ignition	SO_3	Na_2O	K_2O
Wt, %	0,24	0,64	1,77	2,85	0,03	н.о.	47,66	2,26	44,15	н.о.	0,20	0,08

In accordance with the requirements of STB 1450-2010 "Technological documentation. Technological specification. General requirements for the development" the formulation and composition of raw materials for the manufacture of prototypes of ceramic clinker paving slabs using precipitation of chemical water treatment of thermal power plants (Table 2).

Table 2 – Composition of the mixture for forming ceramic clinker tiles with additives of sludges of chemical water treatment precipitation of the CHP

Components	Mixing ratio, %		
	№ 1	№ 2	№ 3
Clay raw material at Rudnya-2 deposit	30	25	20
Clay raw material Latnensky deposit	40	40	40
Clay raw material Zapolye deposit	25	30	35
Shamotte	2	3	4
Sludges of chemical water treatment of the CHP	3	2	1

When preparing studies to optimize the ratio between waste and sintering temperature in the composition of ceramic mass for molding ceramic clinker tiles, the following task was set: to determine the most rational values of the content of inorganic waste generated during water treatment at the CHP and the sintering temperature that provide the required physical and mechanical properties of the tile. To conduct experimental studies at Obolsky Ceramic Plant, experimental samples of ceramic clinker paving slabs (ceramic clinker bricks) with additives of man-made products of the energy complex (chemical water treatment sludges) were made in accordance with the developed recipe (Table 2). Mixing of all raw materials and forming of ceramic clinker tiles (ceramic clinker bricks) was carried out using a mechanical stirrer. After mixing the components, a homogeneous plastic mass was obtained with a moisture content of 18 %. In the course of the experiment, samples of ceramic clinker tiles were formed. The final firing of products was carried out in a muffle furnace at temperatures of 1100, 1150, and 1200 ^{o}C. The total duration of the heat treatment and firing processes was 36 hours, including the holding time at a maximum temperature of 4 hours. In the production laboratory of Obolsky Ceramic Plant studies of the physical and mechanical properties of experimental samples of ceramic clinker tiles were carried out [4]. When preparing studies on optimization, the following indicators were used as input parameters: X_1 – sintering temperature, ^{o}C; X_2 – content of man-made products of chemical water treatment, %. The levels and intervals of variation of the input factors are presented in Table 3.

Table 3 – Levels and intervals of variation of input factors

Input factor name	Designation	Variation levels			Variation interval
		–1	0	+1	
Sintering temperature, ^{o}C;	X_1	1100	1150	1200	50
Content of man-made products of chemical water treatment, %.	X_2	1	2	3	1

The following indicators were used as output parameters: ***Y1*** – Compressive strength, MPa; ***Y2*** – Ultimate bending strength, MPa; ***Y3*** – Water absorption, %; ***Y4*** – Frost resistance, cycles. A full-factor experiment was carried out, realizing all possible combinations of varying the input parameters. After analyzing the combined graph of the dependence of optimization criteria on input factors and taking into account the restrictions imposed on them, the range of rational values of the content of inorganic waste in the ceramic mass (2–3 %) and the sintering temperature – 1150 ^{o}C is determined

Studies of physical and mechanical properties of experimental samples of ceramic clinker tiles conducted at Obolsky Ceramic Plant show the possibility of using man-made products of the energy complex (sludges of chemical water treatment of the CHP) as an additive in the manufacture of general-purpose ceramic building materials. The range of rational values of the content of inorganic waste in the composition of the ceramic mass and the value of the sintering temperature is determined.

References

1. Makarov, A. B. Man-made mineral deposits. Sorovskiy obrazovatel'nyy zhurnal – Sarov educational magazine, 2000, vol. 6, № 8, pp. 76–80. In Russian)

2. Kauchur, A., Hrachanikau, A., Manak, P., Kauchur, S. Kompleksnoe ispol'zovanie neorganicheskikh otkhodov vodonasosnykh stantsiy i teploelektrotsentraley : monografiya [Integrated use of inorganic wastes of water pump stations and thermal power centers: monograph], Vitebsk, VSTU, 2018, 165 p. (In Russian)

3. Kauchur A., Hrachanikau A., Kauchur S., Timonov I., Patotski V. Ceramic brick with addition of rainfall of chemical water treatment of combined heat and power plants, Trudy BGTU – Works of BSTU, 2018, Series 2, № 2, pp. 146–158.

4. Manak, P., Kauchur, A., Hrachanikau, A., Timonov, I. Technogenic products of chemical water treatment of thermal power plants as an additive to clinker ceramic materials. Vestnik Vitebskogo gosudarstvennogo tekhnologicheskogo universiteta [Vestnik of Vitebsk state technological university], 2020, no. 1 (38), pp.150. DOI:10.24411/2079-7958-2020-13815 (In Russian)

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APPLICATION OF ENZYMES FOR CELLULOSIC YARN PROCESSING

ПРИМЕНЕНИЕ ФЕРМЕНТОВ ПРИ ПОДГОТОВКЕ ЦЕЛЛЮЛОЗОСОДЕРЖАЩЕЙ ПРЯЖИ

Lisouski D.[a], Yasinskaya N.
Vitebsk State Technological University, Republic of Belarus
E-mail: [a]lisouskid@gmail.com
Лисовский Д.Л.[a], Ясинская Н.Н.
Витебский государственный технологический университет, Республика Беларусь

ABSTRACT

ENYZYME, CELLULASE, COTTON YARN, BIOSCOURING, BIOTECHNOLOGY

The enzymatic treatment of cellulosic (cotton) yarn has been investigated. It was found that the use of cellulases before peroxide bleaching allows to produce the yarn with improved characteristics: capillarity and tensile strength increase by 21–29 % and 15–22 %, respectively, and bending rigidity decreases by 9–14 % compared to traditionally prepared yarn.

АННОТАЦИЯ

ФЕРМЕНТ, ЦЕЛЛЮЛАЗА, ХЛОПЧАТОБУМАЖНАЯ ПРЯЖА, БИООТВАРКА, БИОТЕХНОЛОГИЯ

Исследован процесс ферментной обработки целлюлозосодержащей (хлопчатобумажной) пряжи. Установлено, что применение целлюлаз перед пероксидной отбелкой позволяет получить пряжу с улучшенными характеристиками: капиллярность и разрывная нагрузка увеличиваются на 21–29 % и 15–22 %, соответственно, а жесткость пряжи уменьшается на 9–14 % по сравнению с традиционно подготовленной пряжей.

Introduction

The production and consumption of textile materials and products from natural fibers occupy one of the leading positions [1]. To ensure the high quality of textiles, the properties of cellulosic (cotton) yarn must correspond to certain requirements,

the main ones of which are high hydrophilicity and tensile strength.

To impart the necessary properties to cellulosic yarn, it is subjected to a number of physical and chemical treatments, the main stages of which are deacidification, souring, bleaching, and finishing. The goal of these processes is the partial removal of non-cellulosic impurities by exposure to aggressive chemicals [2]

In the past few decades, research into biochemical methods for preparing textile materials from cellulose fibers has acquired particular importance. Enzymes selectively react with the substrate and minimize the formation of by-products, are safely inactivated without causing harmful effects on humans and the environment [3, 4].

Materials and Methods

Yarn

Cellulosic (cotton) yarn produced by Rechitsa Textile Company (Belarus) was chosen as the object of the study, the characteristics of which are given in Table 1.

Table 1 – Properties of a sample of cotton yarn

Property	Value
Nominal linear density, tex	38.0
Actual linear density, tex	37.4
Tensile strength, cN	357
Elongation at break, %	6.35
Twist	37.5

Enzymes

For enzymatic processing of yarn, we used ENZITEX CKP (Ferment Company, Belarus), which is a liquid form of cellulase with an activity of at least 500 U/cm^3 and an optimal pH of 4.5-5.5 and an optimal temperature of 50–60 °C.

Textile auxiliaries

The wetting stage was carried out using complex preparation FORYL ALL-IN (Pulcra Chemicals, Germany) containing surfactants and complexing agents.

The finishing stage was carried out using Belfasin GTN (Pulcra Chemicals, Germany), a special cationic softener for cellulosic yarn.

Processing mode

Experimental studies of the process of enzymatic treatment of gray cotton yarn with subsequent peroxide bleaching (FORYL ALL-IN 1.5 g/l, hydrogen peroxide (60 %) 4.5 g/l, caustic soda 2.5 g/l) in a periodic manner has been conducted according to the scheme which is shown in Figure 1.

Figure 1 – Yarn processing mode

The assessment of the effect of enzyme preparations on the physical and mechanical properties of the yarn was carried out according to the following indicators: tensile strength, breaking elongation, bending rigidity, and capillarity of the yarn.

Results and discussion

The test results of yarn samples with and without enzymatic treatment are shown in Figures 2–5. Three replicates were carried out for each experiment; the figures show the average values.

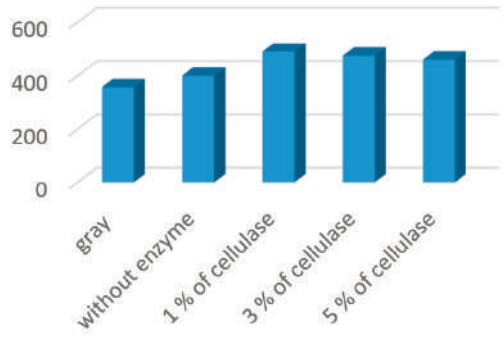

Figure 2 – Tensile strength of yarn

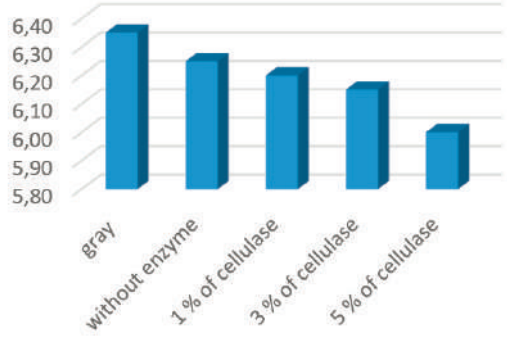

Figure 3 – Elongation at break of yarn

Enzymatic treatment has promoted additional strengthening of the yarn by an average of 30 % over the entire varying concentration range. With an increase in the concentration of cellulase, the breaking load of the yarn decreases slightly, but remains higher than for conventionally processed yarn. The elongation at break of biotreated yarn is less than for yarn without enzymatic treatment by 0.8-5.0 % and decreases with increasing enzyme concentration.

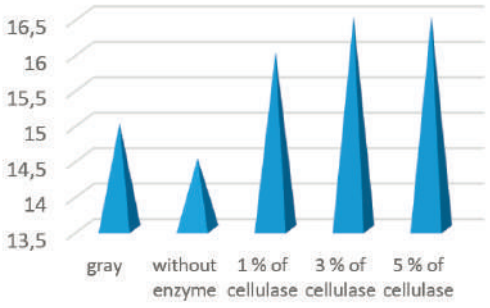

Figure 4 – Deflection of yarn

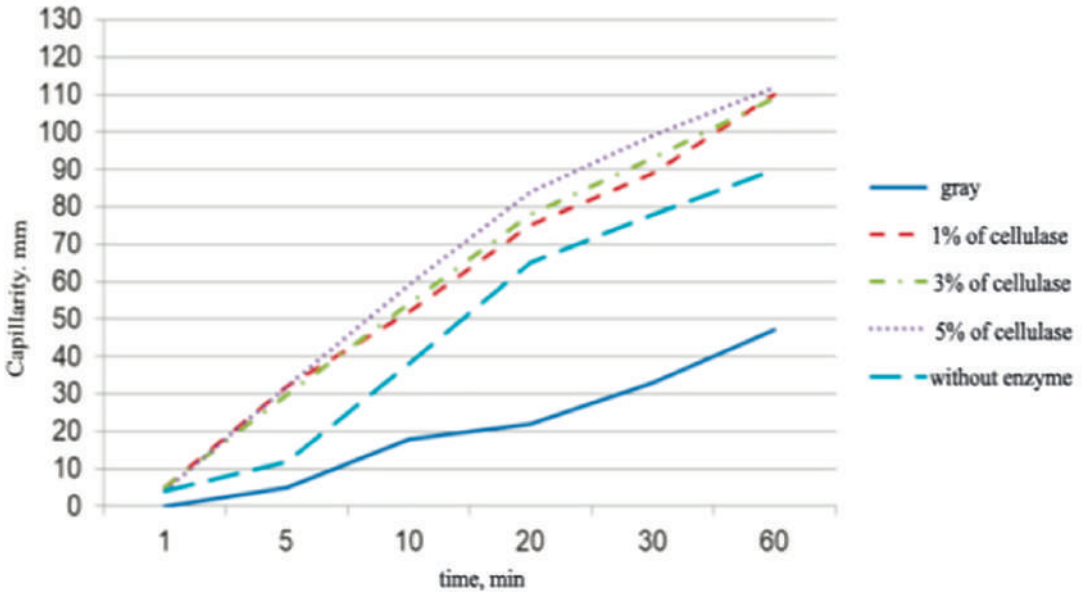

Figure 5 – Capillarity of yarn

The bending rigidity determined by the console method shows that bending rigidity reduces when the deflection increases. It was found that the bending rigidity of traditionally prepared yarn increased in comparison with gray, and for biotreated yarn decreased. It was shown the bending rigidity of the yarn is slightly reduced with the dosage of cellulase increases.

The capillarity of gray yarn does not exceed 50 mm/h, traditional peroxide bleaching enabled to produce yarn with a capillarity of 90 mm/h, and the capillarity of bioprocessed yarn was 110–116 mm/h depending on the concentration of ENZITEX CKP. Thus, the addition of a bioprocessing step provided an increase in the capillarity of the yarn by over 20 % compared to the yarn that had not undergone enzymatic treatment.

Conclusions

As a result of research, it has been shown that enzymatic treatment with the use of cellulase for cotton yarn processing enables to increase the tensile strength of the yarn by 15–22 %, increase the capillarity of the yarn by 21–29 % and reduce the bending rigidity by 9–14 % compared to the traditional processing method.

References

1. Textile Exchange [Electronic resource]: Preferred Fiber & Materials Market Report, 2019. – Mode of access: https://store.textileexchange.org/wp-content/uploads/woocommerce_uploads/2019/11/Textile-Exchange_Preferred-Fiber-

Material-Market-Report_2019.pdf. – Date of access: 20.09.2020.

2. Котко, К. А. Экологически чистая технология биообработки хлопчатобумажной пряжи / К. А. Котко, Н. Н. Ясинская, Н. В. Скобова // Сборник научных трудов по итогам Международной научно-практической заочной конференции: Концепции, теория, методики фундаментальных и прикладных научных исследований в области инклюзивного дизайна и технологий. – Москва, 2020. – С. 117–122.

3. Kiro Mojsov Application of enzymes in the textile industry: a review / Mojsov Kiro // Conference Paper: 11 lnternational Congress "Engineering, Ecology and Materials in the Processing lmlustry", 2011. – P. 230–239.

4. Warke, V. V. Application of biotechnology in textiles / V. V. Warke, P. R. Chandratre // Man-made Textiles in India, 2003. – No. 4, XLVI. – P. 142–146.

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MODERN MATERIALS FOR SPORTSWEAR

СОВРЕМЕННЫЕ МАТЕРИАЛЫ ДЛЯ СПОРТИВНОЙ ОДЕЖДЫ

Lyadova A.
Vitebsk State Technological University, Vitebsk, Republic of Belarus
E-mail: as.vstu@mail.ru
Лядова А.С.
Витебский государственный технологический университет, Республика Беларусь

ABSTRACT

COMPOSITE LAMINATES, SPORTSWEAR, MEMBRANE LAYER

The modern sportswear market is represented by a wide range of materials. All manufacturers produce certain fabrics according to their unique technologies. The variety of materials makes it necessary to generalize information about their properties, determine their advantages and disadvantages. When choosing sportswear, attention should be paid to the selection of fabric because its materials determine its properties. The article discusses various types of materials for the manufacture of sportswear.

АННОТАЦИЯ

КОМПОЗИЦИОННЫЕ СЛОИСТЫЕ МАТЕРИАЛЫ, ОДЕЖДА ДЛЯ СПОРТА, МЕМБРАННЫЙ СЛОЙ

Современный рынок спортивной одежды представлен широким выбором ассортимента материалов. Все производители изготавливают те или иные ткани по своим индивидуальным технологиям. Многообразие материалов вызывает необходимость в обобщении информации об их свойствах, определении их преимуществ и недостатков. При выборе спортивной одежды необходимо уделять внимание подбору ткани, потому как материал, из которой она изготовлена, определяет ее свойства. В статье рассмотрены различные виды материалов для изготовления спортивной одежды.

Clothing is one of the components of the material and non-material culture of a society. A person creates various stocks of clothes in various style solutions by changing certain items of clothing. The very process of transformation and change can be endless. The use of various types of materials in the design of clothing

models allows to increase the range of products, expand their functionality and extend the life of products.

Today the customer needs comfortable clothes, which allows them to feel comfortable regardless of the situation, time, and place. An urgent task is to create sportswear, which helps a customer feel comfortable both in the open air and indoors. Therefore, in materials science, composite layered materials are becoming more and more widespread. These materials may include a membrane.

Modern technological materials play an important role in achieving high results in sports. When choosing sportswear, you need to pay attention to the selection of fabric, because the material from which it is made determines its properties. There are options for winter and summer clothing, special breathable, windproof, waterproof materials and other varieties from which clothing is made.

There are a number of requirements for materials for making a sports suit: wear resistance, hygroscopicity, air permeability, thermal conductivity, comfort, lightness, safety. Sportswear is made from natural or synthetic materials [1].

In the production of sports equipment and products for outdoor activities, the following types of materials are widely used: membrane fabrics, knitted fabrics, fleece, windblocks, softshells, taffeta, duspo, oxford, Cordura, Supplex, Polartec, neoprene.

For the manufacture of sportswear designed to be worn in a cold season, multi-layer materials containing a membrane layer are increasingly used. Their advantages are based on the structure of the fabric that prevents the loss of heat; evaporation from the body passes through the tiny pores of the membrane to the outside, and a layer of dry and warm air remains under the clothes. This is especially true for active sports.

Knitwear for clothing, tight-fitting to the body, is most often used for making leggings and tops.

Fleece is a pile non-woven fabric made of unstructured polyester, in the production of which special technologies of fiber weaving and pile creation are used (the pile and the base are joined together). It makes lightweight, soft, pleasantly tactile knitwear in a wide range of colours. It retains heat, shape, practically does not absorb moisture, dries quickly, does not cause allergies, and has high wear resistance. A special anti-pilling treatment allows fleece products to retain their original appearance for a long time. The surface density of the fleece varies from 100 to 400 g/m^2. It is used in sewing as a lining for winter and demi-season clothes, as well as for making tracksuits, sweatshirts, scarves, hats, and gloves.

A softshell is a multi-layer material consisting of a durable, abrasion-resistant fabric layer, a membrane layer and a fleece inner layer. The use of one layer of such

material makes it possible to replace two or more layers of clothing in a traditional athlete's suit. These materials are characterized by low specific gravity, the ability to retain water and heat, and at the same time, are resistant to wind.

From taffeta, made from chemical fibers of polyester or nylon, with the application of various coatings, both workwear (windbreakers, jackets, overalls, trousers, including insulation) and tourist equipment (sleeping bags, tents, bags, umbrellas) and sports equipment (aprons, flags, etc.) are produced. Taffeta made from polyester is slightly inferior to nylon in strength and chemical resistance, but it is superior in thermal and light resistance.

The main purpose of the development of windblock materials is their 100 % wind protection. In fact, these are two layers - an outer (knitted fabric) and an inner (one-sided fleece), which are connected to each other through a membrane layer. The pile height on the outside and inside can be different. The structure of the material allows the production of products without lining. They are widely used in the manufacture of hats, sweatshirts, overalls, windbreakers, and gloves.

Duspo is a soft, lightweight windproof 100 % polyester fabric. It is unpretentious in washing, dries quickly, has good air exchange properties. Moisture protection is created with a special water-repellent coating. It is widely used in the manufacture of winter and demi-season outerwear, sports and ski suits. Duspo products provide excellent protection from wind and rain. The fabric almost does not get wet – water droplets easily roll off the surface of the garment.

Oxford is a durable fabric made from chemical fibers (nylon or polyester) of a specific structure, most often coated with a coating that makes the fabric waterproof. The fabric is water-repellent. Oxford is used for the production of outerwear and workwear (jackets, overalls), clothing and equipment for tourists, awnings, tents. Frost resistance of oxford with polyvinyl chloride impregnation (PVC) can reach -50 ^{o}C, and with polyurethane impregnation (PU) up to -160 ^{o}C.

Cordura is a range of modern, high-tech fabrics that represent the original structure of weaving of nylon threads of different thicknesses. It has double frictional resistance and is highly resistant to various types of mechanical stress. To achieve the greatest strength, fabrics can be reinforced. The Cordura fabric is used in the manufacture of outerwear, equipment, backpacks and other areas where resistance to punctures, tears, and rough friction is needed.

Polartec is a fleece-type jersey made of polyester with a thick pile, often made with the addition of other fibers: lycra, cotton, wool, nylon, and rayon; they are added in some cases to give the fabric certain properties (for example, the ability to retain shape). Polartec is very durable, warm, lightweight and breathable. Each villus is hollow inside, has a complex structure and mimics the wool of Arctic

animals. The surface of this material does not roll, it does not rustle.

Neoprene is a foamed polymer with closed, air-filled cells in the form of a web. A woven base made of nylon, polyester, cotton or other plastic fabric, usually knitted, is glued to the surface on one or both sides. High quality neoprene fabric is air and water resistant. It has a low absorbency. Products made of neoprene can be used in temperatures from -50 ^{o}C to 100 ^{o}C. Neoprene is used for sewing jackets, and is also used for seals in places where clothing is attached to the body (wrists, neck, shins), for the manufacture of waterproof shoes.

Supplex is a synthetic knitted fabric. The material is made with the addition of lycra, nylon, microfiber and lurex. It is bright, sleek, and beautiful. The main feature of Supplex is elasticity, the ability to simultaneously stretch along the loop rows and columns, which allows it to fit the body and not restrict movement. This material was widely used for the manufacture of sports, dance costumes. Caring for Supplex is very simple, and the material serves for a long time without losing its qualities and properties.

Thanks to the use of modern multi-layer materials, sportswear can be produced with the required level of protection against environmental influences. The choice of composite layered materials depends on their structure, properties, the number of layers, the cost of their manufacture and other factors that must be taken into account at the stage of designing the appropriate clothing.

Sportswear, correctly selected for hygienic indicators, supports athelet's performance.

References

1. Материалы, используемые в продукции компании Holster [Электронный ресурс]. – режим доступа: https://www.zosoptic.ru/horz/useful/articles/9.html. – Дата доступа: 07.08.2020.

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RESEARCH OF THE INFLUENCE OF IMPROVED DRAFTING SYSTEM DESIGN ON RING YARN QUALITY

ИССЛЕДОВАНИЕ ВЛИЯНИЯ УЛУЧШЕННОЙ КОНСТРУКЦИИ ВЫТЯЖНОГО ПРИБОРА НА КАЧЕСТВО ПРЯЖИ КОЛЬЦЕВОГО СПОСОБА ПРЯДЕНИЯ

Makhkamova Sh.[a], Valieva Z., Gafurov K.

Tashkent Institute of Textile and Light Industry, Republic of Uzbekistan

E-mail: [a]shoira-0218@mail.ru

Махкамова Ш.Ф.[а], Валиева З.Ф., Гафуров К.Г.

Ташкентский институт текстильной и легкой промышленности, Республика Узбекистан

ABSTRACT

RING SPINNING MACHINE, DRAFTING SYSTEM, DELIVERY CYLINDER, YARN, PHYSICAL AND MECHANICAL PROPERTIES

The article presents the research results of setting parameters influence of draft system to quadratic unevenness of yarn over the cross-section, specific breakage load and quadratic unevenness on breakage load. The use of a modernized drafting system at the optimum settings will improve the yarn quality due to better control over the movement of fibers. The stability of the drafting is ensured by the preservation of the continuous clamping line and the constancy of the friction forces.

АННОТАЦИЯ

КОЛЬЦЕПРЯДИЛЬНАЯ МАШИНА, ВЫТЯЖНОЙ ПРИБОР, ВЫПУСКНОЙ ЦИЛИНДР, ПРЯЖА, ФИЗИКО-МЕХАНИЧЕСКИЕ СВОЙСТВА

В статье приводятся результаты исследования влияния параметров настройки вытяжного прибора на квадратическую неровноту пряжи по сечению, удельную разрывную нагрузку и квадратическую неровноту по разрывной нагрузке. Использование модернизированного вытяжного прибора при оптимальных параметрах настройки позволяет улучшить качество пряжи за счет лучшего контроля за движением волокон. Стабильность вытягивания обеспечивается сохранением непрерывной линии зажима и постоянства сил трения.

Drawing is one of the most important processes in spinning technology. Drawing is carried out in a drafting system which construction implements the basic provisions of the theory of drawing.

One of the reasons that increases the irregularity of the yarn when drawing the product in the drafting system is the unsatisfactory straightening of the fibers, leading to a decrease in the proportion of controlled fibers during the stretching process, increasing their irregular shifts, creating fiber grouping that reduces the strength and irregularity in the strength of the yarn. Straightening of the fibers occurs mainly during the drawing process between the draft pairs. The efficiency of the straightening of the fibers also depends on the magnitude of the stresses of the friction forces. Consequently, increasing the load on the rollers and improving the quality of their coating will lead to an increase in the straightness of the fibers and a decrease in the irregularity of the outgoing product.

To create the necessary frictional forces in the drawing field and ensure a reliable clamping of the fibers, the cylinders surface is made grooved. The rollers of the drafting system, pressed to the grooved cylinders, rotate under the action of frictional forces. The stratification of the drawn product and the appearance of irregularities are observed because of the lag of the roller from the cylinder and the uneven rotation of the roller. The elastic coating of the rollers when worn with the flutes wears out, and with a small width of the flutes, even a partial damage of the fibers occurs.

To eliminate these drawbacks, it was suggested to improve the drafting system by replacing the grooved part of the draft cylinders with elastic coating bushings [1]. In this case, the contact strip of the draft pair is doubled, which ensures a reliable clamping of the fibers; the frictional field force remains constant along the length of the top roller, thereby stretching the process with high stability. The use of bushings with an elastic coating allows the processing of a twisted roving with increased load on the rollers and at a high speed without damaging the fibers.

Optimal settings for the modernized drafting system were selected to ensure high yarn quality [2].

After solving the problem of optimizing parameters settings of the modernized drafting system, a comparative assessment of the quality indicators of the yarn of linear density 20 tex, produced with the use of a conventional drafting system (control version) and with the use of a modernized drafting system (experimental version) was carried out.

After solving the problems of optimizing the settings of the modernized drafting system, a comparative assessment of the quality indicators of the yarn with the linear density 20 tex, made using a conventional drafting system with a fluted part

of the delivery cylinder (control version) and in the process of using an upgraded exhaust accessory, part of the delivery cylinder was replaced with elastic-coated bushings (experimental version).

The yarn quality indicators of the compared variants are shown in Figure 1–2.

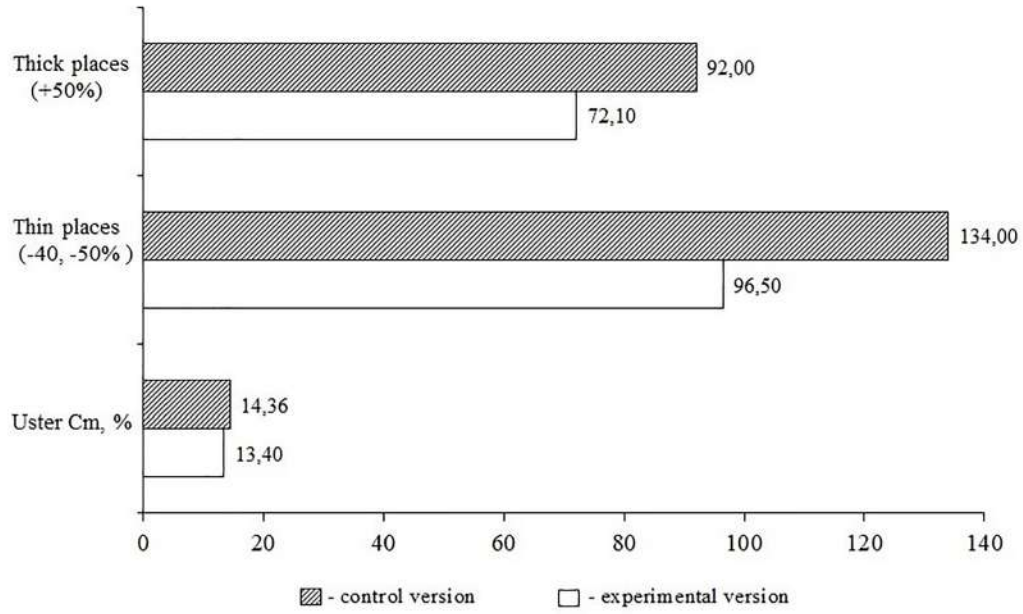

Figure 1 – Irregularity of the yarn in the cross-section

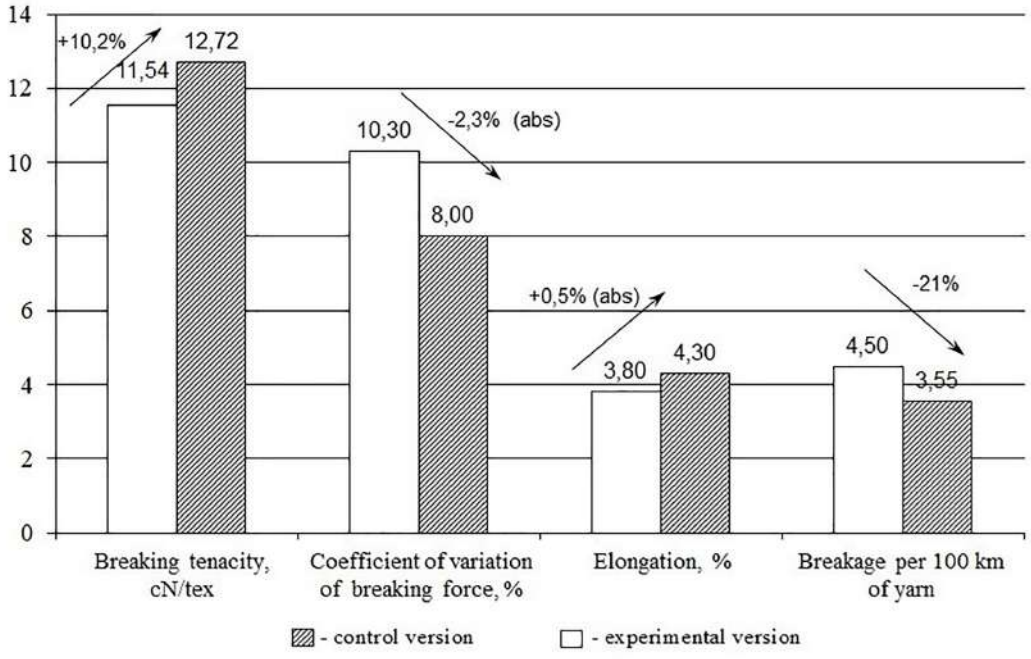

Figure 2 – Main indicators of physical and mechanical properties of the yarn

From Figures 1–2 it is seen that the use of a modernized drafting system with the optimal parameters of its settings allows to improve the quality of the yarn by better controlling the movement of fibers in the drafting system and the stability of the drafting process. The internal irregularity of the yarn is reduced from 14.36 % to 13.4 % by reducing the number of thin places by 28 %, thick places by 21.6 %, which indicates the preservation of a continuous clamping line and constant friction forces. Reducing the internal irregularity allows to increase the breaking tenacity to 12.72 sN/tex, against 11.54 sN/tex in the control (factory) version. The coefficient of variation in breaking force is reduced by 2.3 % (abs), and the elongation of the yarn is increased by 0.5 % (from 3.8 % to 4.3 %).

Yarn quality: breaking load, unevenness in breaking load, internal irregularity at the cross-section, influence on spinning stability and breakage. Breakage occurs in the cross-section of the product, in which the breaking load is less than the tension. The breaking load in the yarn break section is reduced when the number of fibers in the section decreases to 0.6n – 0.8n. An increase in the internal irregularity of the yarn leads to an increase in the number of broken sections. Comparative control and experimental versions, we see the number of thin places (-40 %, -50 %) in the yarn cross-section in the experimental version decreases by 28 %, the quadratic irregularity in the cross-section decreased from 14.36 to 13.4 %, and the breaking load increased by 1.18 sN/tex, while the uniformity of the breaking load increased (the coefficient of variation decreased from 10.3 % to 8 %).

The improvement in the yarn quality indicators made it possible to reduce the breakage from 54 to 43 breaks per 1000 spindles per hour, i.e. by 20.4 %.

Tests in production conditions have shown that when the yarn is spun on a ring spinning machine with a modernized drafting system, the stability of the spinning process improves the quality of yarn.

References

1. Makhkamova, Sh. F., Zhumaniyazov, K. Zh. Influence of the design of the draft cylinder of the drafting system on the uniformity of the contact strip // Textile Problems. – 2009. – № 4. – P. 18–20

2. Makhkamova, Sh.F. Research of the work of the improved structural design of the drafting system on the ring spinning machine // European Sciences review Scientific journal Vienna. – Austria, № 5–6, 2018 (May–June), pp. 299–303.

3. Makhkamova, Sh. F. Technology of production of competitive cotton products by sorting out fibers and using fibrous waste: dissertation for the degree of PhD on technical sciences. – TITLI, Tashkent, 2020.

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GRANULATE FROM POLYURETHANE WASTE FOR THE PRODUCTION OF SHOE SOLES

ГРАНУЛЯТ ИЗ ОТХОДОВ ПОЛИУРЕТАНОВ ДЛЯ ПРОИЗВОДСТВА ПОДОШВ ОБУВИ

Radyuk A.

Vitebsk State Technological University, Republic of Belarus

E-mail: ana.r.13@mail.ru

Радюк А.Н.

Витебский государственный технологический университет, Республика Беларусь

ABSTRACT

WASTE ANALYSIS, POLYURETHANE, GRANULATE, TECHNOLOGY, STRUCTURE, PROPERTIES

The article presents an analysis of polyurethane waste in order to confirm the possibility of producing granules from them. A process flow diagram for granulate production has been developed. Granulate was produced according to the proposed scheme. On the basis of the produced granulate, trial castings of samples of materials were developed in order to confirm the possibility of manufacturing materials for shoe soles from it.

АННОТАЦИЯ

АНАЛИЗ ОТХОДОВ, ПОЛИУРЕТАН, ГРАНУЛЯТ, ТЕХНОЛОГИЯ, СТРУКТУРА, СВОЙСТВА

В статье представлен анализ отходов полиуретанов с целью подтверждения возможности производства из них гранулята. Разработана принципиальная технологическая схема получения гранулята. Получен гранулят по предлагаемой схеме. На основе полученного гранулята были получены пробные отливки образцов материалов с целью подтверждения возможности изготовления из него материалов для подошв обуви.

Synthetic plastics first appeared in 1835 after the discovery of the polymerisation reaction performed with vinyl chloride by Henri Victor Regnault.

Among synthesized plastics, polyurethanes, mainly in the form of foams that are the leading plastics used in the world.

Dr. Otto Bayer was the first who synthesized polyurethanes in 1937. The

production of polyurethane foam on an industrial scale began in the 1950s, and their use grew slowly until the 1990s. Technological progress has led to the emergence new formulations, and the production of polyurethanes is increasing from year to year.

Polyurethane elastomers are rubber-like materials that are manufactured by the reaction of isocyanates with a hydroxyl group in the polyols (alcohol) to which a curative agent is added. The major isocyanates used are either toluene diisocyanate (TDI) or methy-diphenly diisocyanate (MDI), and the polyols are of either polyether or polyester. Various additives are added to these elastomers during their processing to enhance certain properties for specific applications and reduce costs. Polyurethane elastomers are used in various industries.

The PU sole (footwear polyurethane) market size is estimated at USD 4.2 billion in 2019 and projected to reach USD 5.9 billion by 2024, at a CAGR of 7.6 %. Polyurethane is used in footwear to provide the perfect combination of ergonomics, microclimate, and comfort. The superior properties of polyurethane as shoe sole material, growth in footwear sales, and increasing production in the growing economies are expected to drive the PU sole (footwear polyurethane) market [1].

During the production of shoes, a lot of waste is generated, the removal of which difficult and unecological. This waste also includes waste based on polyurethane. Due to a large amount of this waste, it is necessary to look for suitable recycling technologies and opportunities for using this recycled material in practice, for example, polyurethane granules. As for the outstanding ratio of properties, polyurethane granules are an interesting secondary raw material for the potential production of materials for the bottom of shoes.

Investigation of properties of polyurethane waste

The initial stage of research was devoted to studying the properties of polyurethane waste. Chemical, physical, microscopic, and spectroscopic analyses of the waste were performed. The results of the analysis were summarized in Table 1.

Granulate production technology

The basic technological scheme for granulate production includes the following stages: grinding of waste polyurethane foam (PU), drying, granulation, quality control, and packaging [3].

The porosity of the obtained granulate (Fig. 1) was analyzed by scanning electron microscopy (SEM) "VEGA II" LSH of TESCAN (Czech Republic). The bulk density of the granulate is 0,47 g/cm^3 (Standard 11035.1-93).

Table 1 – Waste characteristics

Name of the waste	Appearance	Chemical composition, properties, formula	Physical properties	Microscopic analysis	Spectroscopic analysis
Waste PU foam	Trim material black with a brilliant shade	Polyurethane 100 % [2], without additional inclusions [-CO-NH-R_1-NH-CO-O-R_2-O]	Very flexible, elastic material at room temperature, soluble in glacial acetic acid	There are remaining spherical vapors, no additional inclusions or defects found there	Are various fluctuations in the groups

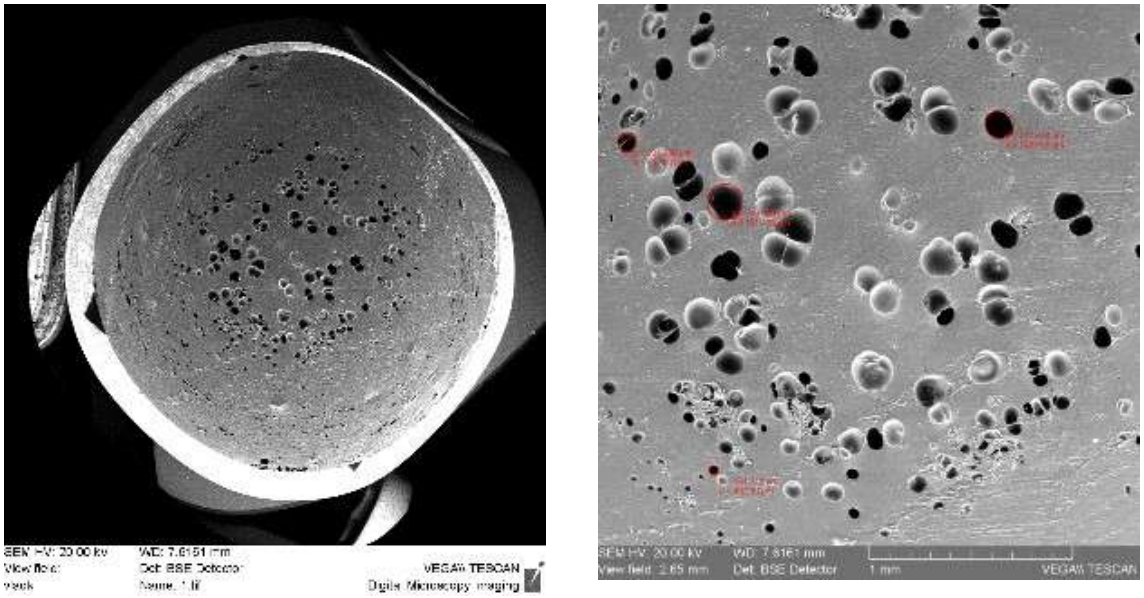

Figure 1 – Porosity of the resulting granulate

Further, test castings of samples of materials were made from the granulate in order to confirm the possibility of manufacturing materials for shoe soles from it. The study of the physical and mechanical characteristics of tensile cast samples based on the produced granulate was carried out in accordance with Standard 11262-80 [4]. The average values of the properties of granulate samples are the following: ε-260 %, σ-8 MPa, E-20 MPa. The structure of the produced cast samples is shown in Figure 2.

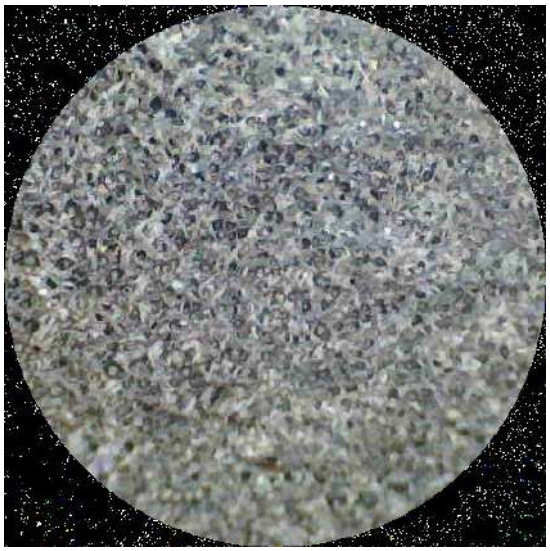

Figure 2 – The surface view of the cast samples

The sample has a loose, slightly porous structure; the pores are well formed, have small diameters of a regular spherical shape of 2-3,5 microns, no additional inclusions or defects were found.

Thus, it can be noted that the structure of the obtained materials meets the requirements for materials for shoe soles, the physical and mechanical characteristics of the samples are higher than the standard values. In this regard, it is possible to produce materials for shoe soles from the obtained granulate in the future.

References

1. PU sole (Footwear Polyurethane) Market by Raw Material (Methylene Diphenyl Diisocyanate, Toluene Diphenyl Diisocyanate, and Polyols), Application (Casuals, Boots, Slippers & Sandals, Sports and Formals), and Region - Global Forecast to 2024 [Electronic resource]: Markets and markets. – Mode of access: https://www.marketsandmarkets.com/Market-Reports/pu-sole-footwear-polyurethane-market-141590067.html. – Date of access: 10.09.2020.

2. ГОСТ ISO 1833-12-2011 Материалы текстильные. Количественный химический анализ. Часть 12. Смеси акрилового, модифицированных акриловых, эластановых, поливинилхлоридных волокон и некоторых других волокон (метод с использованием диметилформамида). – Введ. 01.07.2012. – Москва: Стандартинформ, 2013. – 8 с.

3. Радюк, А. Н. Получение гранулята из отходов пенополиуретанов / А. Н. Радюк, М. А. Козлова, А. Н. Буркин // Якість та товарознавча характеристика товарів різного функціонального призначення»: матеріали Всеукр. наук.-практ. Інтернетконф. студентів і молодих учених, 26-27 травня 2020 р., м. Херсон / Під ред. Л.А. Чурсіної. – Херсон: Видавництво ФОП Вишемирський В.С., 2020. – С. 49–52.

4. ГОСТ 11262-80 Пластмассы. Метод испытания на растяжение. – Введ. 01.12.1980. – М.: Издательство стандартов, 1986. – 16 с.

UDC 687

SYSTEMATIZATION OF TECHNOLOGICAL DEFECTS FOR QUALITY CONTROL OF PRODUCTS OF OUTSOURCING SEWING COMPANIES

СИСТЕМАТИЗАЦИЯ ТЕХНОЛОГИЧЕСКИХ ДЕФЕКТОВ ДЛЯ КОНТРОЛЯ КАЧЕСТВА ПРОДУКЦИИ АУТСОРСИНГОВЫХ ШВЕЙНЫХ ПРЕДПРИЯТИЙ

Rogozhina Iu., Guseva M., Andreeva E., Getmantseva V.
The Kosygin State University of Russia, Russian Federation
Рогожина Ю.В., Гусева М.А., Андреева Е.Г., Гетманцева В.В.
Российский государственный университет имени А.Н. Косыгина (Технологии. Дизайн. Искусство), Российская Федерация

ABSTRACT

GARMENTS, TECHNOLOGICAL DEFECTS, DATABASES, OUTSOURCING PRODUCTION

The stability of the garment production and the flexibility of the production cycle are affected by the seamless supply of textiles and accessories. The developed European fabric industry is focused on the luxury segment, and fast fashion products use not expensive materials produced in Asia, mainly in China. Therefore, despite the new geopolitical models, customers will still place the production of fast fashion clothing at outsourcing enterprises in Asia in the near future. The article describes the characteristics of modern outsourcing sewing production specializing in the manufacture of fast fashion clothing.

АННОТАЦИЯ

ОДЕЖДА, ТЕХНОЛОГИЧЕСКИЕ ДЕФЕКТЫ, БАЗЫ ДАННЫХ, АУТСОРСИНГОВОЕ ПРОИЗВОДСТВО

На устойчивость швейного производства и гибкость производственного цикла влияет стабильность поставок текстиля и комплектующих материалов. Развитая европейская индустрия тканей ориентирована на Luxury сегмент, а для изделий Fast Fashion используют недорогие материалы, произведенные в Азии, преимущественно в Китае. Поэтому, не смотря на новые геополитические модели, в ближайшее время заказчики по-прежнему будут размещать производство одежды быстрой моды на аутсорсинговых предприятиях Азии. В статье представле-

To improve the quality of products, digital control is proposed based on the use of databases and scales for assessing technological defects.

на характеристика современного аутсорсингового швейного производства, специализирующегося на изготовлении Fast Fashion одежды. Для повышения качества продукции предложен цифровой контроль, основанный на использовании баз данных и шкал оценки технологических дефектов.

The globalization of the world economy has contributed to the formation and development of outsourcing in the clothing industry as a universal tool for reducing the cost of products and increasing the competitiveness of companies. Outsourcing in the industry is based on the division of labor and the involvement of third-party, mainly foreign clothing companies into the production process. Since the 1960s, many of the world's leading brands in Europe and America have moved their clothing and footwear production to Asian countries (China, Bangladesh, Vietnam, Pakistan, and India) [1]. The investment and equipping of outsourcing companies with advanced technological equipment and a large number of cheap labor has allowed many companies to present large quantities of clothing products at affordable prices on the market. The advertising campaign of branded clothing, the scale of orders of production batches contributed to the saturation of consumer demand and economic growth in countries with outsourcing enterprises. According to the monitoring conducted by the European Chamber of Commerce, since 2016, the interest of top managers from the EU in placing orders at clothing enterprises in China has gradually faded [2]. The reason for this was an increase in the cost of labor and a decrease in the quality of clothing products [3]. Retailers have begun to shift production to less developed countries neighboring China. For example, the European retail chain H&M explained the relocation of business to Myanmar by the possibility of round-the-clock loading of production equipment and attracting low-skilled labor with a minimum wage.

The current level of technological development has brought a new direction to the clothing market – the presentation of industrial collections to consumers through social networks and online stores [4]. Multimedia retailers and products advertising over the Internet not only put pressure on traditional brands but also form a new production model – customization (modernization) of the basic catalog models, taking into account the customers' wishes and anthropomorphic characteristics [5]. In addition, the fashion market is filled with fast fashion

products, the six-month cycle of development of a new style has been replaced by a six-week one [6]. Cost-effective for the markets of Europe and the United States is the production of clothing of simple cut and simplified technology with a minimum share of manual labor [7]. Cooperation with Asian countries in the production of large quantities of clothing is becoming less profitable due to the increased expenses for delivering products to customers. Transporting goods by sea from Asia to Europe takes about 30 days on average, the cost of air transportation is continually increasing, which affects the final cost of products, and geopolitical tensions make customs clearance difficult. Market analysis has shown that most manufacturers who left the Chinese market and moved their production to other Asian countries are gradually returning to China due to insufficient resources in these countries.

To increase efficiency from the introduction of flexible fashion production at outsourcing firms with an increased frequency of changing new models, it is necessary to automate all stages of the production cycle as much as possible. The approach to the digitalization of product quality control will depend on the type of activity of the enterprise and the cycle of the production process. Research [6] has shown that the most common in outsourcing are cooperative clothing companies, whose business functions are focused on a single type of activity. Low qualification of personnel in small sewing enterprises leads to the introduction of simplified technology for manufacturing products of simple shapes from materials that are easy to process, usually from jersey fabric. The purpose of the study was to prepare initial information for digital quality control of finished clothing products produced in the conditions of outsourcing. For digital product quality control, software based on digital databases [8] and the principle of predicting possible technological defects of products that depend on model features are proposed. The experiment was conducted at the small outsourcing company in China on the example of a jersey T-shirt, as a popular product manufactured at the outsourcing companies in Asia. The product in question has a straight silhouette, short sleeves; the garment's length is to the hip line. The neck is processed with a basic material label. There is décor in n the center of the front. The décor is attached by a high-temperature press. Based on the model features and technological processing of the product, a forecast-classification of possible technological defects was developed.

Analysis of the processing technology showed that special sewing machines with a differential mechanism for moving the material (208, 1208 KL, etc.) were used to connect the parts. They perform three- or four-thread chain stitches that are highly stretchable with a strong connection. The flat-stitch machines of three-thread chain stitch with a sleeve platform (474 KL, GK1500-01Typical, etc.) were

used for processing the bottom of the product and the bottom of the sleeves. An automatic pneumatic thermopress with one or two work tables (WTJ 82x32 Aurora, etc.) was used to attach the décor to the front part. An iron table Cs-394K1+395/11 or SU with a steam iron up-3 were used for ironing.

Analysis of the working conditions in the small Chinese company showed that, due to the increased frequency of changes in the assortment, most of the employees are hired for temporary work with piecework or hourly wages. The workers are not motivated to make a high-quality product because the main task is to do a daily output. It is determined that the outsourcing company does not have an operating technology; the product is sewn by one or two employees. The introduction of automated quality control of manufacturing of clothing products at enterprises of this type will allow to track the causes of defects at the inter-operational stages and prevent the return of batches for rework.

Systematization of technological defects allowed to develop a range [8] for evaluating the quality of manufacturing products by a technical means of identification. The criticality of defects was evaluated in a ten-point range. The maximum score corresponds to the maximum degree of manifestation of the defect. The range allows predicting of the probability of defects, the possibility of their elimination at the finishing stage of the production.

The developed database allows to optimize the stage of confection of the model, improve the technological process, reduce material consumption, reduce labor costs, and completely or partially eliminate the corresponding defects in the manufacturing process of clothing. Based on the information obtained by automated control of production batches of clothing products through the database, the customer decides to accept the finished product or return it to the factory. Since outsourcing companies are located far from the customer, the proposed model of final inspection of finished products significantly reduces the time for processing information, preparing a report, and waiting for a response from the customer. It is experimentally determined that the time for decision-making can be reduced from one or two days to several minutes, which optimizes the delivery time of products to the final consumer. Given the complexity of the transport and logistics supply chain, where a shipment delay in a day can increase the delivery time by a week or two, prompt decision plays a vital role in ensuring that collections arrive in stores on time.

It is noteworthy that recently the demand for fashion clothing among consumers in Asia has been growing, which is reflected in the import-export balance in the industry – many Chinese manufacturers have increased their output of clothing products for the local market [3]. Therefore, the introduction of digital control at

the stages of manufacturing clothing products will fill the clothing market with quality products.

References

1. Минаев, С. Юго-восточного пошива. Коммерсантъ. – Режим доступа: https://www.kommersant.ru/doc/2713978. Дата обращения: 25.04.2018.

2. Гурков, А. Европейский бизнес разочаровывается в Китае. DW. Темы дня. Экономика. – Режим доступа: https://www.dw.com/ru/. Дата обращения: 23.03.2020.

3. Petrosova, I. A., Andreeva, E. G., Guseva, M. A. The system of selection and sale of ready-to-wear clothes in a virtual environment // 2019 International Science and Technology Conference "EastConf". – Vladivostok, Russia, 2019, pp. 1-5. doi: 10.1109/EastConf.2019.8725390

4. Is apparel manufacturing coming Home? – McKinsey Apparel, Fashion@ Luxury Group. 2018. – 32 p.

5. Петросова, И. А., Гусева, М. А., Андреева, Е. Г., Белгородский, В. С., Романовский, Р. С., Степанов, И. О. Кастомизация моделей мужской одежды // Свидетельство о регистрации базы данных RUS 2019620410 01.03.2019, бюл. № 3.

6. Рогожина, Ю. В., Гусева, М. А., Кащеев, О. В. Обзор деятельности аутсорсинговых швейных производств // Всероссийская конференция молодых исследователей с международным участием «Социально-гуманитарные проблемы образования и профессиональной самореализации» (Социальный инженер-2019): сборник материалов. Часть 2. – М.: ФГБОУ ВО «РГУ им. А.Н. Косыгина», 2019. – С. 282–284.

7. Рогожина, Ю. В., Гусева, М. А., Андреева, Е. Г. Влияние Fast Fashion на композицию и конструктивно-технологическое решение моделей одежды, выпускаемых на аутсорсинговых предприятиях // Мода индустриясида инновация ва замонавий технологиялар». Сборник трудов Международной модной конференции, Узбекистан, Ташкент, ТИТЛП, 2019. – С. 35–37.

8. Рогожина, Ю. В., Гусева, М. А., Андреева, Е. Г., Белгородский, В. С., Глебова, Т. Г. Базовые цифровые шкалы технологических дефектов швейных изделий, определяемых техническими средствами идентификации / Заявка на регистрацию базы данных 2020

UDC 747

DESIGN-LAYOUT OF SMALL PRINTED FORM AND SOUVENIR PACKAGING PRODUCT BASED ON VITEBSK-TOURIST ROUTE

ДИЗАЙН-МАКЕТ МАЛЫХ ПЕЧАТНЫХ ФОРМ И УПАКОВКИ СУВЕНИРНОЙ ПРОДУКЦИИ ПО МОТИВАМ МАРШРУТА «ВИТЕБСК ТУРИСТИЧЕСКИЙ»

Samutsina N.[a], Abramovich N., Kovshar A.

Vitebsk State Technological University, Republic of Belarus

E-mail: [a]samusiya@mail.ru

Самутина Н.Н. [а], Абрамович Н.А., Ковшар А.И.

Витебский государственный технологический университет, Республика Беларусь

ABSTRACT

SOUVENIR PACKAGING PRODUCT, DESIGN- LAYOUT, SMALL PRINTED FORM

In this work, the main design issues of souvenir products based on the most recognizable sights of the historical part of Vitebsk were analyzed. The classification of postcards is given. The project solved the issue of creating small print forms for souvenir products: labels, packaging, and shopping bags.

АННОТАЦИЯ

УПАКОВКА СУВЕНИРНОЙ ПРОДУКЦИИ, ДИЗАЙН-МАКЕТ, МАЛЫЕ ПЕЧАТНЫЕ ФОРМЫ

В рамках работы проанализированы основные вопросы дизайна сувенирной продукции по мотивам наиболее узнаваемых достопримечательностей исторической части г. Витебска. Приведена классификация открыток. В проекте решена задача по созданию малых печатных форм для сувенирной продукции: ярлыков, упаковки и сумки-шоппера.

The work aims at creating a design model of small printed forms and packaging souvenir products based on the Vitebsk-Tourist route sights.

In order to achieve this purpose, the following objectives were set:

- to identify the need for packaging of souvenirs;
- to study the types of souvenirs;

- to sketches of iconic places of the Vitebsk-tourist route;
- to create a design layout of small printed forms and souvenir packaging.

The tourism industry is a system that comprises a collection of interrelated elements. Insufficient development of at least one of the industries negatively affects the entire system and significantly reduces the planned income.

Researchers of the theory of souvenir products R.A. Bardina and E.I. Orlovsky, proposed several classifications of souvenirs: food souvenirs, perfume and cosmetics, tobacco products. According to the scientists, the souvenir is one of the specific tourist goods necessary to satisfy the tourist's needs that arise during their travel and are resulted from this travel [1].

Currently, the production of printed materials for the tourism industry gains increased popularity. Booklets are distributed at exhibitions; postcards are distributed in shopping centers, sent by mail. The packaging is quite informative and, at the same time, a very efficient advertising tool that gives maximum effect. Now it is relevant to revive pedestrian routes related to the history and main sights of the city. The city of Vitebsk is the second oldest city in the Republic of Belarus with more than a thousand years of history [2-3].

To solve the tasks of the study, sketches were made with various graphic materials and techniques of the most significant locations of the Vitebsk route associated with the old city.

The types of printing plates were studied, the classification of postcards was determined:

- congratulatory;
- species, which are a source of information on social history from various spheres;
- postcards-reproductions as carriers of works of art;
- artistic, produced by various art associations;
- advertising;
- historical and event, acting as a transmitter of information;
- political;
- patriotic;
- business, intended for congratulations on professional holidays.

The background of the developments introduced geometric elements based on suprematism – one of the most influential areas of abstract art of the twentieth century. The structure of the universe in suprematism is expressed in simple geometric forms: a straight line, a rectangle, a circle, a square on a bright background, marking the infinity of space. Therefore, the contrast of bright color and thin linear-spot graphics should draw the attention of the younger generation

to a souvenir product. When creating postcard graphics, we used the CorelDRAW editor (Fig.1).

Figure 1 – Series of postcards along the Vitebsk-tourist route

Using the developed graphics, design layout for small souvenir products was created – labels, packaging, and shopping bags (Fig.2).

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Figure 2 – Design layout of small printed forms (a) and packaging of souvenir products (b) based on Vitebsk-tourist route

Thus, the development of original souvenir products that convey the region's national characteristics has a favorable impact on the culture and popularization of the city's places of interest.

Reference

1. Сауков, Г. Н. Сувенирная продукция в туризме (региональный аспект) // Туризм в социокультурном пространстве Тюменского региона / Научн. ред. Л. Н. Захарова. – Тюмень: Издательство Тюменского государственного университета, 2006. – С. 105–120.

2. Самутина, Н. Н. Семиотика городской среды / Н. Н. Самутина, А. М. Соснина // Тезисы докладов 51-й Международной научно-технической конференции преподавателей и студентов. – Витебск, УО «ВГТУ». – 2018. – С. 180–181.

3. Карелина, Г. С. Анализ проблемных аспектов наружной рекламы / Г. С. Карелина, Н. Н. Самутина // Молодые ученые – развитию Национальной технологической инициативы (ПОИСК–2020): сб. материалов Национальной молодёжной научно-технической конференции. – Иваново: ИВГПУ, 2020. – С. 273–275.

UDC 677.4.022:62

IMPROVEMENT OF PROPERTIES OF SEMI-WOOLEN YARN

УЛУЧШЕНИЕ СВОЙСТВ ПОЛУШЕРСТЯНОЙ ПРЯЖИ

Sokolov L.
Vitebsk State Technological University, Republic of Belarus
E-mail: soko-leonid@yandex.ru
Соколов Л.Е.
Витебский государственный технологический университет, Республика Беларусь

ABSTRACT

WORSTED YARN, SOFTENING FINISHING, SOFTENER, YARN STIFFNESS, YARN BREAKING LOAD

The article discusses the technology of softening finishing for the semi-woolen yarn in order to improve its quality indicators and application characteristics. The results of experimental studies to determine the type of finishing agent for softening worsted yarn used in knitwear production are presented.

АННОТАЦИЯ

КАМВОЛЬНАЯ ПРЯЖА, УМЯГЧАЮЩАЯ ОТДЕЛКА, МЯГЧИТЕЛЬ, ЖЕСТКОСТЬ ПРЯЖИ, РАЗРЫВНАЯ НАГРУЗКА ПРЯЖИ

В статье рассмотрена технология умягчающей отделки полушерстяной пряжи с целью повышения ее качественных показателей и потребительских свойств. Приведены результаты экспериментальных исследований по определению вида аппретирующего препарата для умягчающей отделки камвольной пряжи, используемой в трикотажном производстве.

The worsted yarn produced at Slonimskaya WSM Company is designed for the production of a wide range of knitwear: hosiery, gloves, underwear, hats, shawls, scarves, etc. This yarn has always been in demand among consumers, as it has good physical, mechanical, and hygienic properties.

Moreover, in recent years, consumers' demand for the quality of worsted yarn has increased significantly. This is explained by the fact that after dyeing the yarn becomes stiffer and does not always meet the requirements of the new range of knitwear and customer requests. This situation sets the task of developing new

technologies to give yarn and knitwear the required softness of the neck, crease resistance, dimensional stability, pleasant feeling when worn, and the ability to maintain original appearance after washing [1].

The most rational way to ensure the necessary properties of worsted yarn is to use methods of softening of the finishing of this yarn with special chemical dressing preparations [2].

The best way is to carry out finishing treatment at the dyeing stage, using the dyeing equipment available at the enterprise facilities.

During the study, one of the main tasks was to select the most suitable dressing agent for worsted yarn.

For the research, the following types of softeners were selected, differing in their performance, stability, optimal conditions of action, and shelf life: Savinase 16L, Intex-M, Belfasin 44, and Alfalinabt-200.

Savinase 16L is an enzyme preparation based on proteolytic enzymes for various technologies for refining wool, including for partial targeted destruction of the cuticle. As a result of complete or partial destruction of the scaly layer (cuticle) of the woolen fiber due to a decrease in their frictional properties, the woolen fabric acquires a soft, silky neck.

Alfalinabt-200 is added at the end of dyeing to make the yarn soft and airy. This preparation is suitable for all types of yarns and has a high softening effect, it gives the yarn softness, airiness, and smoothness at the same time, and a very good antistatic effect.

Belfasin-44 is a preparation for the treatment of textiles made from almost all types of fibers. It is recommended for finishing. It easily penetrates the very core of fibers or fabrics, imparting greater inner softness.

Intex-M is added at the end of dyeing to make the wool yarn soft and reduce creasing. The solution has a good penetrating ability and is evenly distributed in the fiber structure, which provides good physical and mechanical properties of the yarn, gives the products softness, bulk and fullness.

The working solution of the softener is prepared by dissolving it in water using compressed air injection or any conventional mechanical stirrer.

A semi-woolen worsted yarn with a linear density of 31 texx2 of the following composition: woolen fiber – 70 %, and acrylic fiber – 30 %, was subjected to a softening finish.

Using these preparations, samples of worsted yarn were processed after the dyeing process, followed by drying. Each sample was examined according to two parameters [3]:

- loss of yarn mass after softening treatment;

- the stiffness of the yarn.

To estimate the quality of the yarn produced after softening treatment, the following method was used. From the grey yarn and the yarn that underwent softening finishing, samples of knitted fabric with a size of 160x30 mm were produced. The production of prototypes was carried out on a class 10 knitting machine.

Weight loss is determined by weighing knitted fabric samples, and flexural stiffness is determined using standard textiles. For this, the following dependency was used:

- on the stitch post

$$EI(s) = 42046 \times mc / Ao, \mu N \times cm^2, \quad (1)$$

- on the stitch line

$$EI(p) = 42046 \times mp / Ay, \mu N \times cm^2, \quad (2)$$

where mc, mp – the mass of five samples, cut out respectively in the direction of the column or row, g;

A – is the function of relative deflection.

The stiffness coefficient was determined by the dependence:

$$K_{EI} = K_{EI(s)} / K_{EI(p)} \quad (3)$$

The research results are presented in Figures 1, 2.

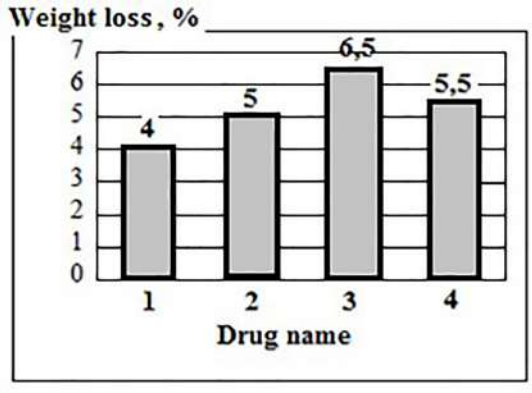

Figure 1 – Weight loss of knitted fabric samples after treatment with different preparations: 1 – Savinase 16L, 2 – Belfasin 44, 3 – Intex-M, 4 – Alfalina BT-200

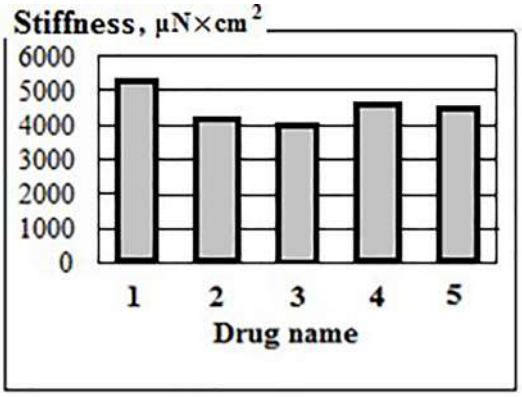

Figure 2 – Stiffness of the base and prototypes of knitted fabric, processed: 1 – without finishing, 2 – Alfalina BT-200, 3 – Intex-M, 4 – Savinase 16L, 5 – Belfasin 44

From the data received, it can be seen that the Intex-M solution showed the best result in the finishing process: the weight loss of the knitted fabric is 6.5 %. This solution effectively removes impurities without damaging the fiber-forming substance.

In addition, a significant increase in the bulk of the fabric is observed due to the increase in the crimp of the wool fiber after enzymatic treatment.

Rigidity studies have also shown that knitted fabrics produced from yarns treated with Intex-M have the greatest softness. This result is confirmed by the organoleptic evaluation of the softness of the knitted fabric.

Thus, a preparation was identified that is most suitable for softening worsted yarn, which is recommended for introduction into the production process at Slonimskaya WSM Company with the aim to conduct a set of studies in order to optimize the parameters of the technological process of the final yarn finishing.

References

1. Соколов, Л. Е., Ясинская, Н. Н. Умягчающая отделка суконных тканей / Л. Е. Соколов, Н. Н. Ясинская // Современные технологии и оборудование текстильной промышленности: сб. тезисов Международной научно-технической конференции. – Москва, 2012.

2. Ясинская, Н. Н., Соколов, Л. Е. Исследование формирования геокомпозитного материала способом пропитки полимерной композицией / Н.Н. Ясинская, Л. Е. Соколов // Вестник УО «ВГТУ». – Витебск: УО «ВГТУ», 2013. – Вып. 1(24).

3. Ясинская, Н.Н., Соколов, Л.Е. Исследование технологии заключительной отделки суконных тканей / Н. Н. Ясинская, Л. Е. Соколов // Техническое регулирование: базовая основа качества материалов, товаров и услуг : сб. науч. трудов МНТК. – Шахты, 2016.

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ANALYS OF MANUAL AND AUTOMATIC CONTROL OF THE FEEDER ROLL OF THE SAW GIN STAND

Umarov A., Usmanov Sh., Ortikova K., Yusupov O.
Namangan Institute of Engineering and Technology, Republic of Uzbekistan

ABSTRACT

COTTON, SAW GIN STAND, SEED ROLL, DENSITY OF SEED ROLL, CONTROL OF THE FEED ROLLERS, QUALITY OF FIBER AND SEED

The article presents the results of experiments of manual and automatic speed control of the feeding rollers with the aim to uniformly adjust the density of a seed roll, and to determine the dependence of fiber and seed quality on automatic feeding depending on the load of the saw cylinder in the saw gin.

The main point of primary processing of cotton is to separate the fibers from the seeds, this is a complex process consisting of several operations, dozens of transitions ensuring the quality of fibers, seeds and other components.

During ginning – the main operation of the primary processing of cotton – the quality of fiber and seed deteriorates due to uneven nutrition of cotton and insufficient improvement of the mechanism for regulating the density of the seed roll.

When researching processes in the saw gin, it becomes necessary to determine and change the speeds, loads, working hours and other indicators of the working tools during operation.

To control the density of the seed roll in the saw gin, the speed of the feed rollers is changed. In studies [1–3], it was proposed to regulate the speed of the feed rollers of the DP series saw gin (Uzbekistan) using a frequency converter. The advantage of this system is also the ability to observe the process of changing the performance of working tools over time.

In the process of ginning as a result of regulating the speed of the feed rollers in order to study the changes in the parameters, experiments were conducted under production conditions on 4ДП-130 saw gin in "Turakurgon pakhta tozalash" JSC (Uzbekistan). The experiments were carried out on manually collected cotton of Namangan-77 I – breeding varieties and V – industrial varieties.

In the experiments, a frequency converter of the Danfoss VLT series was used.

The frequency converter was connected to the laptop with a standard USB cable. The MCT 10 software program developed by Danfoss was also used.

The frequency converter and the sensor for determining the load current of the saw cylinder engine were connected according to the circuit, as well as according to the requirements of their installation, and installed in an electrical panel (Fig. 1). To control the speed of the feed rollers, a control panel was installed on the saw gin (Fig. 2). The control panel consists of a switch for manual and automatic control, a potentiometer for regulating the speed of the feed rollers during manual control, as well as a switch for the motor of the feed rollers.

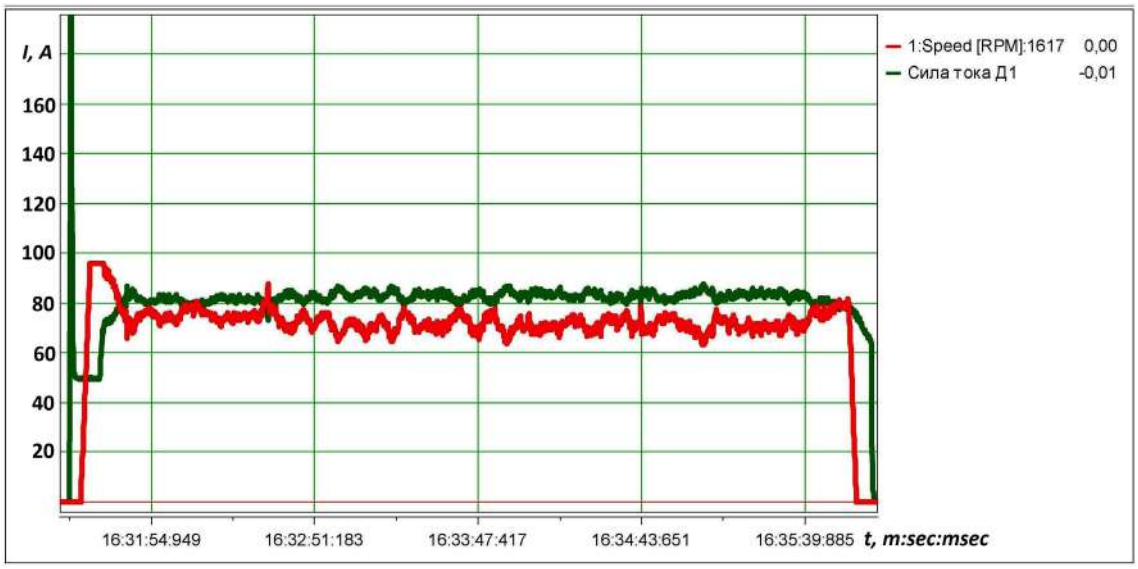
Figure 1 – General view of mounting the frequency converter and current transformer

Figure 2 – Remote control of the feed rollers

Instead of the ИВА variator available on the 4ДП-130 saw gin, a 0.75 kW motor gearbox is installed.

Figure 3 shows the oscillogram of the change in the load current of the saw cylinder engine over time obtained on the MCT 10 program. As we can see in the figure (a), the load current of the saw cylinder engine varied within 80-130 A under manual control of the device. Under automatic control, this indicator (figure (b), the green line) varied within 75-85 A, and the speed of the feed rollers varies inversely alongside with it (red line). That is, we can see the operation of the speed control system of the feed rollers in automatic mode.

a



b

Figure 3 – The oscillogram of the change in the load current of the engine of the saw cylinder over time on the MST 10 software program: a. In manual mode; b. In automatic mode (green line), the corresponding change in the rotation speed of the feed rollers (red line).

The quality indicators of the fiber obtained on the saw gin with the device installed are determined in the HVI system. And the quality indicators of cotton seeds are determined in the seed laboratory.

As it can be seen from Table 1, with the use of automatic control, quality indicators of fiber, such as the Short Fiber Index (SFI) for I-grade cotton decreased from 6.3 % to 5.8 %, and for V-grade from 9.8 % to 8.8 %.

Table 1 – Qualitative indicators of cotton fiber and seed

Desig-nation	Name of indicator	For I-grade cotton		For V-grade cotton	
		Manual control	Automatic control	Manual control	Automatic control
Mic	Micronaire	4.6	4.6	3.9	3.9
Str	Strength, gs/tex	33.0	33.2	30.7	32.1
Unf	Uniformity Index, %	83.3	84.2	82.4	82.9
SFI	Short Fiber Index	6.3	5.8	9.8	8.8
Elg	Elongation, %	6.8	6.9	7.1	7.4
Cnt	Trash Code	12	8	70	61
Area	Trash Area, %	0.8	0.7	2.1	2.0

On the MCT 10 program, you can select such parameters as the maximum and minimum motor speed, current frequency, load current, incoming and outgoing signal, etc. Also using the oscilloscope mode, it is possible to create, load and save a regulated project. This mode enables to observe current changes in the values of selected parameters in real time. After recording the waveforms for analyzing the entire process, the values are saved in the form of a spreadsheet.

References

1. Ahmedkhodzhaev, Kh. T., Abduvakhidov, M., Umarov, A. A., Kshivitsky, O. O. Roll box of the saw gin stand. Patent of the Republic of Uzbekistan No. FAP 00599. // B.I. – 2011. – No. 2 (118). – P. 67.

2. Ahmedkhodzhaev, Kh. T., Abduvakhidov, M., Umarov, A. A., Kshivitsky, O. O. Feeder of the saw gin stand. Patent of the Republic of Uzbekistan No. FAP 00600. // B.I. – 2011. – No. 2 (118). – P. 67.

3. Abduvakhidov, M. A., Umarov, A. A. Investigation of speed regulation of electric drives of gin feeders // Journal of Natural and technical sciences. – Moscow, 2008. – No. 2 (34). – P. 328–329.

4. Umarov, A. A. Investigation of the regulation of the density of seed roll in the saw gin stand // Journal of Natural and Technical Sciences. – Moscow, 2008. – No. 2 (34). – P. 333–334.

5. Axmedxodjayev, Kh., Umarov, A., Ortiqova, K. Investigation of the Ginning Process on ДП Series Saw Gin Stands // Scientific Research Publishing, Engineering, Engineering, 2019, 11, 523–530 http://www.scirp.org/journal/eng

6. Umarov, A., Akhmedkhodzhaev, Kh., Sarimsakov, A., Kenjaeva, M. The Saw Gin Stand with Adjustable Movement of the Roll Box // Scientific Research Publishing, Engineering, 2018, 10, 486–494. http://www.scirp.org/journal/eng, https://doi.org/10.4236/eng.2018.108034

7. Sarimsakov, A., Muradov, R., Umarov, A., Kurbanov, D. Movement Differential Equation of Seed Roller which Has Been Installed Stake Accelerator on the Roll Box of Gin Machine // Scientific Research Publishing, Engineering, 2018, 10, 521–529. http://www.scirp.org/journal/eng, https://doi.org/10.4236/eng.2018.108038

UDC 677.024.017

METHOD FOR MEASURING WOOL FIBER DIAMETER

МЕТОД ОПРЕДЕЛЕНИЯ ДИАМЕТРА ШЕРСТЯНОГО ВОЛОКНА

Valieva Z.[1a], Akhmedov A.[2], Laysheva E.[1], Makhkamova Sh.[1b]

[1]Tashkent Institute of Textile and Light Industry, Republic of Uzbekistan

[2]"Paxtasonoat Ilmiy markazi" Joint stock company, Republic of Uzbekistan

E-mail: [a]zulfiya-valieva-76@mail.ru, [b]shoira-0218@mail.ru, info@paxtasanoatilm.uz

Валиева З.Ф.[1], Ахмедов А.А.[2], Лайшева Э.Т.[1], Махкамова Ш.Ф.[1]

[1]Ташкентский институт текстильной и легкой промышленности, Республика Узбекистан

[2]АО "Paxtasanoat ilmiy markazi", Республика Узбекистан

ABSTRACT

WOOL, LENGTH, DIAMETER, UNEVENNESS, ACOUSTIC DEVICE

Woolen fiber is a very heterogeneous raw material. Therefore, accurate, correct, and rapid determination of the diameter of the wool fibers is an urgent task, predetermining the efficiency and profitability of the wool processing. The article analyzes the process of sound oscillations passing through the wool sample of the PAM-1 device enclosed in the measuring chamber, in order to verify the possibility of measuring the diameter of the wool fiber.

АННОТАЦИЯ

ВОЛОКНО, ШЕРСТЬ, ДЛИНА, ДИАМЕТР, НЕРОВНОТА, АКУСТИЧЕСКИЙ ПРИБОР

Шерстяное волокно является весьма неоднородным сырьём. Поэтому точное, правильное, быстрое определение диаметра шерстяных волокон является актуальной задачей, предопределяющей эффективность и прибыльность шерстеперерабатывающего производства. В статье проанализирован процесс прохождения звуковых колебаний через пробу шерсти, заключенной в измерительную камеру прибора ПАМ-1, для возможности проверки возможности измерения диаметра шерстяного волокна.

The diameter of wool largely determines the technology of its processing into yarn and plays a decisive role at all stages of production and processing to

finished products. Cross section of wool is the basis of the scientific and technical classification of wool, and the study of the peculiarities of its formation and connections with other features of sheep determines the current possibilities of using new scientifically sound methods of selection and use of wool in the processing industry in the wool economy. It is also important that the diameter of the wool plays the role of a pricing factor, and, therefore, affects the profitability of the sheep industry as a whole.

To check the possibility of measuring the diameter of the wool fiber, we analyze the process of the passage of sound vibrations through a sample of wool enclosed in the measuring chamber of the device PAM-1. When plane sound waves pass through a fiber sample, energy losses occur due to friction against the fiber surface, which leads to a change in the amplitude of sound vibrations and a phase shift of sound waves. The amplitude of a plane sound wave along the OX axis, which coincides with the direction of wave propagation, varies according to the formula:

$$P = P_0 e^{-jl}, \tag{1}$$

where P_0 – is the pressure of sound vibrations before the breakdown of the fiber;

l – is the thickness of the fiber sample layer;

j – is the propagation constant, determined by the formula:

$$j = \alpha + \beta i, \tag{2}$$

where α – sound attenuation coefficient;

β – wave number.

After determining the optimal parameters of the wool fiber for measurement on the PAM-1 device, the principle of measuring the attenuation of sound fibers is considered.

Therefore, the relationship of the output signal in the low-frequency region of sound vibrations shows the dependence of the attenuation of acoustic vibrations on fiber parameters

$$\sigma = \frac{1-\varepsilon}{\varepsilon} k S_O \sqrt{f}, \tag{3}$$

where ε – porosity of the fiber sample equal to the ratio of the pore volume in the sample to the total sample volume;

f – frequency of sound vibrations; Hz

S_0 – specific fiber surface equal to the ratio of the lateral surface area of the fibers in the sample to their volume, 1/m

k – constant coefficient.

In this work, we study the dependence of the fineness of a wool fiber on the attenuation of sound vibrations.

For this purpose, we derive the functional relationship of the damping coefficient of sound vibrations α with the diameter of the wool fiber.

Woolen fiber has a cylindrical shape. Therefore, the specific surface of the wool fiber is determined from the following relationship;

The specific surface of the wool fiber is determined by the expression

$$S_0 = S_B / V_B, \qquad (4)$$

where, S_B – the area of the side surface of the wool fiber;

V_B – fiber volume is determined by the following expressions

$$S_B = \pi \cdot d \cdot l, \qquad (5)$$

$$V_B = \frac{\pi \cdot d^2}{4} \cdot l \qquad (6)$$

where d – diameter of fiber; mm:

l – fiber length, mm.

By substituting the expressions (5) and (6) in (4) after simple transformations, we obtain the following expression for the specific surface area of wool

$$S_o = 4 / d, \qquad (7)$$

By substituting the expression (8) in (4) we obtain the following ratio for attenuation factor

$$\alpha = \frac{4(1-\varepsilon)}{\varepsilon \cdot d} k\sqrt{\int}, \qquad (8)$$

having designated

$$B = \frac{4k(1-\varepsilon)}{\varepsilon}\sqrt{f}, \qquad (9)$$

let's receive

$$\alpha = \beta / d, \tag{10}$$

By replacing in formula (1) the sound vibration pressure on the device output signal proportional to it, we have the following expression

$$U = U_0 e^{-al}, \tag{11}$$

By substituting in formula (11) the expression (10) for the attenuation factor and prologarithm the resulting expression

$$LnU = LnU_0 - \frac{B \cdot l}{d}, \tag{12}$$

Given the assumptions taken in the inference of formula (9), it can be assumed that there must be a linear regression between the logarithm of the output of the instrument and the diameter of the wool fiber.

$$LnU = A_0 - \frac{A_1}{d}, \tag{13}$$

here $A_o = LnUo$, $A_1 = Bl$.

Based on the results of the experiment planning, the following conclusions can be drawn:

- the sound impulse of the samples increases with increasing diameter, mass and humidity in the selected ranges of variation;
- comparison of regression coefficients with the corresponding factors shows that the greatest influence in the conducted experiments is the diameter of the woolen fiber.

References

1. Damyanov, G. B. Textile processes quality control and desing of experiment, Momentum press, New York

2. Cottlea, D. J., Baxterb, B. P. Wool metrology research and development. School of Environmental and Rural Science, University of New England, Armidale, NSW 2350, Australia; b SGS New Zealand Ltd., P.O. Box 15062, Wellington, New Zealand (Received 5 March 2015; final version received 2 October 2015)

3. Хамраева, С. А., Лайшева, Э. Т., Валиева, З. Ф. Определение геометрических характеристик местной шерсти стандартным методом и акустическим прибором // Проблемы текстиля. – 2018. – № 1.

4. Kukin, G. N. etc. Textile Materials Science (Textiles): – M.: Legprombytisdat, 1989.

5. Koblyakov, A. I. Laboratory Workshop on Textile Materials Science. – M. Legprombytizdat, 1985.

6. Sebostyanov, A. G. Methods and tools for the study of mechanical and technological processes of the textile industry // MSTU,2007.

7. Ahmedov, A. A. Determining the grade of cotton fibre using an acoustic device // “Paxtasonoat Ilmiy markazi” Joint stock company.– Tashkent, 2002.

Section 2. SOCIAL AND ECONOMIC PROBLEMS OF EDUCATION AND SCIENCE DEVELOPMENT IN THE 21st CENTURY

UDC 331.1; JEL Classification: M10, M21

LABOUR COSTS MANAGEMENT ANALYSIS IN THE ORGANIZATION

АНАЛИЗ УПРАВЛЕНИЯ ЗАТРАТАМИ НА ПЕРСОНАЛ В ОРГАНИЗАЦИИ

Aliakseyeva A.

Vitebsk State Technological University, Republic of Belarus

E-mail: Elena_d@tut.by

Алексеева Е. А.

Витебский государственный технологический университет, Республика Беларусь

ABSTRACT

LABOUR COSTS, LABOUR COSTS EFFICIENCY, LABOUR COSTS MANAGEMENT, STAFF PROFITABILITY

This article discusses the issues of the analysis and assessment of the efficiency of labour costs management. The author proposes an assessment method that includes the following stages: analysis of the composition, structure and dynamics of labour costs, analysis of labour costs using the controlling method, analysis of the labour costs management process, assessment of indicators of the efficiency of the labour costs use. The methodology is based on the data from the state statistical reporting forms,

АННОТАЦИЯ

ЗАТРАТЫ НА ПЕРСОНАЛ, ЭФФЕКТИВНОСТЬ ЗАТРАТ НА ПЕРСОНАЛ, УПРАВЛЕНИЕ ЗАТРАТАМИ НА ПЕРСОНАЛ, РЕНТАБЕЛЬНОСТЬ ПЕРСОНАЛА

В данной статье рассматриваются вопросы анализа и оценки эффективности управления затратами на персонал. Автором предлагается методика оценки, включающая следующие этапы: анализ состава, структуры и динамики затрат на персонал, анализ затрат на персонал методом контроллинга, анализ процесса управления затратами на персонал, оценку показателей эффективности использования затрат на персонал. Методика опирается на данные

and implies a survey of HR specialists. The method allows to identify the reasons for the efficiency decrease or increase, as well as to determine ways to optimize labour costs, which generally contributes to the improvement of the entire HR management system of the organization.

форм государственной статистической отчетности, а также подразумевает проведение анкетирования HR-специалистов. Методика позволяет не только выявить причины снижения или повышения эффективности, но и определить пути оптимизации затрат, что в целом способствует совершенствованию всей системы управления персоналом организации.

Labour costs management is aimed at labour costs optimizing, taking into account their compliance with HR (human resource) priorities and the expected economic and social effect through labour costs planning and analyzing, making decisions in the field of HR management, developing and implementing the organization's HR policy.

For the employer, labor costs are part of the total production costs, which have to be reimbursed through the sales. Labour costs are an integral indicator generally recognized for countries with market economies. It includes the totality of costs associated with attracting, remunerating, incentivizing, solving social problems, organizing work, and improving the working conditions of human resources.

In the practice of Belarusian enterprises, the employer's labour costs include wages, social payments, other expenses not related to the payroll and social benefits.

The method of labour cost management analysis proposed by the author includes the following stages:

Stage 1. Analysis of the labour costs management process. Labour costs management analysis starts from the analysis of the processes of formation, use and distribution of labour costs, criteria for labour costs allocating for their various types; priorities and sources of funding for these costs. To analyze the processes of the labour costs management, a survey method is used: the methodology contains a questionnaire for HR specialists, which allows to study the processes of formation and use of personnel costs. This involves studying the regulation on bonuses, the content of contracts with employees, the system of motivation and remuneration in a particular organization.

Stage 2. Analysis of the labour costs composition, structure and dynamics, its compliance with the organization's HR policy. The analysis is carried out on the basis of the data of the form of state statistical reporting 6-t "Report on the composition

of the payroll and other payments", which is provided once every two years [1–3]. During the analysis, it is also necessary to compare the labour costs dynamics with the dynamics of such indicators as the number of employees, sales proceeds, cost of production, value added, labor productivity, etc.

Stage 3. Analysis of labour costs using the controlling method involves:

- calculating the conditionally constant and conditionally variable parts in labour costs according to the criteria of depending on the amount of labor used (hours worked),
- allocation of the investment part in labour costs, which forms long-term motivation.

Stage 4. Assessment of indicators of the efficiency of the labour costs use. The following indicators can be used for this purpose:

- profit per employee;
- labour costs per employee;
- staff profitability (the ratio of profit to labour costs);
- labour costs per hour worked;
- the ratio of the average wage and the living wage budget;
- ratio of labor productivity growth to wages growth, etc.

The analysis of the effectiveness of the labour costs use is a guide to decision-making in the HR sector. It helps to identify the reasons for a decrease or increase in efficiency, as well as to determine ways to optimize costs, which generally contributes to the improvement of the entire HR management system of the enterprise. The choice of assessment indicators is crucial and requires justification.

Staff profitability is traditionally used as an indicator of the efficiency of labour costs use [5]. In the special literature, two ways to calculate the staff profitability can be found: as the ratio of net profit to the number of employees; as the ratio of net profit to the labour costs. The first method of calculation reflects the net profit per employee, while the labour costs are not taken into account. The second method does not take into account changes in the number of employees and in the labour productivity. Therefore, we will use both indicators in the analysis. At the same time, for clarity, the first calculation method will be called ‘the profitability of staff use’, and the second calculation method will be called ‘the profitability of labour costs’.

To assess the labour costs, indicators such as total labour costs, labour costs by categories of staff, labour costs by types of expenses can also be used. To assess the organization's performance, it is proposed to use not only net profit, but also value added and labor productivity.

It is also important to monitor the labour costs share in the total costs of the organization, as well as in the structure of the value added. At the same time, it is necessary to ensure the outstripping growth rate of cost efficiency indicators compared to the growth rate of the labour costs themselves. The need to increase labour costs, especially their investment component, is due to their low level (in Belarus in comparison with the world average and with neighboring countries). Compliance with this ratio will increase the amount of funds that can be used to invest in human capital, without reducing the compensation part of the labour costs in absolute terms.

There is no need to fear that the labour costs increase will lead to a decrease in the efficiency of their use. It is much more important to ensure the advanced growth rates of the enterprise's performance.

The application of this approach to labour cost management will increase the interest of employees in the results of their own activities, tied to the overall performance of the organization based on the value added over the period (the source of funding for labour costs). This, in turn, will provide opportunities for growth in labor productivity and increased funding for the labour costs.

To improve the situation, it is necessary to finance the labour costs by optimizing their structure and increasing investments in personnel development, linking personnel policy with the strategy and priorities of the organization, creating a transparent and efficient motivation system that focuses on achieving of strategic goals.

Reference

1. On approval of the form of state statistical reporting 6-t "Report on the composition of the wage fund and other payments" and instructions for its completion. Resolution of the National Statistical Committee of the Republic of Belarus of July 28, 2014 N 120. – National legal Internet portal of the Republic of Belarus, 7/2862 of August 9, 2014.

2. On introducing changes and additions to the Resolution of the National Statistical Committee of the Republic of Belarus of July 28, 2014 No. 120. Resolution of the National Statistical Committee of the Republic of Belarus of June 13, 2016 No. 66. National legal Internet portal of the Republic of Belarus, 7/3484 from 17.06. 2016.

3. On amending the Guidelines for completing the state statistical reporting form 6-t "Report on the composition of the wage fund and other payments." Resolution of the National Statistical Committee of the Republic of Belarus

of June 14, 2018 No. 45. – National legal Internet portal of the Republic of Belarus, 7/4063 of 06/22/2018.

4. Армстронг, М., Тэйлор, С. Практика управления человеческими ресурсами / М. Армстронг, С. Тэйлор. – 14-е изд. – СПб.: Питер, 2018. – 1040 с.

5. Як Фитц-енц. Рентабельность инвестиций в персонал. Измерение экономической ценности персонала. – М.: Вершина, 2006. – 320.

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RATIONING OF SAFETY STOCK UNDER INSTABILITY

НОРМИРОВАНИЕ СТРАХОВОГО ЗАПАСА В УСЛОВИЯХ НЕУСТОЙЧИВОСТИ

Ankuda K.

Belarusian State Economic University, Republic of Belarus

E-mail: kovrik91@yandex.ru

Анкуда Е.В.

Белорусский государственный экономический университет, Республика Беларусь

ABSTRACT

STOCK, SAFETY STOCK, FETTER FORMULA, DEMAND UNCERTAINTY

The paper suggests a methodology for calculating the safety stock size using a modified Fetter formula. It also provides an approach to the rationing of floating safety stock in the face of uncertainty in demand. The proposed approach was probed using real data from the production and trading enterprise DoM-Vetraz; scenario calculations were performed for the conditions of unpredictable increase and decrease in demand.

АННОТАЦИЯ

ЗАПАСЫ, СТРАХОВОЙ ЗАПАС, ФОРМУЛА ФЕТТЕРА, НЕОПРЕДЕЛЕННОСТЬ СПРОСА

В работе предложена методика расчета размера страхового запаса по модифицированной формуле Феттера, также приведено нормирование плавающего страхового запаса в условиях неопределенности спроса. Апробация предложенного подхода проведена на реальных данных производственно-торгового предприятия ЗАО «ДоМ-Ветразь», проведены сценарные расчеты для условий непрогнозируемого увеличения и снижения спроса.

In the current unstable economic environment creating the problem of uncertainty in demand for final products, it is necessary to revise the approaches to managing business processes of an enterprise. Modern enterprise management information systems make it possible to predict economic risks and ensure their minimization by reasonably changing management parameters.

Stocks, which represent one of the largest controlled business assets and a significant investment of an enterprise, can be seen as a balancing element of the entire enterprise management system. They can thus, be considered as an integral

indicator of this system's effectiveness [1].

Safety stock is designed to continuously ensure supply in the event of possible change in the delivery time or order size; change in the demand and/or the intensity of consumption, etc. [2, p.17].

In case of well-predicted demand (consumption) and in the presence of reliable suppliers, safety stocks may be inexistent. However, in practice, such a situation is nearly impossible; enterprises operate in the presence of constant risks. Therefore, the solution to the problem of rationing the safety stock in situations of instability is gaining importance.

The purpose of this study is to propose a methodology for rationing safety stock in procurement logistics and its testing on real data of the production and trading enterprise DoM-Vetraz.

The most common methodology for calculating safety stock under uncertainty in foreign and domestic literature is Fetter's formula [3]. This formula was developed for the case when demand and lead-time are normally distributed random variables.

It can be proposed to use a modified Fetter's formula to rationalize the safety stock (Formula 1) [4]:

$$q_{b(t)} = \begin{cases} z_\alpha \sqrt{t_з \sigma_{s_t}^2 + \overline{s_{n_t}^2}\sigma_{t_з}}, & \text{for control system } \textbf{\textit{(QR)}} \\ z_\alpha \sqrt{(t_з+\tau)\sigma_{s_t}^2 + \overline{s_{n_t}^2}\sigma_{t_з}}, & \text{for control system } \textbf{\textit{(ST)}} \end{cases} \quad (1)$$

where $q_{b(t)}$ – is the floating size of the safety stock;

z_α – is the quantile of the normal distribution at the significance level α;

$t_з$ – is the lead-time; σst is the standard deviation of demand;

$\sigma_{S(t)}$ – is the average value of demand (consumption);

$\sigma_{t_з}$ – is the standard deviation of the lead-time;

τ – is the time interval between orders.

This formula can be used for continuous control over the stock level (***QR***: replenishment strategy with a fixed order size and order point), as well as for the periodic one (***ST***: replenishment strategy at fixed time intervals).

The distinctive feature of this approach is in use in the formula the deviation of the factual demand for the period i (s_i^{fact}) from the planned demand (s_i^{plan}) for this period instead of the standard deviation of demand. At the same time, it is proposed to take into account the standard deviation of demand for those cases when the value of factual demand is greater than planned in the analyzed period, which is reflected in formulas (2), (3):

$$\sigma_{s_t} = \begin{cases} \sqrt{\dfrac{\sum_{\substack{i=1 \\ s_i^{fact} > s_i^{plan}}}^{n_t} \left(s_i^{fact} - s_i^{plan}\right)^2}{n_t - 1}}, \; if \;\; \exists i = \overline{1, n_t} \;\; s_i^{fact} > s_i^{plan} \\ 0, if \;\; s_i^{fact} \le s_i^{plan} \;\; \forall i = \overline{1, n_t} \end{cases} \quad (2)$$

where ***nt*** is the length of the comparison period (determined by the cycle τ), the period is floating and determined according to the moving average principle.

$$\bar{s}_{n_t} = \frac{\sum_{i=1}^{n_t} s_i^{fact}}{n_t} \quad (3)$$

This approach will allow taking into account the unsteady nature of demand in an unstable economic environment and reducing the amount of safety stock thanks to the modern methods for forecasting independent demand.

As part of the study, the QR system for continuous monitoring of the production stock was tested on the real data from the production and trading enterprise DoM-Vetraz for 2019. During the implementation of this system, a modified Fetter's formula was applied to the calculation of the safety stock size.

The calculations showed the effectiveness of using this formula. The size of the safety stock was reduced by 9 % compared with the classical calculation method, while the total stock was reduced by 6 % for the analyzed period. The proposed modification of Fetter's formula for calculating the safety stock for the case of a structural change in demand in the online monitoring mode allows the following:

a) in case of an unpredictable increase in demand by 70 %, ensure a deficit-free supply (including by increasing safety stock in this scenario by 136 %), while using the classical approach leads to a shortage and a halt in production – Figure 1;

b) in case of an unpredictable decrease in demand by 50 %, reduce the level of excess stocks (in this case, by reducing the safety stock by 51 %), thus optimizing the company's stocks and reducing logistics costs – Figure 2.

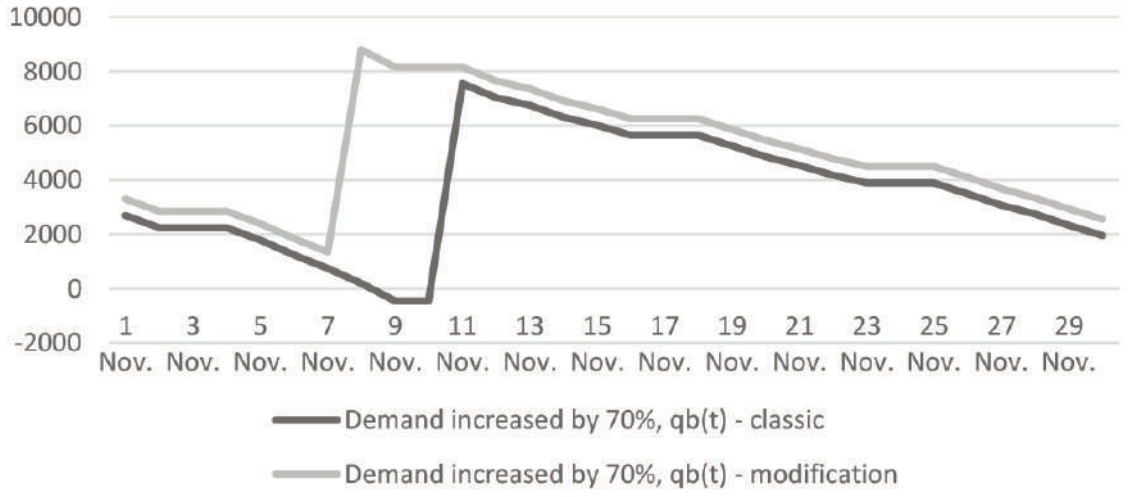

Figure 1 – The movement of the total stock according to scenario 1 using the example of a classical and modified calculation method $q_{b(t)}$

Source: compiled by the author

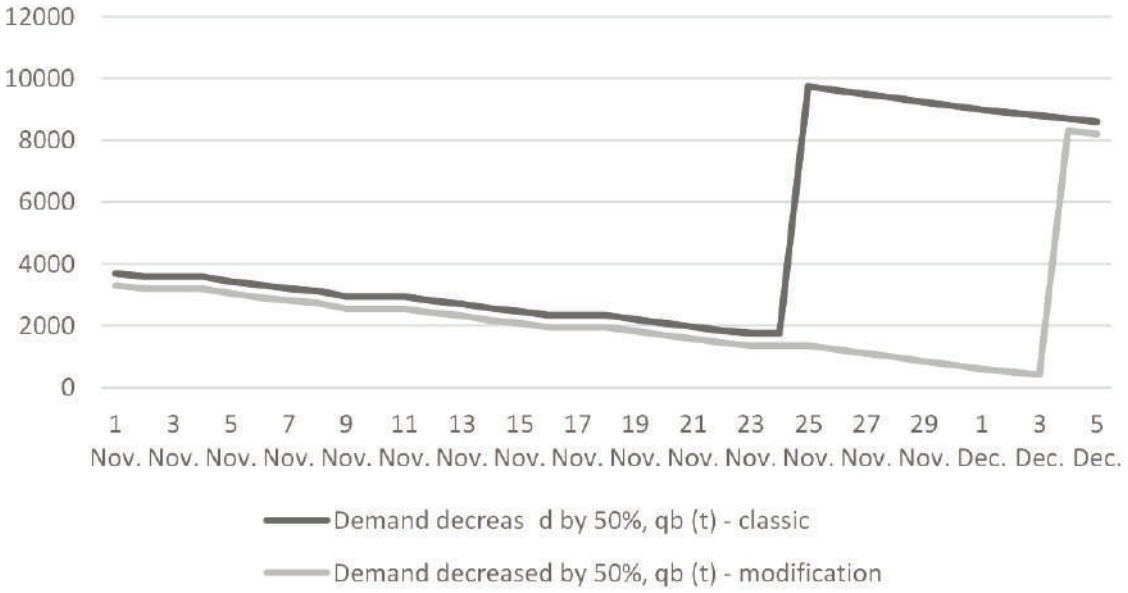

Figure 2 – The movement of the total stock according to scenario 2 on the example of the classical and modified calculation method $q_{b(t)}$

Source: compiled by the author

Reference

1. Шрайбфедер, Дж. Эффективное управление запасами. –Москва: Альпина Бизнес Букс. – 2006. – 304 с.

2. Стерлигова, А. Н. Управление запасами в цепях поставок: учебник. – Москва: ИНФРА, 2008. – 430 с.

3. Сергеев, В. И. (ред.) Логистика: полный курс MBA. – М.: ЭКСМО, 2014. – 944 с.

4. Миксюк, С. Ф. Управление запасами в закупочной логистике в корпоративной информационной системе: концептуальный подход / С. Ф. Миксюк, Е. В. Анкуда // Белорусский экономический журнал. – Минск: БГЭУ. – №1 (90). – 2020. – С. 138–147.

JEL – M42

PERCEPTION OF COMPANY'S FINANCIAL REPORTING AUDIT QUALITY BY CLIENTS AND AUDITORS

ВОСПРИЯТИЕ КАЧЕСТВА АУДИТА ФИНАНСОВОЙ ОТЧЕТНОСТИ ПРЕДПРИЯТИЯ ЗАКАЗЧИКАМИ И АУДИТОРАМИ

Buhayeu A.

Vitebsk State Technological University, Republic of Belarus

Бугаев А. В.

Витебский государственный технологический университет, Республика Беларусь

ABSTRACT

AUDIT, AUDITOR, AUDIT QUALITY, CLIENT, AUDITOR'S OPINION, CEO

It is generally accepted that the audit profession has reached pinnacle heights in enforcing professional standards (International Standards on Auditing; hereinafter – ISAs), Code of Ethics, Regulatory Visits, etc. All this can be explained very simply: as an attempt to protect the public interest. Note that the issues of audit quality in international standards are considered conceptually. That is, the quality of audit as a category, as well as the quality of audit services, are not defined in professional standards (and other regulatory and methodological documents).

Each of the parties to the audit, namely the auditor and the client, considers the audit quality from its point of view.

АННОТАЦИЯ

АУДИТ, АУДИТОР, КАЧЕСТВО АУДИТА, МНЕНИЕ АУДИТОРА, ДИРЕКТОР

Общепризнано, что аудиторская профессия достигла определенных результатов в обеспечении соблюдения профессиональных стандартов (Международных стандартов аудита; далее – МСА), Кодекса этики, контроля качества аудита регулирующими и надзорными органами и т. д. И все это объясняется очень просто: попыткой защитить общественные интересы. При этом сам термин «качество аудита» в МСА рассматривается концептуально. То есть качество аудита как категория, так же как и качество аудиторских услуг, не определены в профессиональных стандартах (и в других нормативных правовых актах).

Проведенные автором исследования позволили установить различия в подходах аудиторов и заказчиков ау-

The research carried out by the author made it possible to draw a conclusion about the different approaches of auditors and clients to the quality of audit and find common points of contact in the further convergence of their positions.

дита в отношении качества аудита и найти общие точки соприкосновения в дальнейшем сближении их позиции.

1. Introduction. The ISAs [1–10] disclose the relevant audit characteristics (audit categories or terminology) and their requirements, which should ensure audit quality. However, we must agree that the client has a minimal understanding and is insufficiently informed about the auditor's assessments of materiality, and audit risk, and methods of collecting audit evidence, and therefore cannot assess the quality of the "production" of the audit service for compliance with audit standards. Consequently, professional standards are primarily intended to assess the audit quality and audit service only from the auditor's position or regulatory bodies (internal or external to the auditor). At the same time, the degree of satisfaction of both the client and the users of accounting (financial) statements information with the audit results is not taken into account. However, it is the degree of satisfaction of the client and other consumers of financial reporting information that gives the initial assessment of the audit quality.

2. Empirical study. Over the past 15 years, the author of the proposed study, in the course of carrying out professional audit activities, conducted a survey of the opinions of heads of organizations and chief accountants of more than 700 organizations of all forms of ownership and various sectors of the economy (except for banks and insurance entities), as well as fellow auditors (individual entrepreneurs and in the staff of audit firms) on certain issues of their understanding of audit quality.

As a result, the following data were obtained on 7 key audit quality issues:

Table 1 – **Answers to the question: Do you have an idea of the audit legislation and the rules of auditing?**

Answer	Executives (%)	Chief accountants (%)	Auditors (%)
Yes	1.5	67.2	100.0
No	98.5	32.8	-
	100.0	100.0	100.0

So, the managers are practically not familiar with audit legislation, and the accountants' presentation about this is insufficient.

Table 2 – Answers to the question: Do you know in general what audit documentation is?

Answer	Executives (%)	Chief accountants (%)	Auditors (%)
Yes	1.0	85.5	100.0
No	99.0	14.5	-
	100.0	100.0	100.0

During the audit, accountants provide all the necessary information to form working documents at the request of auditors, but as for the CEO, the term of audit documentation itself is a novelty.

Table 3 – Answers to the question: Do you agree that the auditor's report and written representations of audit results should disclose all significant shortcomings in the company's activities?

Answer	Executives (%)	Chief accountants (%)	Auditors (%)
Yes	15.2	1.3	95.3
No	84.8	98.7	4.7
	100.0	100.0	100.0

Undoubtedly, chief accountants and CEOs are not interested in presenting all the shortcomings in the company's activities in written form. Especially, when the owner or head of the audited entity is ready to take the most severe measures of influence (up to and including dismissal) against executives and chief accountants based on the audit results. Besides, auditors sometimes prefer to bring such information "in the form of verbal communication", which is not a written representation of audit information, with the subsequent provision by the audited entity of data on the adjustments made. The latter is due to the unwillingness to lose the client in the case of presenting such "frank" information about the real state of affairs of the auditing entity (Table 4).

There is no doubt that both the CEO and the chief accountants prefer the unmodified auditor's opinion on the financial statements of the auditee. However, auditors are afraid to express such opinions (fearing possible consequences from the Ministry of Finance of the Republic of Belarus and the Auditor's Chamber in the

form of accusations of insufficient arguments in the working documents for issuing such conclusions), preferring mainly the modified opinion (an adverse opinion) option (Table 5).

Table 4 – Answers to the question: What type of auditor's opinion on the entity financial reporting suits you (your staff)? (multiple answers are possible)

Answer	Executives (%)	Chief accountants (%)	Auditors (%)
unmodified auditor's opinion	100.0	100.0	4.4
modified auditor's opinion (a qualified opinion)	2.0	1.0	95.6
modified auditor's opinion (an adverse opinion)	0	0	4.7
a disclaimer of auditor's opinion	0	0	1.5

Table 5 – Answers to the question*: Do you think that the availability of the auditor's working documentation does not affect the information security of your enterprise?

Answer	Executives (%)	Chief accountants (%)	Auditors (%)
Yes	15.2	1.3	75.3
No	84.8	98.7	24.7
	100.0	100.0	100.0

*The client came to this point of view after a short friendly dialogue of the auditor with the manager and the chief accountant about the need for working documents for the auditor's and the composition of the information provided for the preparation of such documents by the client.

There is a real possibility of seizure of the working documents of the auditor by various state bodies in accordance with the current legislation in Belarus. Therefore, there is a risk of falling into the "bad hands" of working documents, which leads to great doubts about the reliability of the information security system among auditors from the point of view of executives and chief accountants. And some of the auditors also have similar doubts.

Table 6 – Answers to the question: Do you think that the availability of working documents is the most important tool for defending the auditor's position in litigation on the quality of audit in economic courts?

Answer	Executives (%)	Chief accountants (%)	Auditors (%)
Auditor's opinion (type)	100.0	100.0	100.0
Written representations of audit information	92.0	95.0	100.0
Appropriate consultation during the audit	100.0	100.0	100.0
Relevant tax advice	100.0	100.0	100.0
Checking the correctness of tax calculations	100.0	100.0	100.0
Solving some complex problems of business activities (after the reporting period)	100.0	100.0	35.5
Auditor's documentation	10.0	16.0	100.0

So, most auditors consider the availability of working documentation as their main argument in the event of disputes in economic courts over damage caused to a client by a poor-quality audit, while directors and chief accountants rely on the arguments in disputes (About working documents under ISAs see more in [11]).

Table 7 – Answer to the question: What, in your opinion, characterizes the audit quality to a greater extent? (multiple answers are possible)

Answer	Executives (%)	Chief accountants (%)	Auditors (%)
1	2	3	4
Auditor's opinion (type)	100.0	100.0	100.0
Written representations of audit information	92.0	95.0	100.0
Appropriate consultation during the audit	100.0	100.0	100.0
Relevant tax advice	100.0	100.0	100.0
Checking the correctness of tax calculations	100.0	100.0	100.0

End of table 7

1	2	3	4
Solving some complex problems of business activities (after the reporting period)	100.0	100.0	35.5
Auditor's documentation	10.0	16.0	100.0

As you can see from Table 7, for CEOs and chief accountants, audit documentation as proof of the audit quality is generally not attractive. They are more interested in the auditor's report, written representations of audit information, etc., professional auditor's services. Well, as for the auditor, the audit documentation is above all.

Conclusions.

General conclusion: The concept of audit quality for the client and the auditor is somewhat different. If the client is interested in the actually performed actions to conduct the audit, embodied in a documentary form (audit report, written representations of audit information), then for the auditor his/her documentation as the basis for justifying the quality of the audit is above all.

Thus, one more additional conclusion can be made that only the client is interested in the fact of the presence of the working documentation of the auditor only from the point of view of the potential for information leakage to other parties, primarily to the Regulatory and law enforcement agencies. Well, for the auditor, working documentation is the hallowed principle, it is something that can be fought off both in economic courts and during external controlling of audit quality by the Ministry of Finance of the Republic of Belarus and the Auditor's Chamber.

References

1. ISQC 1 INTERNATIONAL STANDARD ON QUALITY CONTROL 1 «QUALITY CONTROL FOR FIRMS THAT PERFORM AUDITS AND REVIEWS OF FINANCIAL STATEMENTS, AND OTHER ASSURANCE AND RELATED SERVICES ENGAGEMENTS»/ available at: https://www.google.by/url?q=https://www.ifac.org/system/files/downloads/a007-2010-iaasb-handbook-isqc

2. INTERNATIONAL STANDARD ON AUDITING 315 IDENTIFYING AND ASSESSING THE RISKS OF MATERIAL MISSTATEMENT THROUGH UNDERSTANDING THE ENTITY AND ITS ENVIRONMENT / available at: https://www.google.by/url?q=https://www.ifac.org/system/files/downloads/a017-2010-iaasb-handbook-isa-315.pdf&sa=U&v

ed=2ahUKEwjo7KGehozrAhUvM-wKHVsYB4gQFjAAegQICBAB&usg=AOvVaw3R2bvH23ZD34HHaa6izXl1

3. INTERNATIONAL STANDARD ON AUDITING 220 QUALITY CONTROL FOR AN AUDIT OF FINANCIAL STATEMENTS / available at: https://www.google.by/url?q=https://www.ifac.org/system/files/downloads/a010-2010-iaasb-handbook-isa-220.pdf&sa=U&ved=2ahUKEwia-NvbhozrAhVMKuwKHTk-C9IQFjAAegQIABAB&usg=AOvVaw3D8En-p33HGftPS1JoJsyb

4. HANDBOOK OF INTERNATIONAL QUALITY CONTROL, AUDITING, REVIEW, OTHER ASSURANCE, AND RELATED SERVICES PRONOUNCEMENTS / available at: https://www.google.by/url?q=https://www.kacr.cz/file/4133/2016-2017-iaasb-handbook-volume-1.pdf&sa=U&ved=2ahUKEwjU1P6Yh4zrAhVKyqQKHU1zAdwQFjAAegQIABAB&usg=AOvVaw3rR4Qu9K0rYitRYq6WF9Hx

5. 2018 HANDBOOK OF INTERNATIONAL QUALITY CONTROL, AUDITING, REVIEW, OTHER ASSURANCE, AND RELATED SERVICES PRONOUNCEMENTS/ available at: https://www.iaasb.org/publications/2018-handbook-international-quality-control-auditing-review-other-assurance-and-related-services-26

6. International Auditing Standards (ISA) Summaries/available at: https://www.google.by/url?q=http://leaccountant.com/auditing-standards-summaries/isa/&sa=U&ved=2ahUKEwjo57a_iIzrAhUNGuwKHU6lBa84ChAWMAV6BAgDEAE&usg=AOvVaw1vHa1JopMEXbtMEaGm1CEk

7. HANDBOOK OF INTERNATIONAL AUDITING, ASSURANCE, AND ETHICS PRONOUNCEMENTS. 2004 EDITION / available at: http://www1.worldbank.org/publicsector/pe/befa05/IAASB_Auditing%20Handbook_2004.pdf

8. INTERNATIONAL STANDARD ON AUDITING (ISAs)/ available at: https://www.google.by/url?q=https://www.icpak.com/wp-content/uploads/2017/02/International-Standards-on-Auditing-ISAs-by-CPA-Nebart-Avutswa.pdf&sa=U&ved=2ahUKEwjo57a_iIzrAhUNGuwKHU6lBa84ChAWMAh6BAgFEAE&usg=AOvVaw3qpcEDDN8OIN_ojYhi60T2

9. International Auditing Standards (ISA) Summaries/ available at: https://www.google.by/url?q=http://leaccountant.com/auditing-standards-summaries/isa/&sa=U&ved=2ahUKEwjGutmAiozrAhWL_KQKHSxmBCs4ChAWMAR6BAgGEAE&usg=AOvVaw3HYYJGXoRK43OYM21_D4c0

10. International Standard on Auditing/ available at: https://www.iaasa.ie/getmedia/b2e8d804-d291-4c1a-8d54-7fffe421cc87/ISA501I.pdf

11. Бугаев, А. В., Пакшина, Т. П., Ермаченко, О. В. Объем и содержание рабочей документации аудитора согласно требованиям международных стандарстов аудита (ISAs) / Иннновационное развитие экономики: научно-практический и теоретический журнал / No 3 (57), 2020, май – июнь, с. 145–154.

UDC 658.6

ANALYSIS OF THE BALANCE OF FOREIGN TRADE IN TEXTILE AND CLOTHING GOODS IN THE EAEU

АНАЛИЗ СБАЛАНСИРОВАННОСТИ ВНЕШНЕЙ ТОРГОВЛИ ТОВАРАМИ ТЕКСТИЛЯ И ОДЕЖДЫ В ЕАЭС

Вукаи К.

Vitebsk State Technological University, Republic of Belarus

E-mail: krbykoff@mail.ru

Быков К.Р.

Витебский государственный технологический университет, Республика Беларусь

ABSTRACT

BALANCE, EXPORT, FOREIGN TRADE BALANCE, IMPORT, TEXTILES, CLOTHES

The article presents the results of assessing the balance of foreign trade of textile enterprises and clothing in the EAEU countries. Absolute and relative key indicators characterizing the state and level of development of foreign trade are highlighted, as well as its main findings.

АННОТАЦИЯ

СБАЛАНСИРОВАННОСТЬ, ЭКСПОРТ, САЛЬДО ВНЕШНЕЙ ТОРГОВЛИ, ИМПОРТ, ТЕКСТИЛЬ, ОДЕЖДА

В статье представлены результаты оценки сбалансированности внешней торговли предприятий текстильного производства и одежды в странах ЕАЭС. Выделены ключевые абсолютные и относительные показатели, характеризующие состояние и уровень развития внешней торговли, а также приведены ее основные выводы.

Problem statement. In the context of growing competition globally, foreign economic activity is the most important indicator of the involvement of a number of countries in the global division of labor, the value chain, which requires activating the factors of intensive growth based on the initiative and enterprise of business. The relevance of this topic is represented by the balance of foreign trade of Belarusian enterprises within the framework of the regional integration Association – the Eurasian Economic Union (EAEU), since a significant share of foreign trade in goods is still maintained from one counterparty country – Russia. The benefits

of member countries' participation in the EAEU by type of economic activity and individual enterprises depend on how high is the contribution of domestic organizations to the creation of value added of national origin through exports.

Main part. For the production of any product: export, investment and consumer needs external resources-imported raw materials, components. Import is not the main problem for the Russian or Kazakh economy since the raw material nature of exports with a focus on rich minerals provides foreign exchange earnings for the subsequent purchase of materials and components necessary for the manufacturing industry. For an open economy, Belarus has to restrict imports (external purchases) due to the lack of natural resources. Belarus strives to maximize the export of goods and services in order to create a positive balance from foreign trade, which allows the country to receive foreign currency to solve social and economic problems. According to statistics from Belarus, the excess of imports over exports has been observed for a number of years. However, a negative foreign trade balance not always indicates an imbalance for the industry (or enterprises) carried out foreign trade operations. For example, in Belarus, a large part of imports is used for the production of export products.

The question arises: what is meant by the category "balance"? In the scientific literature, this and other issues related to the balance of the country's economy and enterprises are actively addressed by Belarusian and foreign scientists, such as Luchenok A. I. [1], Bykov A. A., Kravtsov M. K., Danilchenko A. V., Levkovich A. P., Balashevich M. I., Gotovsky A. V. and others. The author of this article considers the balanced development of an enterprise as an increase in the added value created by it, provided that it maintains break-even and outstrips the growth of exports over imports, which ensures the enterprise's contribution to economic growth without creating trade and budget imbalances [2].

The considered methodological approaches in [2] to measuring and evaluating the balance of foreign economic activity of enterprises have a number of differences. The assessment of the state and level of balance of exports over imports (or foreign trade balance) of enterprises producing textiles and clothing was carried out on the basis of the group's indicators: "State and dynamics of foreign trade" [2]. The statistical data of the Eurasian Economic Commission (EEC) for 2015-2018 and the use of the classifier of goods of the CUSTOMS code of the EAEU served as the information base [3]. The assessment of the dynamics and structure of foreign trade in the production of textiles (C13) and clothing (C14) is presented for all EAEU member states.

Dynamics of trade turnover and balance of foreign trade in textiles and clothing in the EAEU countries. The total volume of foreign trade in textiles and clothing

of the EAEU member states in 2018 amounted to 16.9 billion US dollars, including exports of goods – 2.5 billion US dollars, imports of goods – 14.5 billion US dollars. Compared to 2017, the total volume of foreign trade in textiles and clothing of the EAEU countries increased by 11 %, or by 1.69 billion US dollars, exports of goods – by 11.8 % (by 0.26 billion US dollars), imports – by 10.9 % (by 1.4 billion US dollars). The results of the dynamics of foreign trade in textiles and clothing indicate an increase in the negative impact of the negative balance from minus 8.4 billion US dollars in 2015 to minus 12 billion US dollars in 2018.

A fairly significant improvement in the turnover of textiles and clothing compared to 2015, amounting to 44.5 %, or more than 5.2 billion us dollars, exports of goods – by 49 % (by 0.82 billion US dollars), imports – by 43.8 % (by 4.4 billion US dollars). However, the negative balance in trade in textiles and clothing increased by $ 3.6 billion over four years.

The largest share in the turnover was clothing – 62.24 %, textiles – 37.76 % in 2018. The largest contribution among the EAEU member states to the total turnover of textile and clothing production during the analyzed period was observed in Russia – 71.5 % and over 10 % – only in Belarus. In the EEU, the largest share was occupied by foreign trade in C14 – 62.3 % on average, except for Belarus – 61.7 % was trade in C13.

The change in the balance of foreign trade in textiles and clothing of the EAEU countries from 2015–2018 amounted to minus 3.6 billion US dollars. The results of changes in the balance of foreign trade in goods, in percentage terms, reflect the contribution of each EAEU country to the change in the balance as a whole, are ranked by the significance of their influence in descending order. The largest contribution to the deterioration of C13 and C14 foreign trade in the EAEU was made by imports in the amount of about 2.8 billion US dollars, or 76.9 %. Kyrgystan was placed in the second position. Its negative balance increased by $0.4 billion. This is equivalent to a contribution of 11.5 % of the total deterioration in the balance of foreign trade in goods. A fairly significant deterioration in the foreign trade balance was registered in January, amounting to 8.6 %, or more than 0.3 billion US dollars.

References

1. Макроэкономические аспекты обеспечения сбалансированности национальной экономики: монография / А. И. Лученок [и др.]. – Минск: Беларус. навука, 2015. – 371 с.

2. Быков, К. Р. Сбалансированность внешней торговли предприятий текстильного производства в странах Евросоюза [Электронный ресурс]. – Режим

доступа: http://nic.vstu.by/?page_id=9986. – Дата доступа: 12.09.2020.

3. Евразийская экономическая комиссия (ЕЭК) [Электронный ресурс]. – Режим доступа: http://eec.eaeunion.org. – Дата доступа: 30.07.2020.

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COMMUNICATIVE CONTEXT OF VENTURE FINANCING

КОММУНИКАТИВНЫЙ КОНТЕКСТ ВЕНЧУРНОГО ФИНАНСИРОВАНИЯ

Egorova V.
Vitebsk State Technological University, Republic of Belarus
E-mail: valego@tut.by
Егорова В.К.
Витебский государственный технологический университет, Республика Беларусь

ABSTRACT

VENTURE BUSINESS; VENTURE FINANCING; STARTUP MOVEMENT; BUSINESS PROJECT; BUSINESS ANGEL

The article reveals the economic essence of venture financing – long-term high-risk investments of private capital in newly created small high-tech companies. The relevance of the development of venture financing in Belarus is explained by its potential significance for the innovative development of the country.

АННОТАЦИЯ

ВЕНЧУРНЫЙ БИЗНЕС; ВЕНЧУРНОЕ ФИНАНСИРОВАНИЕ; СТАРТАП-ДВИЖЕНИЕ; БИЗНЕС-ПРОЕКТ; БИЗНЕС-АНГЕЛ

В статье раскрывается экономическая сущность венчурного финансирования – долгосрочных высокорисковых инвестиций частного капитала во вновь создаваемые малые высокотехнологичные компании. Актуальность развития венчурного финансирования в Беларуси объясняется его потенциальным значением для инновационного развития страны.

In a country focused on innovative development, it is necessary to rapidly create and develop venture financing. For this, the most preferable from the point of view of efficiency – in terms of return on investment and timing – is the implementation of the classic scheme of the state fund of venture capital funds based on the Israeli model Yozma. In addition to the Israeli experience, the mechanisms of venture financing of Russia, Kazakhstan, China are being studied [1]. When forming a system of venture financing, it is planned to actively attract private capital, including foreign investors, who need to obtain accreditation from the State Committee for

Science and Technology to work in the Belarusian market.

The principle of operation of venture capital financing in Belarus is based on Western standards: high profitability – 15–30 % per annum; long-term nature of investments; the possibility of diversifying activities; investing in research and development; potentially new jobs. The advantages of venture funding include the possibility of obtaining long-term money on favorable terms and the investor's personal interest in the successful completion of the project. Among the disadvantages are the difficulty in finding a personal venture investor, the need for full disclosure of information on the startup, the risk of the investor leaving the project at any time, the possibility of the investor's interference in the company's management process.

As a rule, the largest investors in a Venture Fund (an investment fund focused on working with innovative enterprises and projects (startups)) are pension funds (their share is about 25 %), banks (10 %), insurance organizations (10 %), corporate investors (3 %), government (5 %), private investors (3 %), endowment funds or non-profit funds (3 %), investment intermediaries (15 %). According to experts, on average, to find an investor for one venture capital project, it is necessary to be evaluated by at least 50 investors, 5–7 of whom will be interested in the project and only 1–2 will invest in it. In order to implement at least 20 projects a year, at least 1000 business investors are needed [2].

In Belarus, there are a number of problems in the development of venture business: a rather heavy tax burden for newly created enterprises, restrictions on investing in risky projects, an unsettled judicial system, the problem with the protection of intellectual property rights, as well as underdeveloped infrastructure (business incubators, innovation centers, pension and insurance funds). There are very few technological developments at this stage. Of all projects, only 5–7 % are science-intensive and breakthrough technologies. Most of all startups target the Belarusian market. At the same time, its capacity is relatively small.

The Belbiz group of companies, with the support of the US Agency for International Development within the framework of the AID Venture project, assessed the interest of businesses in venture financing in our country. According to a study in which 300 startups, investors and entrepreneurship support entities were interviewed, Belarusian business is interested in investing capital in new projects. More than 40 % of the investors surveyed plan to invest about USD 500,000 in technology startups in the coming years. Thus, at the current level of activity, Belarusian investments in them may exceed USD 100 million per year. Over the past 3 years, about half of the investors surveyed have carried out 5 transactions with technology startups, and 84 % of projects have attracted investments of up

to USD 500 thousand. At the same time, 77 % of startups received money at the stage of creating a prototype of products and entering the market. Business angels helped 60 % of early-stage startups [3].

The introduction into domestic legislation of instruments for structuring venture deals, collective investment institutions, widely used in world practice, decriminalization of business responsibility and the introduction of tax incentives will become powerful incentives for the development of venture entrepreneurship in the country.

Among the problems of the development of venture business in Belarus, one should first of all highlight the small number of initiative people, startups who are ready to risk their careers for their own business. Another limiting factor is the fact that we have many inventions, while there are not many managers with the business skills to commercialize these developments. Thus, most workers in domestic scientific institutions are characterized by a complete indifference to the possibilities of financing their developments and the absence of real initiative for their implementation.

In this regard, we can say that the lack of investment resources for financing projects is not the only problem in the development of venture financing in Belarus. Besides, investments in Belarus are often very "expensive and short". Our country has avoided the sale of the most appealing assets at bargain prices, unlike, for example, it happened in Russia. Therefore, the money was earned by Belarusian businessmen with great difficulty, and they are in no hurry to part with it. Investors want to get the maximum return from each project. Thus, as a rule, they want to get significant shares in the project ones for relatively small investments. This is largely why there are not many venture projects, after all, only very courageous investors can venture to risk money in such projects. The specific Belarusian problem is that the planning horizon of the Belarusian business is maximum 3 years. Taking into account the instability of the macroeconomic situation, it is extremely difficult to count on a longer term, therefore projects with a payback period of more than 3 years almost immediately lose interest from potential investors.

According to research, most investors expect a return on equity of 30–40 %. The most attractive sectors for them are: artificial intelligence (44 %), fintech (38 %), health (37 %), e-commerce (15 %), manufacturing (15 %). Investment decisions are also influenced by return on investment (64 %), the team (64 %), technological innovation (54 %), scalable business model (50 %). So far, 67 % of startups consider access to venture investments in Belarus to be poor. 85 % of companies using incentives are ready to transfer their business to other countries if the incentives are canceled.

Investors are constrained by their assessment of the external environment. Only 15 % of the participants in the venture capital ecosystem believe that favorable conditions have been created in our country for doing and developing business, and 51 % assess them negatively. Reforming the investment climate was approved by 13 % of respondents, 24 % admit the changes but do not believe that they allow them to develop actively. 38 % do not see any reforms, and 19 % have a negative attitude towards them.

The level of investor protection is rated very modestly. Thus, 40 % of the survey participants consider it insufficient, 21.8 % – sufficient only in some areas, 19.5 % have enough guarantees, but they are not satisfied with the law enforcement practice. At the same time, a guarantee for a foreign investor is the presence in the legislation of understandable institutions of civil, commercial, and corporate law that ensure the return on investment.

Therefore, it is not surprising that venture investors choose other countries: for the sake of more progressive corporate legislation and effective exit mechanisms from venture projects (79 %), a more predictable and trustworthy judicial system (57 %), and a more convenient taxation system (46 %). Thus, 41 % of respondents consider the USA and Cyprus attractive for their business, 35 % would choose Israel, 28 % – Estonia, 16 % – Great Britain. According to the authors of the study, it is possible to turn capital flows towards Belarus if the instruments for structuring venture transactions, collective investment institutions, widely used in the world practice, are introduced into domestic legislation, decriminalization of business liability and the introduction of tax incentives.

Favorable changes have taken place since the survey. Decree No. 7 "On the development of entrepreneurship" and a package of documents on the liberalization of the conditions for doing business in Belarus were signed, as well as Decree No. 8 "On the development of the digital economy", which, as a legal experiment, introduces tools of English law for HTP resident companies [3].

Currently, work is underway to amend other laws. Three working groups function in parallel:

1. Under the Ministry of Economy, they are working on amending the law on business entities.

2. At the National Center for Legislation and Legal Research they are working on amending and supplementing the Civil Code.

3. Under the State Committee for Science and Technology, they develop a regulatory legal act on the development in Belarus of mechanisms aimed at forming a system of venture activities.

According to experts, in the next 2–3 years, venture activities in Belarus will

acquire the shape of an industry. The number of investors in venture projects will continue to grow. Business incubators will be more and more useful for the development of venture capital companies. Also, in the coming years, 1–2 venture funds are likely to appear in Belarus, and the interest of both Russian and Western venture funds in Belarusian projects will increase.

References

1. Hill, B. Business angels: how to attract their money and experience for the implementation of their business ideas / B. Hill, D. Power. – Moscow: Eksmo, 2008. – 85 p.

2. World economy, finance and investment [Electronic resource] / History of development and features of venture investment in the countries of the world. – Access mode: http://www.globfin.ru. – Date of access: 20.08.2020.

3. Economic newspaper, 28.02.2017. Venture financing: what hinders its development [Electronic resource] / Access mode: https://neg.by/novosti. – Date of access: 05.08.2020.

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LABOUR MARKET: MODERN APPROACHES TO INCREASING THE EFFICIENCY OF LABOUR RESOURCES USE

РЫНОК ТРУДА: СОВРЕМЕННЫЕ ПОДХОДЫ К ПОВЫШЕНИЮ ЭФФЕКТИВНОСТИ ИСПОЛЬЗОВАНИЯ ТРУДОВЫХ РЕСУРСОВ

Gorovoy S.[a], Vankevich A.

Vitebsk State Technological University, Republic of Belarus

E-mail: [a] stanislavgorovoj@gmail.com

Горовой С.О., Ванкевич Е.В.

Витебский государственный технологический университет, Республика Беларусь

ABSTRACT

LABOUR MARKET, THE EFFICIENCY, LABOUR RESOURCES, DIGITALIZATION OF THE ECONOMY, SKILLS AND COMPETENCIES, EMPLOYABILITY

The article discusses the efficiency of the use of labour resources in the national economy in the context of the digital transformation of the labour market. The author proposes modern approaches to improving the efficiency of the use of labour resources based on foreign experience. The primary attention is focused on the use of big data analytics in human resource management, the formation of a professional standard for a specialist in human resource management, as well as the effective employability of graduates of higher education institutions.

АННОТАЦИЯ

РЫНОК ТРУДА, ЭФФЕКТИВНОСТЬ, ТРУДОВЫЕ РЕСУРСЫ, ЦИФРОВИЗАЦИЯ ЭКОНОМИКИ, НАВЫКИ И КОМПЕТЕНЦИИ, ТРУДОУСТРАИВАЕМОСТЬ

В статье рассматривается проблема эффективности использования трудовых ресурсов в национальной экономике в условиях цифровой трансформации рынка труда. Автором предложены современные подходы к повышению эффективности использования трудовых ресурсов на основе зарубежного опыта. Основное внимание сконцентрировано на применении аналитики больших данных в области управления человеческих ресурсов, формировании профессионального стандарта специалиста по управлению человеческими ресурсами, а также эффективной трудоустраиваемо-

сти выпускников учреждений высшего образования.

Today, the problem of efficient use of labour resources is one of the key problems not only for the labour market but also for the economy, since, in current conditions, there are rapid changes due to the progressive development of the national economy, wide integration and globalization processes that constantly dictate the need in new knowledge, skills and competencies for specialists of various professional-qualification groups. Fierce competition between countries for leadership in terms of labour productivity determines the need to identify ways to increase human capital and the efficiency of its use. In addition, the issue of the quality of human resources and what effect they should bring for the successful development of the country's economy comes to the fore. In a market economy, one of the most important tasks of increasing the profitability of production is to take into account and measure the factors that determine the efficiency of the organization's personnel, in particular the level and structure of personnel costs, since the organization's personnel as a bearer of unique knowledge and skills becomes one of the company's primary resources. In the global market, competition has already shifted from finance and technology to human resources. The necessary finances can be found within a few hours, new technologies cease to be new within a few months. Thus, only the companies that managed to place people at the center of the solution of corporate problems achieved an undeniable competitive advantage. A characteristic feature of contemporary management is the recognition of the growing role of the human factor in the production system and the development of new forms and methods of personnel management, primarily at the level of organizations [8]. Today, the main factors of competitiveness are the provision of labour resources with the required level of qualifications and competence. Investments in personnel are viewed as investments that add value to human capital.

In the modern world, the development of human resources is inextricably linked to the processes of widespread digitalization and computerization. In this regard, the nature of labour activity is significantly changing, which is associated with advanced training of workers, their constant training, and the formation of creative potential. The development of the labour market based on digital technologies leads to the modernization of labour relations: in communication between employers and performers, there is an active use of information and communication technologies and the formation of new norms of behavior [3]. One of the ways to increase the efficiency of the use of labour resources based on

the use of digital technologies can be the use of big data analytics to determine the skills and competencies in demand in the labour market. According to a 2015 survey by the IBM Institute [6], business companies use Big Data analytics in 3 main areas: customer service, operational efficiency, and risk management. At the same time, in the past few years, the term "Big Data" has come to be used in relation to analytics in the field of human resource management (HRM).

On the one hand, such a personnel technology will make it possible to determine the skills and competencies in demand in the context of certain categories of personnel in real time. On the other hand, it will help higher education institutions in drawing up curricula for students, taking into account the requirements of employers in the current labour market conditions, as a result, it will significantly facilitate the search for work for graduates and increase efficiency of their employability. In this regard, there is a need to train qualified HRM specialists on a national scale; moreover, the functions of big data analysis should be clearly formulated and spelled out in the professional standard of a HRM specialist in the context of specific job responsibilities. As a result, the applied methods, educational formats, educational programs, approaches to interaction with potential employers require adaptation to the new needs of the digital economy [3].

A fundamentally new direction for improving the efficiency of the personnel management system in Belarus can be the formation of a professional standard for a specialist in human resource management (HRM) of an organization. The use of professional standards makes it possible to clearly define the functional responsibilities of the employee, the requirements for his competencies, to optimize the placement, workload of personnel, which ultimately has a positive effect on the effectiveness of the HRM specialist and his/her contribution to the formation of the final result of the organization. The use of professional standards throughout the organization will ensure the effective employment of all employees in the workplace, optimize the organizational structure of management [7] and the employer's personnel costs. The basis of the professional standard is the HRM specialist's professiogram, which clearly formulates the knowledge, skills and abilities necessary for the performance of labour functions, as well as the requirements for the level of education and the availability of practical experience in the field of HRM. The introduction of the professional standard of a HRM specialist into the activities of organizations of Belarus will ensure effective work with human resources, increase the level of professionalism in solving personnel problems, and the effectiveness of the information and analytical system of the labour market being formed [2].

The concept of increasing the efficiency of the use of labour resources is closely

related to the graduate's ability to find employment (employability). While the education system responds to this challenge with a significant time lag, there are imbalances between the structure of supply and demand in the labour market due to the shortage and surplus of personnel in the context of various professional-qualification groups. Methods for forecasting the need for personnel used in Belarus include only a quantitative forecast based on extrapolation (1; 5), which does not allow identifying skills in demand for graduates in the labour market. The employability of a graduate should be formed systematically in the educational process by developing an appropriate set of skills (in demand in the labour market, included in the curriculum, agreed with employers). The modern labour market formulates completely new challenges: educational institutions need to form algorithms for managing the employment of graduates, which must be adaptable, that is, the ability to respond in advance and quickly to changes in external and internal factors that have a significant impact on its functioning by making adequate management decisions (4), up to making adjustments to the strategy for regulating youth employment. The answer to these challenges should be the formation of the necessary competencies for employability among graduates, which will allow a young specialist to enter the labour market as an active subject and successfully adapt in the face of dynamic changes.

Reference

1. Боровик, Л. С. Прогнозирование баланса трудовых ресурсов: методологические аспекты // Материалы XVII Междунар. науч. конференции. – Минск: изд-во НИЭИ М-ва экономики Республики Беларусь. – С. 81–88.

2. Ванкевич, Е. В. Информационно-аналитическая система рынка труда и прогнозирования потребности в кадрах: содержание и направления формирования в Республике Беларусь / Е. В. Ванкевич, Э. Кастел-Бранко // Белорусский экономический журнал. – 2017. – № 2. – С. 73–92.

3. Головенчик, Г. Г. Трансформация рынка труда в цифровой экономике / Г. Г. Головенчик // Цифровая трансформация. – 2018. – № 4 (5). – С. 27–43.

4. Дудина, М. М., Глотова, Е. Е. Изучение требований работодателей к выпускникам вузов: российский и зарубежный опыт // Вестник Омского государственного педагогического университета. Гуманитарные исследования. – 2015. – № 1(5).

5. Касперович, С. А. Совершенствование системы прогнозирования объемов и структуры подготовки кадров в Республике Беларусь // Проблемы прогнозирования и государственного регулирования социально-экономического

развития: материалы XVII Междунар. науч. конф. (Минск, 21–22 окт. 2016 г.) В 3 т. Т.1 / редкол.: А. В. Червяков [и др.]. – Минск: НИЭИ М-ва экономики Респ. Беларусь. – С. 89–94.

6. Международный институт управления бизнесом [Электронный ресурс]. – Режим доступа: https: //www.ibm-institute.com/. – Дата доступа: 10.09.2020.

7. Савельева, Е. А. Профессиональные стандарты как инструмент управления численностью персонала и развития кадрового состава организаций // Лидерство и менеджмент. – 2018. – Том 5. – № 3. – С. 125–135.

8. Титов, А. А. Значение управления человеческими ресурсами в современных условиях функционирования предприятия // Молодой ученый. – 2017. – № 20. – С. 283–284.

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FORECAST OF SEASONAL FLUCTUATIONS OF SUPPLY IN THE LABOR MARKET OF BELARUS

ПРОГНОЗИРОВАНИЕ СЕЗОННЫХ КОЛЕБАНИЙ ПРЕДЛОЖЕНИЯ НА РЫНКЕ ТРУДА РЕСПУБЛИКИ БЕЛАРУСЬ

Kalinovskaya I.
Vitebsk State Technological University, Republic of Belarus
E-mail: i-kalinovskaya@yandex.by
Калиновская И. Н.
Витебский государственный технологический университет, Республика Беларусь

ABSTRACT

LABOR MARKET, SUPPLY FORECASTING, SEASONAL FLUCTUATIONS, ARTIFICIAL INTELLIGENCE

The article suggests the method of collecting information and making a forecast of seasonal fluctuations of supply at the labor market of Belarus, based on the technology of artificial intelligence with the use of the method of seasonality analysis by U. Parsons. Obtaining information and making forecast values was carried out on the basis of data from the job search portal Jobs.tut.by and GSZ.gov.by from January 2015 to December 2019.

АННОТАЦИЯ

РЫНОК ТРУДА, ПРОГНОЗИРОВАНИЕ ПРЕДЛОЖЕНИЯ, СЕЗОННЫЕ КОЛЕБАНИЯ, ИСКУССТВЕННЫЙ ИНТЕЛЛЕКТ

В статье предлагается методика сбора информации и составления прогнозных значений сезонных колебаний предложения на рынке труда Республики Беларусь, основанная на технологии искусственного интеллекта с применением метода анализа сезонности У. Парсонса. Получение информации и составление прогнозных значений осуществлялось на основании данных портала поиска работы «Jobs.tut.by» и «GSZ.gov.by» с января 2015 г. по декабрь 2019 г.

When analyzing the dynamics of supply on the Belarusian labor market, there are periods of decline and increasing activity of those who want to find or change jobs. In other words, the labor market, like most social structures, is subject to seasonality.

In order to draw a graph of the seasonality of the labor market and obtain its forecast values, the first stage was to collect resumes from Belarusian job search websites. The websites Jobs.tut.by and GSZ.gov.by were chosen as the primary source of resumes as they contain the maximum number of submitted resumes by job seekers.

Collection of resumes and their preparation for further analysis was carried out by a software product based on artificial intelligence, developed by the Department of Management in Vitebsk State Technological University. This process was implemented by methods of scraping, SpaCy, and machine learning and included stages: extraction of resumes from web sources, data cleaning, deduplication, job classification, saving the collected data in the program Superset [1, 2]. Figure 1 shows the initial data for seasonality analysis of the collected resumes.

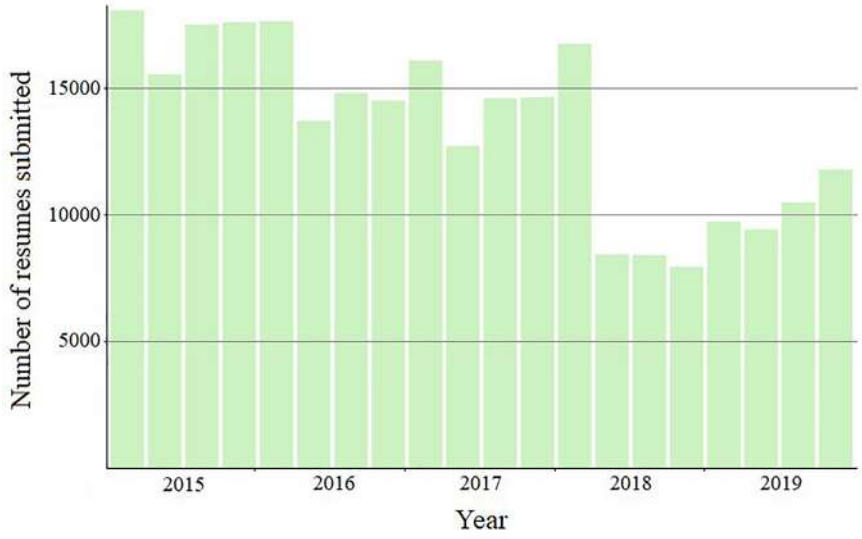

Figure 1 – Input data for seasonality analysis

Source: compiled by the author.

As a result of the analysis of technologies for forecasting seasonal market fluctuations, it was found that the most accurate are the methods by which the measurement is made directly from empirical (statistical) data without preliminary processing. Thus, W. Parsons' method was chosen as the optimal method of forecast development, which allows to eliminate the error caused by the influence of the general trend with the help of the average coefficient of rise (fall) of the general trend for complex percentages [3].

The technology of seasonal wave construction by W. Parsons' method consists in calculation of chain relations of initial values of the number of submitted summaries

and determination of average median values of chain relations. Calculations of values are presented in Table 1.

Table 1 – Construction of a seasonal wave

Year	Quarterly, thousands of resumes				Total for the year
	I	II	III	IV	
2015	18	15,5	17,5	17,6	68,6
2016	17,6	13,7	14,8	14,5	60,6
2017	16,1	12,7	14,6	14,6	58
2018	16,7	8,44	8,42	7,95	41,51
2019	9,74	9,42	10,5	11,8	41,46
Year	**Quarterly chain relations of row levels**				**Average of quarterly relations for the year**
	I	**II**	**III**	**IV**	
2015	-	86,1	112,9	100,6	99,86192183
2016	100	77,8	108,0	97,9	95,96076979
2017	111,0	78,9	114,9	100	101,2192751
2018	114,4	50,5	99,6	94,4	89,77589231
2019	122,5	96,7	111,5	112,4	110,7690557
Average quarterly relations from chain relations for 5 years	111,9	78,0	109,4	101,1	
Median values from chain relations	112,7	86,1	111,5	100	
Converted median average	100	86,1	95,9	95,9	
Converted and corrected median average	100	86,9	97,9	99,0	95,99799024
Seasonal wave	104,2	90,6	102,0	103,1	100

Source: compiled by the author.

Figure 2 shows the constructed seasonal wave of supply in the labor market of Belarus.

The trend line of the constructed seasonal wave is represented by a polynomial of the third degree: $Y = -5{,}8922x^3 + 47{,}846x^2 - 115{,}84x + 178{,}05$.

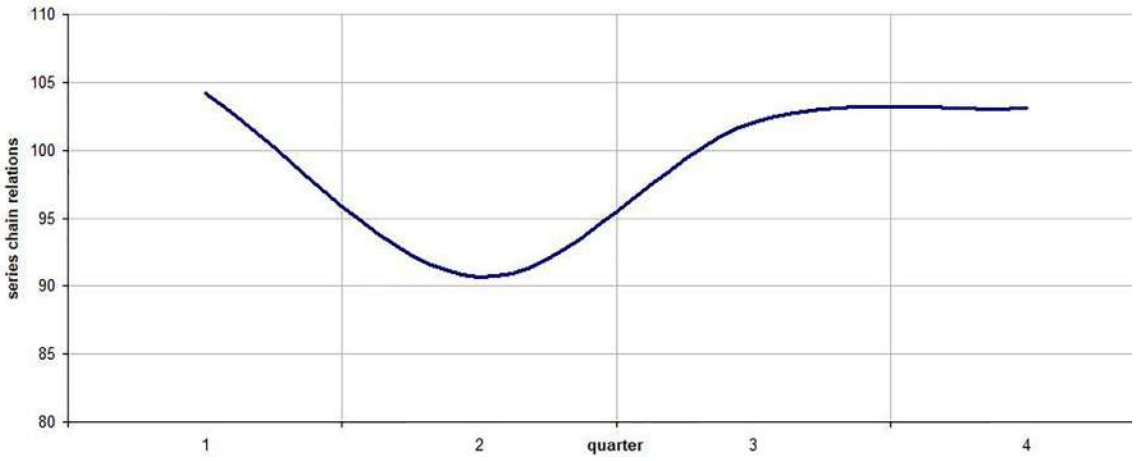

Figure 2 – Seasonal wave of supply in the labor market of Belarus

Source: compiled by the author.

Conclusions:

1. It is recommended to collect data on the labor market and prepare them for further analysis by methods of scraping, SpaCy and machine training.

2. When conducting a labor market analysis of Belarus there is seasonality.

3. According to the chart (Fig. 2), there is a sharp decline in the number of submitted resumes from the beginning of the first quarter to the first half of the second quarter and a revival until the last week of the third quarter. Decrease in activity of job seekers is explained by the fact that the employees who found a job at the end of the year are on test and training period. Furthermore, the revival is connected with the search for seasonal work and the first job by graduates of educational institutions.

References

1. Ванкевич, Е. В., Калиновская, И. Н. Технологии искусственного интеллекта в управлении человеческими ресурсами / Е. В. Ванкевич, И. Н. Калиновская // «Белорусский экономический журнал» – 2020. – № 2(91). – С. 38–51.

2. Kalinouskaya, I. N. Recruitment based on artificial intelligence technologies // I. N. Kalinouskaya / Proceedings of the International Conference «Process Management and Scientific Developments». – Birmingham, United Kingdom, July 22, 2020. – Scientific publishing house Infinity, 2020. – P. 7–15.

3. Калиновская, И. Н. Прогнозирование товарных рынков : конспект лекций / И. Н. Калиновская. – Витебск : УО «ВГТУ», 2018. – 82 с.

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CUSTOMER SATISFACTION ASSESSMENT MECHANISM

МЕХАНИЗМ ОЦЕНКИ УДОВЛЕТВОРЕННОСТИ ПОКУПАТЕЛЕЙ

Nikolaeva Yu.

Vitebsk State Technological University, Republic of Belarus

Николаева Ю.Н.

Витебский государственный технологический университет, Республика Беларусь

ABSTRACT

CONSUMER, SATISFACTION, ASSESSMENT SCALE, CATEGORY, MECHANISM

The concept of marketing assumes that marketing begins and ends with the consumer. Consumer orientation is about achieving customer satisfaction and, as a result, retention and preservation. A direct link between customer satisfaction and company profitability has been recognized. Satisfaction can be monitored and maintained at an appropriate level through marketing research to measure satisfaction. This measurement is an assessment of how consumers perceive the company's activities as a supplier of goods. The article discusses the methodology for assessing customer satisfaction, considers the primary methods for determining customer satisfaction.

АННОТАЦИЯ

ПОТРЕБИТЕЛЬ, УДОВЛЕТВОРЕННОСТЬ, ШКАЛА ОЦЕНКИ, КАТЕГОРИЯ, МЕХАНИЗМ

Концепция маркетинга предполагает, что маркетинг начинается и кончается потребителем. Ориентация на потребителя состоит в достижении его удовлетворенности и, как следствие, в его удержании и сохранении. Признана прямая связь между уровнем удовлетворенности потребителей и прибыльностью компании. Вести мониторинг удовлетворённости и поддерживать её на соответствующем уровне можно путём маркетинговых исследований по измерению удовлетворённости. Такое измерение представляет собой оценку того, как потребители воспринимают деятельность компании в качестве поставщика товара. В статье рассмотрена методика оценки удовлетворенности потребителя, рассмотрены основ-

ные способы определения потребительской удовлетворенности.

One of the important trends caused by the continually growing market turbulence is the transformation of consumers into the most valuable asset of any company. Success in competition is achieved only by those companies that have managed to build stable, long-term relationships with their customers, kept both in relatively favorable periods and under the pressure of economic problems. Representatives of the scientific community and practitioners have long been drawing attention to the fact that the main guarantee of consumer loyalty is consumer satisfaction with goods and services and realized the social significance of its study and evaluation. The first cross-sectoral national instrument for assessing consumer satisfaction with the quality of goods and services was introduced in 1989 in Sweden. Taking into account the experience gained in 1996 a model of the American Customer Satisfaction Index (ACSI) was proposed, and in 2000 – its improved European analogue (ECSI – European Customer Satisfaction Index). From 01.01.2010 in all member countries of the European Union, there was introduced a mandatory comprehensive analysis of the functioning of markets in the interests of consumers. It also involves assessing consumer satisfaction. Consequently, today this indicator is considered one of the main targets of marketing activities of any company.

Customer satisfaction is a category that cannot be measured and evaluated directly; its measurement is based on the generalization of the subjective assessments of consumers obtained in the course of personal surveys. The results obtained can be inaccurate and generate risks when using them, both due to the subjectivity of the respondents' opinions, and due to the error of representativeness sampling. Since the end result of assessing consumer satisfaction is the justification of recommendations for its improvement, it should be realized that the quality of planned management measures can be significantly increased by taking into account the relevant risks when making recommendations.

Systematic research and assessment of customer satisfaction provide companies with a number of significant benefits by providing practical, ongoing feedback to whom goods and services are addressed. Thus, R. Sharma believes that the study of customer satisfaction:

- provides ideas for improving the product and the whole life what experience;
- promotes customer retention;
- identifies satisfied consumers who can become brand advocates;
- provides information support for management decisions.

Information that can be used by researchers to assess customer satisfaction

consists of data centering and direct evaluation data. In the middle, customer satisfaction metrics include, for example, the frequency and trends of customer complaints and disputes, product returns or repairs, data collected from communication with customers by marketing personnel, service personnel, and the like. Direct assessment of consumer satisfaction is carried out on the basis of marketing optimization, which can be only qualitative or only quantitative, or a combination of qualitative and quantitative [1].

An important problem in conducting this kind of marketing research is choosing the type of scale for quantifying customer satisfaction. Modern marketing experts suggest using these types of scales:

- a yes/no answer to the question of whether consumers are ready to recommend a product or company to others; however, firstly, one question is not enough for an objective and comprehensive assessment of satisfaction; secondly, the willingness to recommend depends on the psychological characteristics of the consumer – being completely satisfied personally, they may feel the differences between their own needs and the needs of others and not consider it possible to impose their opinion;
- a "yes/no" answer to the question of whether the consumer is satisfied with the products or services of the company; however, as A. Cherny rightly notes, "the use of binary scales for assessing satisfaction ... does not provide reliable and valid information regarding the actual value of the studied category. This is due to the fact that this type of scale has an error 2–3 times greater than interval scales, which consist of 10 categories of assessment at the same level of significance" [2];
- scales of gradation of answers (verbal or numerical rating scales), for example, the scale of the degree of consumer agreement with the statement about satisfaction with the product or services of the company may consist of the answers "strongly agree", "agree", "neutral", "disagree", "completely disagree" (the number of points is 5, 4, 3, 2 and 1, respectively); if there is a need to force the defendant to accept a particular position and there are neutral answers, then an even number of scale levels can be used in the questionnaire – 4 or 6; for example, a customer might be "very satisfied", "satisfied", "rather satisfied", "rather dissatisfied", "dissatisfied" or "very dissatisfied" with the product (scores 6, 5, 4, 3, 2, and 1);
- satisfaction assessment scales in points from 1 to 10, where 1 is absolutely dissatisfied, 10 – completely satisfied; using such scales, it is possible to assess customer satisfaction both in general and in several components, which creates a convincing information basis for generating ideas to increase customer satisfaction;
- scales that provide for assessing both customer satisfaction in several

components and the importance of these components for consumers (also in points from 1 to 10); this allows, in addition to justifying measures to increase satisfaction, also calculate the integral indicator of satisfaction and build a matrix "importance – satisfaction" to determine the order of implementation of measures.

Based on the fact that the last version of the rating scale is the most comprehensive and objective, we developed a methodical approach to assessing customer satisfaction for the main components of the marketing complex of the enterprise. It is this approach that creates a reliable information base for generating planned measures to increase consumer satisfaction.

Reference

1. Kotler, F., & Keller, K. Marketing menedzhment [Marketing Management]. – SPb, 2006.

2. Omar, N. A., Wel, C. A., Aziz, N. A., & Alam, S. S. Investigating the structural relationship between loyalty program service quality, satisfaction and loyalty for retail loyalty programs: evidence from Malaysia. Measuring Business Excellence, 2013, 17 (1), p. 33–50.

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INTEGRATING THE RISK MANAGEMENT PROCESS INTO THE QUALITY MANAGEMENT SYSTEM OF THE TESTING LABORATORY

ИНТЕГРИРОВАНИЕ ПРОЦЕССА УПРАВЛЕНИЯ РИСКАМИ В СИСТЕМУ МЕНЕДЖМЕНТА КАЧЕСТВА ИСПЫТАТЕЛЬНОЙ ЛАБОРАТОРИИ

Savitsky K., Makhon A., Karpushenko I.[a]

Vitebsk State Technological University, Republic of Belarus

E-mail: [a] karinstep@rambler.ru

Савицкий К. Г., Махонь А. Н., Карпушенко И. С.[a]

Витебский государственный технологический университет, Республика Беларусь

ABSTRACT

RISK, RISK-MANAGEMENT PRINCIPLES, QUALITY MANAGEMENT SYSTEM, TESTING LABORATORY, ACCREDITATION OF LABORATORIES

The article presents data on structural changes in the new version of GOST ISO / IEC 17025-2019 and the results of adapting the principles of risk management to the main activities of the testing laboratory.

АННОТАЦИЯ

РИСК, ПРИНЦИПЫ УПРАВЛЕНИЯ РИСКАМИ, СИСТЕМА МЕНЕДЖМЕНТА КАЧЕСТВА, ИСПЫТАТЕЛЬНАЯ ЛАБОРАТОРИЯ, АККРЕДИТАЦИЯ ЛАБОРАТОРИИ

В статье представлены данные о структурных изменениях в новой версии ГОСТ ISO/IEC 17025-2019 и результаты адаптации принципов риск-менеджмента к основной деятельности испытательной лаборатории.

In the process of accreditation of a testing laboratory, it is necessary to update the quality policy in accordance with the requirements of GOST ISO/IEC 17025-2019, as well as to include risk management in the list of strategic goals in the field of test quality.

The laboratory's risk-management policy may include:

- statement of the laboratory management's focus on risk management in relation to the stated goals;
- the intention to implement risk-management in the practice of making any

decisions, performing any actions and processes;

- defining the authority, responsibility, and accountability of staff;
- the obligation to ensure access to the necessary resources for those responsible for risk management;
- commitment to involve as many stakeholders as possible in risk management;
- establishing risk-management performance indicators;
- allocation of resources for risk management;
- ways to resolve conflicts;
- the obligation to review and improve the risk-management policy and structure periodically, as well as in the event of changes in circumstances;
- striving to improve risk-management.

ISO 31000:2018 helps to integrate the risk management process into the overall management scheme of the testing laboratory, processes, policies and culture of the organization, which contains principles and General guidelines for effective identification and risk management.

Table 1 shows the result of adopting the principles of risk management to the laboratory activities of the testing laboratory.

Table 1 – Principles of risk-management for testing laboratories

Principle	Content	Application for testing laboratories
1	2	3
Integration	Risk-management is an integral part of the organization's activities and contributes to its improvement	Risk-management is part of the testing laboratory's management system (GOST ISO/IEC 17025-2019)
Universality	Risk management is an integral part of all the management processes of the testing laboratory	Risk management is part of management's responsibilities. Any management decision is made based on a risk analysis. The testing laboratory uses risk management on a planned and event-based basis
Adaptedness	The structure and process of risk management are correlated and adjusted to the external and internal context of the organization	Risk management must correspond to the external and internal context. ISO/ IEC 17025:2017 establishes mandatory risk-management only for laboratory activities (the laboratory has the right to apply this approach in other areas as well)

End of table 1

1	2	3
Inclusiveness	Appropriate and timely involvement of stakeholders allows us to take into account their knowledge, views and opinions.	Risk management is transparent and takes into account the interests of different parties. The main stakeholders are the laboratory's specialists and its clients
Dynamism	Risks may arise, change, or disappear as the external and internal context of the organization changes. Risk management forecasts, detects and responds to these changes and events in a timely and appropriate manner	Any change in the context should entail a risk analysis. Identified risks should be regularly reviewed to ensure effective and reliable results
Consideration of human and cultural factors	Human behavior and culture significantly affect all aspects of risk management at every level and stage	The main source of inconsistencies in the testing laboratory is the human factor. The laboratory must necessarily take it into account when analyzing risks and identifying their sources
Continuous improvement	Risk management is constantly improved through training and experience accumulation	Risk management contributes to the continuous improvement of the organization, since the organization must develop a strategy for improving risk management along with improving other aspects of its activities

"Impartiality" and "Confidentiality" requirements play an essential role in integrating risk management processes into laboratory activities (Fig. 1).

For practical implementation of Section 4.1 "Impartiality", it is recommended to keep records in the following order:

- analysis of potential risks of impartiality, including risks related to the laboratory's activities, its relationships, and relationships within its staff;
- measures to eliminate or minimize risks associated with impartiality;
- action plan: develop and implement appropriate actions.

In order to implement section 4.2 "Confidentiality" in the activities of the testing laboratory, the client must be notified in writing that the laboratory intends to publish the data in open sources. The notification must be provided prior to

the start of laboratory testing and should therefore be included in the contract or other similar document. Information about customer data remains confidential. Laboratory employees and service providers must also sign a declaration of confidentiality.

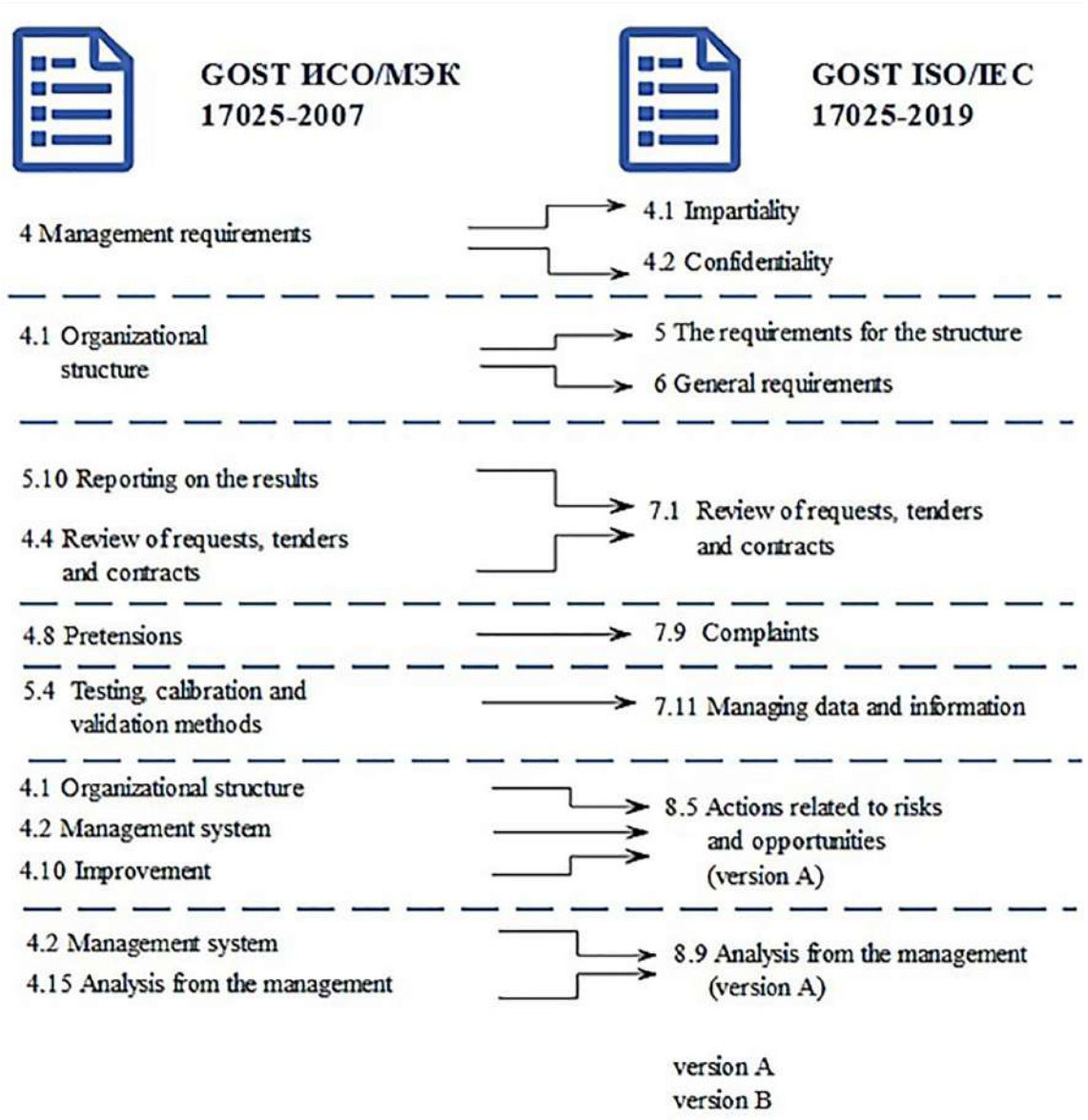


Figure 1 – Scheme of structural changes in GOST ISO/IEC 17025-2019

Integration of risk management in a testing laboratory begins with the analysis of external and internal factors that can influence the success of the laboratory in achieving its goals. The testing laboratory is characterized by consideration of risks in the field of accreditation, preservation of state and commercial secrets, handling of toxic and radioactive substances, ensuring industrial, fire, environmental, and

sanitary safety. The internal context is also considered in the same way. Description of the context, it is recommended to document each year.

References

1. ISO/IEC 17025 : 2017. Общие требования к компетентности испытательных и калибровочных лабораторий. – Введен 29.11.2017, взамен ISO/IEC 17025:2005 – ISO /CASCO. – 40 с.

2. ISO 31000 : 2018. Менеджмент рисков. Принципы и руководящие указания / ред. 20.04.2019 – Режим доступа: http://www.pqm-online.com. – Дата доступа: 20.06.2020.

UDC 658.152:004.9(476.5)

ANALYSIS OF EFFICIENCY OF USE OF ORGANIZATION'S FIXED ASSETS USING MACRO PROGRAMMING ELEMENTS (EVIDENCE FROM VITEBSK CARPETS COMPANY)

АНАЛИЗ ЭФФЕКТИВНОСТИ ИСПОЛЬЗОВАНИЯ ОСНОВНЫХ СРЕДСТВ ОРГАНИЗАЦИИ С ПРИМЕНЕНИЕМ ЭЛЕМЕНТОВ МАКРОПРОГРАММИРОВАНИЯ (НА ПРИМЕРЕ ОАО «ВИТЕБСКИЕ КОВРЫ»)

***Savitskaja T.*, *Vardomatskaya E.*[a], *Zauyalava A.*[b]**
Vitebsk State Technological University, Republic of Belarus
E-mail: [a]el_v@tut.by, [b]alinazavialova@gmail.com
Савицкая Т.Б.*, *Вардомацкая Е.Ю., Завьялова А.О.
Витебский государственный технологический университет, Республика Беларусь

ABSTRACT

FIXED ASSETS OF THE ORGANIZATION, ANALYSIS OF FIXED ASSETS, CALCULATION OF INDICATORS OF THE EFFICIENCY OF USING FIXED ASSETS, SOFTWARE APPLICATION

The article examines the efficiency of using fixed assets of Vitebsk CarpetsCompany for the period 2016–2017. To automate the calculation of performance indicators, a universal software application has been developed based on the MS Excel spreadsheet processor.

АННОТАЦИЯ

ОСНОВНЫЕ СРЕДСТВА ОРГАНИЗАЦИИ, АНАЛИЗ ОСНОВНЫХ СРЕДСТВ, РАСЧЕТ ПОКАЗАТЕЛЕЙ ЭФФЕКТИВНОСТИ ИСПОЛЬЗОВАНИЯ ОСНОВНЫХ СРЕДСТВ, ПРОГРАММНОЕ ПРИЛОЖЕНИЕ

В статье исследуется эффективность использования основных средств ОАО «Витебские ковры» за период 2016–2017 года. Для автоматизации расчетов показателей эффективности разработано универсальное программное приложение на базе табличного процессора MS Excel.

Any enterprise seeks to increase the volume of production and sales of products. To do this, it is necessary to know whether the company has enough fixed assets and what is their technical condition. Having an idea of the structure of fixed assets, their physical deterioration and factors affecting them, it is

possible to predict problems that can lead to a decrease in the efficiency of using fixed assets and production facilities of the enterprise.

For a general assessment of the movement and technical condition of fixed assets, a number of indicators are used that reflect the intensity of the processes of receipt and disposal of fixed assets: coefficient of receipt (input), coefficient of renewal, coefficient of disposal, coefficient of liquidation and coefficient of growth of fixed assets.

The purpose of the study is to analyze the effectiveness of using the organization's fixed assets and create a universal software application that automates the calculation of key indicators for such an analysis. The object of the research is the fixed assets of Vitebsk Carpets Company.

The information base of the research is presented by the data of accounting and statistical reporting of Vitebsk Carpets Company for 2016–2017. Research tools are MS Excel spreadsheet processor, macro programming technology.

In accordance with the adopted methodology for calculating the efficiency of using the organization's fixed assets [1], an algorithm is proposed that includes the following stages:

1. The choice of indicators, i.e., the data of accounting and statistical reporting for the base and reporting period, on the basis of which the criteria for the effectiveness of the use of fixed assets of the organization are calculated.
2. Calculation of the average annual cost of fixed assets and its growth rates.
3. Calculation of indicators of movement of fixed assets and their absolute deviations.
4. Calculation of indicators of the technical condition of fixed assets.
5. Calculation of indicators of efficiency of use and growth rates of fixed assets (capital productivity, capital intensity, capital-labor ratio, profitability).

Calculation of the dynamics of these indicators is a routine and time-consuming process, even with the use of information technology. Therefore, it is more convenient to use information products to implement the formulated algorithm. For these purposes, they often use the capabilities of the MS Excel spreadsheet processor, programming languages C, C++, C #, or web programming technologies. Despite the apparent advantages of the C, C++, C # languages, particularly their support for various styles and programming technologies and cross-platform, these languages have drawbacks, and the main one is the difficulty of learning them. Therefore, the MS Excel spreadsheet processor was used as a toolkit, which has a friendly interface and provides a wide range of built-in functions [2]. To select the direction of analysis, a software application was developed, the main button form of which is shown in Figure 1.

Figure 1 – Main page of the software application

Compiled by the authors.

The calculation of each group of indicators is made on separate sheets of the MS Excel, navigation between them is carried out using control tools (buttons) and hyperlinks). To automate calculations, formulas and built-in functions of various categories of MS Excel are used, as well as procedures and functions are written and written in the Visual Basic for Applications (VBA) programming language. Macros are written to activate calculations [3].

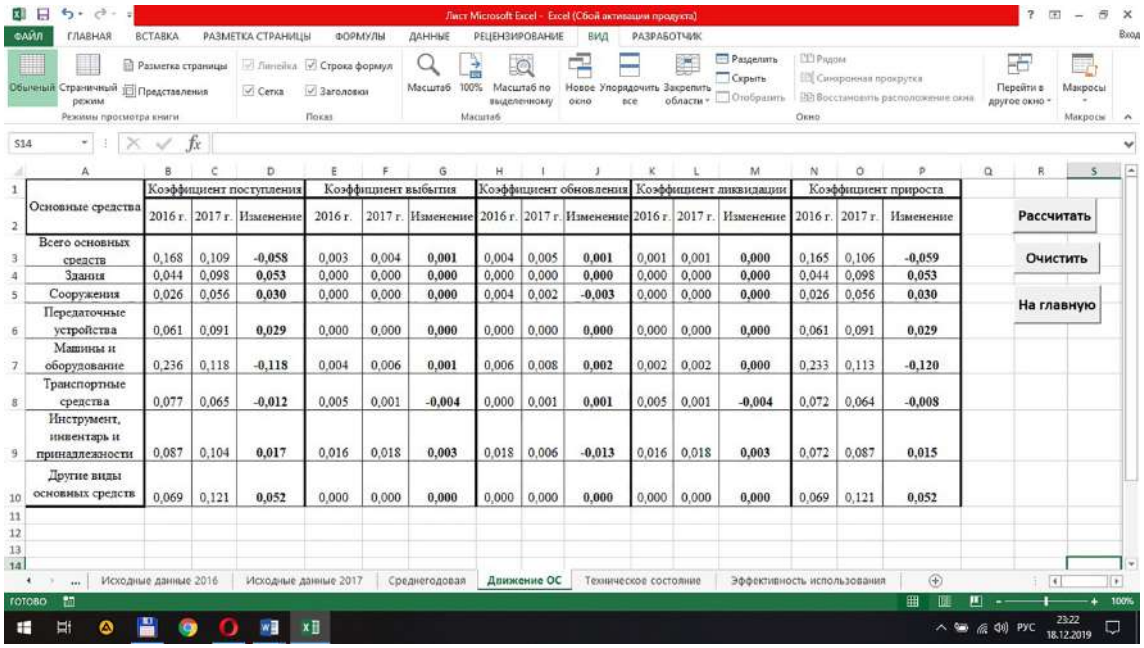
As an example of the calculation technology, the analysis of the movement, receipt and disposal of fixed assets, carried out according to the template table on the worksheet of the developed product (see Fig. 2), is given.

Compiled by the authors.

Based on the results of the analysis of the movement of fixed assets, it was found that in 2017 compared to 2016, the rate of receipt of fixed assets decreased by 0.058 percentage points. [4]. The greatest decrease in this indicator (by 0.118 percentage points) is observed in the group of machinery and equipment, which indicates a decrease in the share of equipment being commissioned and an increase in the wear of fixed assets. At the same time, the retirement ratio increased by 0.001 percentage points, which is associated with an increase in the number of written off and liquidated fixed assets, the renewal ratio increased by 0.001 percentage points, the growth rate decreased by 0.06 percentage points.

In a similar way, the analysis of the depreciation of fixed assets was carried out, which showed that in 2017, compared to 2016, the shelf life ratio decreased by 0.05. The largest decrease in the coefficient is observed for vehicles (by 0.10),

machinery and equipment (by 0.08), tools, inventory, and accessories (by 0.05). At the same time, structures have the highest degree of wear (0.78), which is due to the insufficient volume of commissioned assets and the low degree of write-off of obsolete fixed assets. Analyzing the coefficients of shelf life and wear, it was found that the degree of wear of fixed assets was 0.55 in 2016 and 0.60 in 2017.



Основные средства	Коэффициент поступления			Коэффициент выбытия			Коэффициент обновления			Коэффициент ликвидации			Коэффициент прироста		
	2016 г.	2017 г.	Изменение	2016 г.	2017 г.	Изменение	2016 г.	2017 г.	Изменение	2016 г.	2017 г.	Изменение	2016 г.	2017 г.	Изменение
Всего основных средств	0,168	0,109	-0,058	0,003	0,004	0,001	0,004	0,005	0,001	0,001	0,001	0,000	0,165	0,106	-0,059
Здания	0,044	0,098	0,053	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,044	0,098	0,053
Сооружения	0,026	0,056	0,030	0,000	0,000	0,000	0,004	0,002	-0,003	0,000	0,000	0,000	0,026	0,056	0,030
Передаточные устройства	0,061	0,091	0,029	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,061	0,091	0,029
Машины и оборудование	0,236	0,118	-0,118	0,004	0,006	0,001	0,006	0,008	0,002	0,002	0,002	0,000	0,233	0,113	-0,120
Транспортные средства	0,077	0,065	-0,012	0,005	0,001	-0,004	0,000	0,001	0,001	0,005	0,001	-0,004	0,072	0,064	-0,008
Инструмент, инвентарь и принадлежности	0,087	0,104	0,017	0,016	0,018	0,003	0,018	0,006	-0,013	0,016	0,018	0,003	0,072	0,087	0,015
Другие виды основных средств	0,069	0,121	0,052	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,069	0,121	0,052

Figure 2 – Analysis of the movement of fixed assets of Vitebsk Carpets Company

The analysis of the calculated indicators of the efficiency of using fixed assets of Vitebsk Carpets Company, carried out on a separate sheet of the workbook, allows us to conclude that in 2017, compared to 2016, the capital intensity of fixed assets decreased by 0.01 rubles, the indicators of capital productivity and profitability, on the contrary, increased by 0.02 rubles. and 2.39 p.p. accordingly, which speaks of more rational use of fixed assets [5].

The developed software application has a friendly interface and does not require any special programming skills.

The application is universal, since it allows, on the basis of accounting, statistical and operational accounting materials, to form the necessary initial data, and then to analyze the availability, movement, condition and use of fixed assets of enterprises and organizations of any form of ownership.

References

1. Шутенко, А. А. Анализ эффективности использования основных средств / А. А. Шутенко // Научный журнал «Вектор экономики». – 2017. – № 12(18). – С. 15.

2. Волчёнков, Н. Г. Основы программирования на языке Visual Basic для офисных приложений: учебное пособие [Электронный ресурс]. – Москва : НИЯУ МИФИ, 2018. – 166 с.

3. Вардомацкая, Е. Ю. Интерактивное приложение для автоматизации калькуляции себестоимости / Е. Ю. Вардомацкая // Сборник научных статей МНПК «Социально-экономическое развитие организаций и регионов Беларуси: эффективность и инновации» / УО «ВГТУ». – Витебск, 2018. – С. 51–55.

4. Соломатин, А. Н. Экономика, анализ и планирование на предприятии торговли : учебник для вузов / А. Н. Соломатин. – Санкт-Петербург : Питер, 2009. – 560 с.

5. Саруханян, А. А. Теоретические основы анализа основных средств организации / А. А. Саруханян // Аллея науки. – 2018. – № 2(18). – С. 361–364.

UUD 336.743

PROSPECTS FOR THE USE OF BLOCKCHAIN AND CRYPTOCURRENCIES TECHNOLOGY IN BELARUS

ПЕРСПЕКТИВЫ ИСПОЛЬЗОВАНИЯ ТЕХНОЛОГИИ БЛОКЧЕЙН И КРИПТОВАЛЮТЫ В РЕСПУБЛИКЕ БЕЛАРУСЬ

Semenchukova I.

Vitebsk State Technological University, Republic of Belarus

E-mail: sii481609@mail.ru

Семенчукова И. Ю.

Витебский государственный технологический университет, Республика Беларусь

ABSTRACT

BLOCKCHAIN, DISTRIBUTED REGISTRY TECHNOLOGY, SMART CONTACT, DIGITAL CURRENCY, CRYPTOCURRENCY, CRYPTO ECONOMY, MINING, BITCOIN, RATE, PROSPECTS

The article examines the essence and significance of blockchain and cryptocurrency technology, as well as the prospects for their use in Belarus today.

АННОТАЦИЯ

БЛОКЧЕЙН, ТЕХНОЛОГИЯ РАСПРЕДЕЛЕННОГО РЕЕСТРА, СМАРТ-КОНТАКТ, ЦИФРОВАЯ ВАЛЮТА, КРИПТОВАЛЮТА, КРИПТОЭКОНОМИКА, МАЙНИНГ, БИТКОЙН, КУРС, ПЕРСПЕКТИВЫ

В статье рассматривается сущность и значимость технологии блокчейн и криптовалюты, а также перспективы их использования в Республике Беларусь на сегодняшний день.

As the term "distributed registry technology" implies, blockchain technology is based on the ability to create and share unique digital records without a centralized proxy [4].

A distributed database of this technology, consisting of blocks that include transactions (not necessarily financial), allows to preserve all information about the transactions, as well as to protect the data from unauthorized change or hacking. This solution looks more reliable than the traditional implementation: the database is the central server responsible for security system administrator.

Because of its characteristics, blockchain offers the world unprecedented opportunities to distribute rewards for economic activity with much less risk of

intercepting them and without the hidden costs [4].

Cryptocurrencies were the first mass testing of blockchain technology (distributed registry technology). The use of cryptocurrencies in monetary relations allows to increase the security and control ability of private money to be issued.

Cryptocurrency, in the vast majority of cases, is not secured by any goods and is not guaranteed by the state. Thus, its value is determined simultaneously on the basis of individual perception and how it is assessed by other members of society, i.e. the level of trust in it. Existing only in the form of code and having limited opportunities for direct exchange for goods (the function of the means of payment) cryptocurrency is nevertheless used as money. Its uniqueness in relation to fiat money is also that its limited turnover and regulation are actually ensured without the participation of the state government.

Compared to the traditional monetary system, it is difficult to "reprint" digital money and thus cause inflation to administratively limit/prohibit the use and conduct of transactions with cryptocurrencies.

To date, the scale of the use of cryptocurrencies does not give reason to believe that most subjects of the world economy are moving away from the use of fiat money in favor of cryptocurrencies. So far, there are about 1000 cryptocurrencies with a total market capitalization of $211.7 billion, with the United States having $114.4 billion or 54 % of bitcoin supply[3].

Everyone registered in the system can become the owner of the cryptocurrency. To do this, it is enough to create an electronic wallet, verify a personal account and keep credentials in a safe place. The wallet is ready to be deposited as soon as the registration is completed.

One way to buy cryptocurrency is mining. Mining is the use of software and technology to ensure that the registry of transaction blocks (blockchain) operates by entering into a distributed registry (according to predetermined rules and principles) information about transactions committed between users.

Despite the technical limitations and difficulties associated with the mining and circulation of cryptocurrencies (low transaction processing speed, risk of system stability, etc.), individual states are already experimenting with digital money, as well as blockchain technology. However, the importance of the prospects for using cryptocurrencies for individuals, the state, and the business vary [3].

The formation of the legal framework for the regulation of crypto-economy in Belarus began with Decree No. 8 "On the development of the digital economy" signed by the President of the Republic of Belarus on December 21, 2017.

In particular, the document defined such key concepts as "cryptocurrency", "mining", "blockchain", "smart contract", "crypto-platform operator" and others.

In addition, the rights of legal entities and individuals to own cryptocurrencies were regulated and the primary development institution in this area, the High Technology Park (HTP), was defined.

Thus, the first steps have been taken to form an institutional environment and regulatory field for cryptocurrency and blockchain activities.

According to the Decree, the leading institution responsible for developing regulatory principles in the field of cryptocurrency transactions is the High Technology Park.

Other state bodies of Belarus are also moving quickly enough in adopting the necessary regulations for the development of cryptoeconomy. Thus, in February 2018, the National Bank of Belarus amended the regulation on the rules of internal control carried out by banks, which allowed banks to open accounts to crypto-economy entities, including miners.

In 2018, the development of the Decree in Belarus was amended to the banking legislation, which establishes the procedure of banks with tokens (including cryptocurrencies), operators working with these assets. The Ministry of Finance of the Republic of Belarus, with the participation of experts, created a standard for the financial accounting of crypto assets. Thus, participants of economic relations reflect these assets in accounting (created and placed token – obligation; acquired in any way, including mining – an asset). It is worth noting that this standard is the best international experience.

In regulating the activities of the crypto-platform operator (crypto-exchange) in Belarus, the requirements for the activities of Forex companies were taken as the basis [3].

One of the essential rules implemented in the Belarus legislation is the five-year tax break. The taxation principles apply to transactions with cryptocurrencies until 2023, after 2023 the same tax principles apply to the same as for the asset, the rights to which the token certifies. In addition, there are exemptions from currency controls. [3].

In 2015, a company of enthusiasts created the first blockchain company in Belarus. The Cryptosode project was created with the aim of building the first major bitcoin mining center. Cryptosode quickly became the leader of mining in the region: today, the company owns mining farms in Belarus and China.

By the 2030s, different versions of distributed registry technologies, or blockchain, could significantly change everything from online financial transactions to ways to vote and address product manufacturing issues. Widespread use of blockchain technologies may be a turning point in history, but so far, these technologies themselves and the possibilities for their application are at an early

stage of development [5].

Belarus has made great strides in the legal implementation of everything related to the digital economy and, in particular, blockchain.

Although blockchain is moving in the material world in modest steps, it makes great strides in its "native" digital environment. By becoming the basis for bitcoin and other cryptocurrencies, blockchain has attracted billions of dollars in currency and other assets, although not without some cost adjustments. Blockchain has great potential for application in the financial industry and many prospects for the benefit, including the possibility of expanding the availability of financial services and markets by providing access to them without the need to contact the bank [5].

Reference

1. Бабкин, А. В., Буркальцева, Д. Д., Пшеничников, В. В., Тюлин, А. С. Криптовалюта и блокчейн-технология в цифровой экономике: генезис развития // Научно-технические ведомости Санкт-Петербургского государственного политехнического университета. Экономические науки. – 2017. – № 5. –2017. – С. 9–22.

2. Конорев, Н., Мазуров, С. Перспективы применения технологии блокчейн в Республике Беларусь // Банковский вестник. – 2017. – С. 66–71.

3. Криптовалюты и блокчейн как атрибуты новой экономики. Разработка регуляторных подходов: международный опыт, практика государств-членов ЕАЭС, перспективы для применения в Евразийском экономическом союзе. – М.: ЕЭК 2019. – 74 с.

4. Шваб, К., Дэвис, Н. Технологии Четвертой промышленной революции // К. Шваб, Н. Дэвис. – М.: Эксмо, 2018. – С. 333.

5. Myfin.by [Электронный ресурс]. – Режим доступа: https://myfin.by/. – Дата доступа: 24.02.2020.

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INNOVATION AS A FACTOR OF THE ORGANIZATION'S COMPETITIVENESS

ИННОВАЦИИ КАК ФАКТОР КОНКУРЕНТОСПОСОБНОСТИ ОРГАНИЗАЦИИ

Sherstneva O.

Vitebsk State Technological University, Republic of Belarus

Шерстнева О.М.

Витебский государственный технологический университет, Республика Беларусь

ABSTRACT

INNOVATION, INNOVATIVENESS, INNOVATION STATUS, INNOVATION MANAGEMENT, INNOVATION ASSESSMENT

The article analyzes various approaches to the interpretation of the concept of "innovation" and "innovativeness". The essence and properties of the organization's innovativeness are defined. The components of innovation and the environment of impact on innovation are considered. The content and interrelation of such categories as innovative thinking, innovative potential, innovative activity, innovative climate, and innovative culture are analyzed.

АННОТАЦИЯ

ИННОВАЦИЯ, ИННОВАЦИОННОСТЬ, ИННОВАЦИОННЫЙ СТАТУС, УПРАВЛЕНИЕ ИННОВАЦИОННОСТЬЮ, ОЦЕНКИ ИННОВАЦИОННОСТИ

В статье проанализированы различные подходы к трактовке понятия «инновационность» и «инновации». Определены сущность и свойства инновационности организации. Рассмотрены составляющие инновационности и среда воздействия на инновационность. Проанализировано содержание и взаимосвязь таких категорий, как инновационное мышление, инновационный потенциал, инновационная активность, инновационный климат, инновационная культура.

Over the past decade, scientific and technological progress in economic research has been increasingly associated with the concept of the innovation process. We believe that the following methodological approaches should be applied to determine the essence of scientific and technological progress.

Effective. According to this approach, the essence of scientific and technological progress is based on the results of updating production technology: increasing the share of new types of products, new types of materials, improving the forms of production organization, and more. The result of the technological upgrade of production is the increase in its technological level, productivity growth, and the increase of production, improving its quality. Scientific and technological progress (STP) is defined as a continuous process of improving the means of production and the production process based on the achievements of modern science.

Resource. According to it, scientific and technological progress is a dynamic set of measures for the creation, implementation, and dissemination of new knowledge, the creation and use of more advanced technological processes, forms of production organization based on science, technology, and best practices. The resource approach to the characterization of STP is based on material and technical, labor, financial, and information resources for creating and applying innovations that improve production efficiency.

The development of STP can be achieved with more or fewer resources, that is, if the effective pace of the scientific and technical process is higher than the resource, then there is an intensive path of development, and if the opposite is the case – intensive. We believe that the main content of scientific and technological progress is the process of accumulation and practical implementation of new scientific and technical knowledge, an integral system of "science-technology-production" which includes a number of the following stages: fundamental theoretical research; applied research; development; development of technical innovations; production of new equipment.

The unifying element in the formation of an integrated system of "science-technology-production" is innovation. Innovations are an important link in bringing the obtained scientific results to their use in production in order to increase the efficiency of economic activity [1, p. 57-84]. The term "innovation" is currently actively used both independently and with reference to a number of similar concepts: "innovation activity", "innovation process", "innovation potential", etc.

There are a number of methodological ways to interpret the concept of "innovation". Given that "innovativeness" is a term derived from "innovation", there are different approaches to its understanding. Some researchers interpret "innovation" as:

- scientific and technological novelty of the product;
- a resource that can be used for innovation [1];
- a property of the organization in the form of the ability to update for adaptation to the variability of the external environment [2].

It is necessary to distinguish between innovation at the macro level (which is manifested in the innovation of a country or region), meso-level (innovation of an industry or type of activity), and micro-level (innovation of an organization, enterprise, entrepreneur).

The organization's innovation is manifested in the following properties:

1) the organization develops based on the development of innovations. These can be new achievements in the field of technology, technology, processing of material resources and information, social knowledge, as well as in the field of management, pedagogy, and psychology;

2) management in the organization is carried out by the horizontal principle, with its decentralization, focusing on expanding the types of reactions to various changes in the external environment.

3) the long-term goal of the organization is to survive in a competitive environment. Its functioning is characterized by such concepts as business activity, behavior, variety of reactions, adaptability to changes in the external environment, flexibility, and competitiveness;

4) the organization is open to changes (changes in thinking, behavior, product, etc.);

5) the organization is characterized by proactive management, that is, focusing not so much on following the demand as on influencing experience; not just sensitivity to market signals, but also the creation of new signals;

6) the ability of the manager to bring innovative processes to full completion.

The appropriate level and growth of innovation contribute to the growth of the organization's performance. Many researchers confirm this with empirical data and prove the link between innovation and competitiveness. They consider innovation as a factor contributing to the formation of competitive advantages of the enterprise.

Thus, innovation is a systemic, multidimensional, and complex concept. In general, innovation can be defined as the ability of a subject to generate new ideas, introduce innovations, and apply new technologies. It covers both the actual results of innovation activities and the possible results, potential implementation, and use of innovations.

The organization's innovativeness combines the following components: innovative thinking, innovative potential, innovative activity.

Innovative thinking is creative thinking, which manifests itself in a positive perception of innovative transformations and the ability to generate new ideas.

Innovation potential is an organic combination of resources (including material, financial, intellectual, informational, and other resources) that can be directed

to the implementation of innovative activities under certain existing internal and external factors of the innovation environment.

Innovation activity is a purposeful activity of business entities to introduce various types of innovations.

The organization's innovative environment is characterized by an innovative culture and an innovative climate. Innovation culture is an internal environment and includes accumulated knowledge, experience, beliefs, behavioral characteristics and relationships of personnel, and their motivation system. The innovation climate should be understood as a specific state of the external environment of the organization that contributes to the achievement of the innovation goal.

The innovative goal of the organization is its innovative development and achievement of the status of an innovative leader. Innovation status represents the position of an organization among innovative companies; the innovative state of an organization, characterized and determined by its innovative culture and innovative climate.

Economic scientists define innovation depending on the object and subject of research. There are a number of ways to define the essence of innovation. The basic definition of the category "Innovation" was given by I. Schumpeter, by which he understood a different quality of the means of production, which is achieved as a result of the introduction of new means of production or its organization. He identified five types of innovations: production of products with new properties; introduction of a new production method; search and development of a new market for goods; changes in the organization of production and its material and technical support; introduction of new organizational and institutional. However, we believe that these types of innovations are more characteristic of the types of the innovation process.

When studying the essence of the concept of "innovation", it is advisable to separate the concepts of "innovation" and "innovativeness". Innovations are a formalized result of fundamental and applied research and development in a particular field of activity to improve its effectiveness. They can be issued in the form of inventions, patents, trademarks, innovation proposals to improve the product, and more. In order to introduce innovations, turn them into a form of innovation and get a positive result, it is necessary to conduct marketing research, organizational and technological preparation of production, and formalize the results. Investing in the development of innovations is only a component of innovation, and most importantly, the introduction and receipt of the result that characterizes innovation. It should also be noted that the concept of "innovation", from our point of view, should not include the development, introduction of new

products, new technologies, as well as diffusion of innovation. This approach identifies "innovation" with the innovation process, innovation activity.

Thus, the term "innovation" means the end result of introducing innovations in the form of new or improved existing technologies, products, services, or other organizational and technical solutions that meet public needs and provide economic, scientific, technical, environmental, and other effects.

Reference

1. Ковалик, Я. Инновационность как фактор конкурентоспособности малых и средних предприятий. – Режим доступа: http://science-bsea.narod.ru/2007/ekonom_2007/kovalik_innovac.htm /. – Дата доступа: 19.08.2020.

2. Шумпетер, Й. Теория экономического развития / Й. Шумпетер. – Москва:: «Прогресс», 1982. – 754 с.

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BLOCKCHAIN AS A TOOL FOR DIGITALIZATION OF THE ECONOMY

БЛОКЧЕЙН КАК ИНСТРУМЕНТ ЦИФРОВИЗАЦИИ ЭКОНОМИКИ

Stasenia T., Mandrik O.[a]

Vitebsk State Technological University, Republic of Belarus

E-mail: [a]mandrik_miit@rambler.ru

Стасеня Т.П., Мандрик О.Г.

Витебский государственный технологический университет, Республика Беларусь

ABSTRACT

BLOCKCHAIN, CRYPTOCURRENCY, TOKEN, DIGITALIZATION OF THE ECONOMY

Many scientists tend to place high hopes on digital technologies, believing that their implementation will lead to economic growth. The United States and China, which are considered the informal leaders of the "digital" race, were the first to declare a course towards "digitalization". The EU countries, Australia, Canada and others have adopted the corresponding strategies and programs. The world does not fully understands what the "digital economy" is and what consequences it will lead to. Many people often understand this as new forms of payments and communication with consumers, but not new forms of management and economic relations.

The term "digital economy" has emerged relatively recently but has already become widely used. Fundamental economic theory lags behind practice. There is no common understanding of such a phenomenon as the "digital economy" globally, but there are many definitions.

Blockchain technology was created in 2008 by Satoshi Nakamoto. It was he who came up with the idea to store encrypted data not in one place but in a sequential chain of blocks.

The blockchain system (register of transaction blocks) is built on the basis of specified algorithms in a distributed decentralized information system that uses cryptographic methods to protect information and a sequence of blocks with information about operations performed in such a system. Each of these blocks

stores information about the previous block, and so on down the chain to infinity. All this data does not have a single owner – it is stored on different computers.

The entire global blockchain system is divided into 3 large classes:

1. Classic blockchain and its decentralized payment systems, such as bitcoin and other cryptocurrencies. Everyone can access them, and the entire community is the administrator.

2. The services of the blockchain. The services provide public blockchain services, but they are registered in any jurisdiction and have an account in the local currency.

3. A private blockchain created by organizations to reduce IT costs and speed up transaction registration.

Advantages of the blockchain:

1. Security. In traditional electronic storage systems, all data is processed on a single server – this is the main information center, the brain, and if it is hacked, all information will be available or lost. The whole point of the blockchain is that there is no single center, and each block stores information about the previous one.

2. Immutability. The user can make changes to the same single center when hacking. Data stored in the blockchain cannot be changed or forged. Even if someone hacks and replaces the information in one of the blocks, it will not go further because the other blocks are also encrypted.

3. Openness and transparency. The data is unknown to anyone, but at the same time, everyone can view it if they want.

4. The possibility to send amounts without intermediaries. Using the blockchain, the user can send small transfers without the commission charged by the intermediary. The scheme is simple: rubles or dollars are transferred to cryptocurrency, a percentage is taken, and the recipient transfers them back to conventional money.

5. Speed of operations. The blockchain system automatically performs calculations – creates a request, checks whether there are enough funds in the account, debits money, and more. Accordingly, the time of transactions is reduced, the user does not need to spend resources on documentation, paperwork, etc.

Disadvantages of blockchain:

1. Tokens (digital shares) – a record in the blockchain or other distributed information system that certifies that the token owner has rights to civil rights objects and\or is a cryptocurrency. In most cases, tokens are bought and sold illegally. The legal status of blockchain technology is still being formed.

2. Unlike standard payment systems, the blockchain currently cannot perform the same number of transactions in a short time. If the former process is capable

of about 45 thousand transactions in one second, the capacity of the bitcoin is only about 7 at the same time.

As a result of this work, we can draw the following conclusions:

First, the possibilities of blockchain promise significant changes in the digitalization of the economy.

Secondly, the use of blockchain is just beginning, but even a few successful cases give hope that this technology will be widely used in the near future.

Third, the blockchain will be useful for confirming transactions that occur remotely, verifying the authenticity of transactions, controlling the supply chain, and other actions. Thanks to blockchain technology, processes in this network become transparent.

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RISK MANAGEMENT IN A COMMERCIAL BANK

УПРАВЛЕНИЕ РИСКАМИ В КОММЕРЧЕСКОМ БАНКЕ

Trashchenko O.
Belarusian State Economic University, Republic of Belarus
Тращенко О.Л.
Белорусский государственный экономический университет, Республика Беларусь

ABSTRACT

MANAGEMENT, RISK, BANKING RISK, CLASSIFICATION, FEATURES, BANKING SYSTEM

One of the most important areas of science at present, which is of great importance for many sectors of the economy, is the theory of risk management. Interest in this area is associated with the increasing complexity of the relationship between various spheres of society. The aim of the study is to determine the place of banking risk in the general system in order to improve the efficiency of internal control in the implementation of banking operations. As a result, we concluded that despite the rapid spread of risk management practices in banks, there are still different interpretations of their concept.

It can be considered that the emergence of risk, as a phenomenon, is associated with the moment of the historical origin of man on the Earth. Even then, earthly beings could foresee all kinds of dangers and tried to avoid unnecessary risks, often risking their very lives. This is one of the first forms of risk management.

The history of the concept of risk dates back to antiquity when the mathematical apparatus necessary for its development was born. It was during the Renaissance that the intensive development of this concept began. The concept of risk is one of the main ones in the formation of Western civilization, forming the basis of the market economy. Furthermore, the most important catalyst for its development is the ability to operate in uncertain conditions.

However, the term "risk" first began to be used only in the 1920s of the 19th century. At this time, investment activities were developing, which served to form the theory of risk and the emergence of forecasting in financial markets.

In the scientific literature, the term "risk" was fixed only in the 20th century. However, regardless of the fact that there are currently a large number of

publications on the theory of risks, their types and risk management, the problem of terminology in the field of risks and their classification is still relevant. Despite the apparent similarity, different authors formulate the concept of risks differently, and the classification criteria are not clear enough and scientifically grounded.

The analysis of the sources showed that the main part of the definitions of various types of risks is contained in the legislation regulating banking activities. At the same time, there are specific types of risks applied to banks: currency, credit, operational, reputational, liquidity risk, interest rate, innovation, individual, systemic, strategic, insurance, information security risk and others.

Most definitions define risk as corresponding to a specific type of risk in the area. Therefore, the concept of the word "risk" available in the economic literature is quite diverse.

The economic essence of risk is of a complex nature and is associated with decision making under conditions of uncertainty. Risk is a historical phenomenon and combines the experience of many generations in different conditions, which has a positive or negative impact on the results of activities. [3, p.35]

In domestic practice, the theory of risk has become widespread among the scientific community only as a result of the development of commerce and the transition to market relations. The companion of any business activity is a risk. The problem of risk reduction does not lose its relevance since, due to constant technological progress, financial globalization and periodic economic crises, new types of risks appear. In the conditions of a crisis economy, the solution of this problem is given considerable attention by credit organizations and central banks, which have the functions of a regulator.

The banking system is an essential element of the national and international economy, as it performs the essential functions of accumulation and redistribution of capital, as well as changes and regulation of settlements, ensuring the continuity of production of goods and services, thus stimulating investment activity, consumption and demand [2, p. 34].

Stable functioning of the banking system is required to ensure sufficient development and growth of economic sectors. It is vital to prevent the emergence of crisis phenomena within the bank system in order to minimize their spread to other sectors of the economy. This determines the need to control and optimize the risks to which the banking system is prone [4, p.82].

The main reasons for the emergence of banking risk include the following: crises in the economy, inflation processes, external debt, bank income, innovations in the financial sector, and others.

The core of banking is risk-taking. If the risks can be controlled, then commercial

banks are stable in their business. However, the likelihood of incurring losses reduces the potential for excess profits. Profitability and risk have a straightforward relationship [1, p. 2].

Currently, the economy is often prone to crises; therefore, the issues of researching banking risks are relevant for modern scientists, banking specialists, as well as for legal entities and individuals who use the services of banks.

Crises affecting banks affect the interests of a wide range of customers who have entrusted their funds to banks. In this case, banks risk both their own and borrowed funds. Severe financial losses of participants are harder to bear than crises of production since they are linked to each other by monetary obligations.

Until recently, proper attention has not been paid to the problems of banking risks. This is directly related to the fact that for almost sixty years the state-owned banks haven't felt risks in their activities. In modern society, due to the fact that banks take an aggressive position towards each other, conducting more risky transactions and operations, attention to banking risks only increases. The most popular banking science and practice are the ideas of preventing and reducing risks. However, the question of the essence of banking risks remains controversial at the present time.

The lack of consensus among researchers about the essence of banking risk indicates the multifaceted and heterogeneous nature of this concept. Having comprehended various scientific views on the concept of the term "bank risk", we have clarified and concretized its definition, which more accurately reflects the positive side of risk.

Banking risk is an inherent condition for the implementation of an action or inaction with probable unsatisfactory consequences, expressed in the possibility of obtaining a negative result in the banking sector and requiring a decision on the need to implement optimizing actions.

The peculiarity of the banking business is risk management. It is essential to be able to predict and manage banking risks, and assess risks in the financial market in time. The study of the main types of banking risks and their minimization is an essential task for commercial banks. But only thanks to the correct classification of banking risks, they can be qualitatively assessed and subsequently managed and controlled.

Today, domestic commercial banks use a risk management system to minimize the difference between expected and real profits. Modern management systems are based on the requirements of the Central Bank and the recommendations of the Basel Committee.

Thus, we can conclude that banking activities inherently carry risks. This is due

to the uncertainty of the external environment in which it is located. To achieve a high-quality level of risk management, a clear definition of banking risks and their classification are required. The risk situation that arises in the banking sector is characterized by the following parameters: the impact of the external environment, lack of time and lack of information.

Despite the rapid spread of the practice of risk management in banks, there are still different interpretations of their concept. The problems associated with uncertainty and banking risks are complex and varied.

Banking risks are a complex system that includes a set of factors (sources of origin, criteria and principles) that interact both inside and outside the bank and are in constant motion and evolution.

References

1. Aliev, B. Kh., Idrisova, S. K., Rabadanova, D. A. Assessment of the loan portfolio in order to ensure the stability of the banking sector in the region // Finance and Credit. – 2011. – No. 25. – P. 2–8.

2. Korsakov, E. V. Basic approaches to defining the concept of banking risk // Young scientist. – 2019. – No. 25. – P. 205–208.

3. Maramygin, M. S., Balin, S.E. Risk and its place in banking // News of the Ural State University of Economics. – 2010. – No. 4. – P. 34–39.

4. Assessment of the creditworthiness of borrowers in banking risk management: textbook / E. P. Shatalova, A. N. Shatalov. – 2nd ed., Erased. – M.: KNORUS, 2012. – 168 p.

5. Semenova, K. A., Kutukova, L. T. Banking risks: essence and classification // Young scientist. – 2019. – No. 38. – P. 125–127.

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DEVELOPMENT OF ECONOMY AND EDUCATION IN THE POST-CRISIS CONDITIONS COVID-19 PANDEMIC

РАЗВИТИЕ ЭКОНОМИКИ И ОБРАЗОВАНИЯ В ПОСТКРИЗИСНЫХ УСЛОВИЯХ ПАНДЕМИИ COVID-19

Tretyakova E.

Ural State University of Economics, Russian Federation

E-mail: tretyakova-ev@yandex.ru

Третьякова Е.В.

Уральский государственный экономический университет, Российская Федерация

ABSTRACT

PANDEMIC CORONAVIRUS COVID-19, ECONOMY, EDUCATION, SCIENCE, DISTANCE LEARNING SYSTEM, REMOTE EMPLOYMENT TECHNOLOGIES, REMOTE FORMS OF INTERACTION

The COVID-19 pandemic and its consequences for the economy, education, science have become an unprecedented problem both for the business community and for ensuring sustainable education. We were able to clearly see that without minimizing the negative impact of pandemic on the economy, education, science, it is impossible to reduce the inevitable socio-economic losses and ensure sustainable education, which is a common critical goal for countries worldwide. Advantages and disadvantages of the distance learning system, remote employment technologies, remote forms of interaction, which received

АННОТАЦИЯ

ПАНДЕМИЯ КОРОНАВИРУСА COVID-19, ЭКОНОМИКА, ОБРАЗОВАНИЕ, НАУКА, ДИСТАНЦИОННОЕ ОБУЧЕНИЕ, ТЕХНОЛОГИИ УДАЛЕННОЙ ЗАНЯТОСТИ, ДИСТАНЦИОННЫЕ ФОРМЫ ВЗАИМОДЕЙСТВИЯ

Пандемия COVID-19 и ее последствия для экономики, образования и науки явились беспрецедентной проблемой и для бизнес-сообщества, и для обеспечения устойчивого образования. Мы смогли наглядно убедиться в том, что без минимизации негативного влияния пандемии на экономику, образование, науку невозможно снизить неизбежные социально-экономические потери и обеспечить устойчивого образования, что является общей важнейшей задачей для стран во всем мире. Рассмотрены достоинства и недостатки дистанцион-

a powerful impetus for development and improvement, are considered. The paper analyses new forms of labour organization for employees and managers, a new form of education services. The highest degree of relevance materials considered in the world recently has been confirmed in the article.

ной системы обучения, технологий удаленной занятости, дистанционных форм взаимодействия, которые получили мощный импульс для развития и совершенствования. Проанализированы новые формы организации труда работников и руководителей, новая форма услуг образования. Подтверждена наивысшая степень актуальности рассмотренных в статье материалов в современном мире.

The 21st century was marked by the development of coronavirus infection. The scale of the development of the infection was much wider than a conventional epidemic. It was not just the progressive spread of infection among people, and the spread is much higher than usual rates in a particular territory. The existing universal epidemiological threshold of the epidemic disease (5 % of the population of the territory or 5 % of representatives of any social group) was significantly exceeded.

On March 11, 2020, the United Nations declared the spread of coronavirus in the world as a pandemic. A pandemic is the spread of infection on a global scale. When a new virus overcomes people in different countries, people have no immunity to it, and the health care system does not have a vaccine, then this is a pandemic.

The United Nations identifies the coronavirus pandemic as the world's most serious challenge since the Second World War. The world after the pandemic, experts say, will be different. How and how much the economy, education and science will change as a result of this crisis is not very clear yet, but it is evident that significant changes are coming.

It is a challenging time for the country's economy as well as for educational and commercial organizations. However, it is essential not to forget about the future. In the coming years, the fate of the world economy depends on the lessons that business leaders learn from the current events [1].

It is generally accepted that the world economy after the pandemic will experience a deeper recession (decline in production or a slowdown of economic growth) than during the past economic crises. COVID-19 has become one of the main problems of the global economy. A dangerous virus is forcing business people and investors to change plans, think about business survival and post-crisis

development strategies. The COVID-19 epidemic primarily threatens people's life and health, but its impact on the economy, education, science is also hazardous.

According to many experts, authorities should minimize the negative impact of the pandemic on the economy, education, science and reduce the inevitable socio-economic losses. It is a most urgent task for all countries.

Scientists forecast the further development of civilization is impossible without the growth of its humanitarian component. Globalization is going from an extraverted phase to an introverted one, for which the Internet and digitalization have already prepared humanity. During self-isolation, a person stays at home but communicates with the whole world. As a result of self-isolation, entirely new forms of individual and collective meditation, genres of art can arise and are already emerging, which can contribute to bringing people together through themselves [2].

In the author's opinion, this unique feature of the national system of values, the ability to skillfully combine the European idea of individualism with the Asian idea of collectivism, managers should use to make strategies for the development of commercial enterprises in the post-crisis period.

The transition to remote work in state and private companies, to strict quarantine activities of many small and medium-sized enterprises in the service sector, etc. led to a significant decrease in Gross Domestic Product up to 8–10 %.

This pandemic showed that modern world communities, without hesitation, stopped the economy in order to save human lives. In such conditions, a lot of people ask the question: is it really necessary? Professor of Paris Economics Sciences Po S. Gurief writes: "... Modern Western society gives a simple answer to the question of whether it is necessary saving lives, even if it leads to a halt in the economy: it would be done, whatever the cost" [3].

At the time of the quarantine measures that affected every citizen, the Internet became the main base for teaching people worldwide. The education system simultaneously switched to a distance learning system. Schools and higher education institutions have been able to implement distance learning everywhere using a variety of e-learning systems and platforms.

As a result of the development of modern technologies, it becomes easier for a person to learn, to take new knowledge.

The major conveniences of distance learning are:

- the ability to study at a convenient time,
- more individual approach to the level and duration of learning,
- work at home,
- flexible schedule,

- recording and revising classes,
- choosing a teacher,
- expanding quantity of teachers in the same discipline, and others.

However, the shortcomings of distance learning were also identified:

- faster fatigue,
- increase in the role of auxiliary materials,
- complexity of transferring information by non-verbal methods, and others.

It should be noted that increasing the effectiveness of distance learning depends on the availability of technology, the continuity of the Internet system, a high level of motivation, the providing of the necessary materials, electronic resources. The effectiveness of distance learning depends on the high quality of tools created by the teacher for a comfortable educational process: electronic manuals, interactive platforms, etc. The use of a distance format in learning has become our daily routine and is a significant factor in increasing the efficiency of the process based on the current situation in the world.

Below are the advantages and disadvantages of remote employment technology.

The advantages include:

- free schedule,
- saving resources (time, money, office clothes, and meals),
- more opportunities and energy for self-education and self-development,
- there is an opportunity to eat better and do exercise, and others.

The disadvantages include:

- it is difficult to limit work up to 8 hours,
- remote work is not suitable for all professions,
- high degree of self-motivation is required,
- utilities are increasing, and others.

Technologies of remote employment, distance learning, and remote forms of interaction in the post-crisis period will receive a very powerful impulse for development and improvement. In the author's opinion, the large and long-term shifts in human communication, information consumption, new forms of labour organization for employees and managers that began during the coronavirus will become norms and standards for the nearest future. In this regard, it is evident that a severe shortage can be expected in the markets of IT security specialists, teachers and managers who are able to organize remote work of students or employees because many arising problems will require a professional approach with specificity.

Reference

1. Рагимова, С. Десять факторов, меняющих все / Forbes Brand Voice. – Режим доступа: http://www.forbes.ru/brandvoice-photogallery/sap/345705-desyat-faktorov-menyayushchih-vsyo.

2. Акмаева, Р. И., Карлина, Е. П. О возможных стратегиях развития российских компаний в посткризисный период // Вестник Астраханского государственного технического университета. Серия: Экономика. – 2020. – № 2. – С. 7–18.

3. Гуриев, С. ВВП или жизни людей. Пожертвовавший жизнями ради экономического роста не получит ни того, ни другого // Ведомости, 2020, 26 марта. – Режим доступа: https://www.vedomosti.ru/opinion/articles/2020/03/27/826385-vvp-lyudei.

UDC 336.71

SWOT ANALYSIS OF DIGITALIZATION IN BELARUS BANKING INDUSTRY

SWOT-АНАЛИЗ ЦИФРОВИЗАЦИИ БАНКОВСКОГО СЕКТОРА БЕЛАРУСИ

Vankevich Y.

Belarus State Economic University, Republic of Belarus

Ванкевич Я.В.

Белорусский государственный экономический университет, Республика Беларусь

ABSTRACT

SWOT ANALYSIS, DIGITAL BANKING

The article presents a SWOT analysis matrix of the digitalization of the Belarusian banking system. The research outlines directions of the development which include the creation of an interbank identification system, the development of electronic payment systems, and digital banking. Implementation of these directions will optimize the banking sector, reduce operating costs, increase the volume of services provided and the bank's financial performance.

A SWOT analysis matrix was made on the basis of the analysis of the theoretical principles of digitalization in the banking sector under current conditions and the specific nature of this process in Belarus (Table 1).

Based on the SWOT analysis, the following directions in the development of digital technologies in Belarusian commercial banks can be identified:

- development of electronic payment systems (increasing the number of electronic payment systems, expanding their tasks and functionality, increasing the number of transactions);
- development of digital banking (including the development of applications, transfer to telecommuting);
- development of new forms of lending (video lending, project crowdfunding, scoring lending);
- use of artificial intelligence in the implementation of banking products (introduction of chatbots, lead generation).

Table 1. SWOT Analysis Matrix of Commercial Banks Digitalization in Belarus

	Opportunities: a wide range of services; service range expansion; worldwide access; cost reduction by means of personnel optimization.	Threats: theft of funds; high level of digitalization of rival Russian banks; public access to personal information on the Internet.
Strengths: high speed of processing requests and transactions; independence from local bank branches; a human factor does not interfere with the process of decision-making.	Strength-Opportunities: time saving; ease of entering new (foreign) markets; development of electronic payment systems; increased productivity by means of the introduction of artificial intelligence (chatbots); expansion of moneylending services; transfer to telecommuting.	Strength-Threats: development of in-house security and protection system of customers data; ability to analyze the positive and negative experience of Russian banks.
Weaknesses: insufficient academic qualifications in digitalization among managers; lack of incentive among personnel; absence of training necessary to work in a digital bank.	Weakness-Opportunities: retraining and advanced training of managers; allocation of funds accumulated due to personnel optimization for training or retraining; development of new forms of remuneration.	Weakness-Threats: unemployment growth among banking professionals; loss of bank competitiveness at in the international market.

Notice: The source is author's own work

To increase the share of the digital economy in GDP, experts of the Eurasian Development Bank recommend developing information infrastructure, including information centers, subsystems, data and knowledge banks, communication systems, control centers and technologies for collecting, storing, processing and transmitting information. The basis of digital banking is remote service, so the transfer of some employees to telecommuting can reduce the costs for jobs provision (rent, utilities, etc.). The development of artificial intelligence, and

robust ICT infrastructure in economically developed countries entails the development of industrial robotics and the industrial Internet. This will result in the creation of an entire information-technology-organizational-and-managerial system that comprises production, supply and distribution processes. Automation of bank processes allows presenting information on a 24-hour basis while reducing the cost of providing these services. Robotic advisers carry out functions of a portfolio manager who determines risks and an optimal investment strategy. And they can be used as mobile applications.

Thus, the main prospects for the development of digital technologies in the banking sector of Belarus include the introduction of artificial intelligence technology (the use of chatbots in the implementation of banking services). The main directions of development of digital banking in Belarus are the following: creation of an interbank identification system, development of electronic payment systems and digital banking. Implementation of these directions will optimize the country's banking sector, reduce operating costs, increase the volume of services provided and the bank's financial performance. Collectively, this will ensure the strengthening of the Belarusian national banking system and effective solution of the tasks assigned to it in the context of the digital transformation of the economy.

UDC 330.322

MODEL OF FORMATION OF THE OPTIMAL INVESTMENT PORTFOLIO WITH A LIMITED BUDGET

МОДЕЛЬ ФОРМИРОВАНИЯ ОПТИМАЛЬНОГО ПОРТФЕЛЯ ИНВЕСТИЦИЙ ПРИ ОГРАНИЧЕННОМ БЮДЖЕТЕ

Vardomatskaya E.[a], Moiseenko M.
Vitebsk State Technological University, Republic of Belarus
E-mail: [a]el_v@tut.by
Вардомацкая Е. Ю.[a], Моисеенко М.В.
Витебский государственный технологический университет, Республика Беларусь

ABSTRACT

MATHEMATICAL MODEL, INVESTMENT PORTFOLIO, NET PRESENT VALUE, PROFITABILITY INDEX, LINEAR PROGRAMMING, LINEAR OPTIMIZATION, SPREADSHEET PROCESSOR, SOLVER ADD-ON

The article discusses a mathematical model of the formation of an optimal investment portfolio by the criterion of maximizing the total net present value (NPV) with preliminary ranking by the profitability index (PI) in a limited budget.

АННОТАЦИЯ

МАТЕМАТИЧЕСКАЯ МОДЕЛЬ, ИНВЕСТИЦИОННЫЙ ПОРТФЕЛЬ, ЧИСТАЯ ПРИВЕДЕННАЯ СТОИМОСТЬ, ИНДЕКС РЕНТАБЕЛЬНОСТИ, ЛИНЕЙНОЕ ПРОГРАММИРОВАНИЕ, ЛИНЕЙНАЯ ОПТИМИЗАЦИЯ, ТАБЛИЧНЫЙ ПРОЦЕССОР, НАДСТРОЙКА ПОИСК РЕШЕНИЯ

В статье рассмотрена математическая модель формирования оптимального инвестиционного портфеля по критерию максимизации общей чистой приведенной стоимости (NPV) с предварительным ранжированием по индексу рентабельности (PI) в условиях ограниченного бюджета.

In specialized economic literature, the concept of "investment portfolio" is widely used. On the one hand, this concept means a set of investment projects that should eventually bring a certain income after the initial investment of some funds. On the other hand, a set of securities – bonds, stocks, enterprise assets should also

provide future returns for the owner.

By I.A. Blank's definition [1], an investment portfolio is "a purposefully formed set of financial instruments intended for financial investment in accordance with the developed investment policy".

Optimization of the investment portfolio implies the achievement of investment goals by determining the ratio of individual investment objects, taking into account the available investment resources. Most often, investment optimization is performed according to such criteria as increasing the return on the investment portfolio and/or reducing the risks of the investment portfolio.

In addition, optimization is possible in order to change the number of elements in the investment portfolio either by ensuring the internal stability of the investment portfolio or by ensuring the growth of the company's capitalization. At the same time, the investment portfolio must correspond to the volume of investment resources that provide a certain level of profitability and portfolio liquidity, taking into account risks.

The purpose of this research is to solve the problem of choosing investment projects in conditions of a limited budget. The profitability index was used as a criterion for the initial selection of projects for the portfolio.

One of the mathematical programming methods – linear optimization – was used as a *solution method*.

Research toolkit – MS Excel spreadsheet processor and Search for a solution (Solver) add-on.

The object of the research was the investment portfolio of a particular company, which, having a certain limited investment budget (monetary units), is considering the possibility of participating in the financing of a number of investment projects. The assessment of the profitability of investing in the proposed projects was made according to the criteria of the total net present value (NPV) of the investment portfolio and the profitability index (PI), which ensure the return on investment. As a result of the preliminary analysis, six projects were selected that are attractive for financing [2]. The assumed conditions for the implementation of projects are shown in Table 1.

Since each investor seeks not only to reach the break-even point but also to get the maximum return on investment, the total net present value of projects is used as an optimization criterion, subject to restrictions on the amount of the budget [3].

Table 1 – Proposed investment portfolio. Source: developed by the authors

Project	I	PV	NPV	PI
Project A	-80000	95000	15000	1,19
Project B	-60000	79000	19000	1,32
Project C	-70000	112000	42000	1,6
Project D	-100000	145000	45000	1,45
Project E	-40000	52000	12000	1,3
Project F	-110000	126500	16500	1,15

The mathematical model of the problem in the proposed setting has the form.

Objective function – the total net present value of projects: $A*X \rightarrow max$,

Restrictions: $C * X \leq B$, $Xk \geq 0$ $(k = 1; n)$,

where A is a matrix of coefficients for variables of the objective function;

X is the vector of variables of the objective function;

C is a coefficient of the constraint function;

B is the vector of restrictions.

If we designate project *"A"* through $X1$, project *"B"* through $X2$, etc., then the objective function of the task can be formulated in a vector form:

$$\max NPV = \begin{vmatrix} 15000 \\ 19000 \\ 42000 \\ 45000 \\ 12000 \\ 16500 \end{vmatrix} * \begin{vmatrix} X1 \\ X2 \\ X3 \\ X4 \\ X5 \\ X6 \end{vmatrix}$$

In terms of investment, the budget of the firm is limited to a certain amount (monetary units). Consequently, the total initial costs for the implementation of projects cannot exceed this amount. This condition defines the constraints for this task:

$$\begin{vmatrix} 80000 \\ 60000 \\ 70000 \\ 100000 \\ 40000 \\ 110000 \end{vmatrix} * \begin{vmatrix} X1 \\ X2 \\ X3 \\ X4 \\ X5 \\ X6 \end{vmatrix} \leq \text{budget amounts}$$

In addition, the number of projects cannot be negative, and also each project cannot be implemented more than once, that is: $0 \le Xk \le 1$ (k = 1; 6)

The model implementation in the MS EXCEL environment is shown in Figure 1.

	A	B	C	D	E	F
1		***Отбор проектов в условиях ограниченного бюджета***				
2						
3	**List of projects**	**Objective function coefficients**	**Constraint function coefficients**	**Objective function**	**Constraint function**	**Objective function variables**
4		*A*	*C*			*Xi*
5	Project A (X1)	15000	80000	0	0	0
6	Project B (X2)	19000	60000	19000	60000	1
7	Project C (X3)	42000	70000	42000	70000	1
8	Project D (X4)	45000	100000	45000	100000	1
9	Project E (X5)	12000	40000	6000	20000	0,5
10	Project F (X6)	16500	120000	0	0	0
11						
12	max NPV			112000		
13	Budget				250000	

Figure 1 – Model implementation in the MS EXCEL environment

Source: developed by the authors *Compiled by the authors.*

Cells F5: F10 contain the values of variables unknown to X (initially, they are set to zero).

In cells D5: D10, the values of the terms of the objective function are calculated.

In cells E5: E10, the terms of the constraints are calculated.

Cell D12 is the total NPV of the optimal investment portfolio.

Cell E13 is the investment budget of the firm (250,000 monetary units accepted).

From the solution given with the help of the Search for solution MS Excel add-on, it follows that with this amount of the investment budget of the firm, the maximum possible value of NPV = 112,000 monetary units. For this, it is necessary to implement 0.5 projects "E", as well as projects "B", "C", "D".

More often, the project cannot be implemented in parts, or investment objects are not subject to fragmentation (buildings, personnel, etc.). Then it is advisable to use integer optimization. For this, a constraint of the form should be added to the developed model: $Xk = (0,1)\ (k = 1; 6)$. In this case, the optimal portfolio will include projects "B", "C", "D", and the total NPV will be 106,000 monetary units.

As a result of the research, we can conclude that the imposition of integer constraints changed the value of the objective function downward. In the general case, the introduction of additional restrictions always leads to a decrease in the optimization effect.

The final decision on the formation of the optimal investment portfolio, in any case, remains to the specialists, and the results of the investment analysis are only the basis for further careful study of various aspects of the project.

References

1. Бланк, И. А. Управление денежными потоками. – К.: Ника-Центр, Эльга, 2002. – 736 с. – (Библиотека финансового менеджера. Выпуск 8).

2. Яшева, Г. А. Оценка эффективности инвестиций в табличном процессоре MS EXCEL / Г. А. Яшева, Е. Ю. Вардомацкая // Журнал «Планово-экономический отдел». – № 2 (128), февраль 2014. – С. 40–53.

3. Вардомацкая, Е. Ю. Имитационное моделирование инвестиционных рисков / Е. Ю. Вардомацкая, Ю. В. Бельченкова // Материалы докладов 43 научно-технической конференции преподавателей и студентов университета.– 2010. – С. 90–92.

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LIMITED COSTS CONTROL PROBLEMS

ПРОБЛЕМЫ КОНТРОЛЯ ОГРАНИЧЕННЫХ ЗАТРАТ

Vasiokha V.[a], Kasayeva T.
Vitebsk State Technological University, Republic of Belarus
E-mail: [a]vasiokha@gmail.com
Васёха О.В.[а], Касаева Т.В.
Витебский государственный технологический университет, Республика Беларусь

ABSTRACT

LIMITED COSTS, OTHER LIMITED COSTS, PROFITS TAX, FINANCIAL CONTROL, MANAGERIAL CONTROL

This article highlights the most critical problems connected with limited costs control. Recommendations for optimizing their financial and managerial control and organizing the management process are proposed and substantiated. Tables have been developed to create a sufficient information field for the analysis of limited costs, development of a methodological basis for their accounting and future improvement of the control process.

АННОТАЦИЯ

НОРМИРУЕМЫЕ ЗАТРАТЫ, ПРОЧИЕ НОРМИРУЕМЫЕ ЗАТРАТЫ, НАЛОГ НА ПРИБЫЛЬ, ФИНАНСОВЫЙ КОНТРОЛЬ, УПРАВЛЕНЧЕСКИЙ КОНТРОЛЬ

В данной статье освещены наиболее актуальные проблемы контроля нормируемых затрат. Предложены и обоснованы рекомендации по оптимизации их финансового и управленческого контроля и организации процесса управления. Разработаны таблицы, позволяющие создать достаточное информационное поле для осуществления анализа нормируемых затрат, разработки методологической основы их учета и совершенствования контрольного процесса.

The costs of the organization are the object of constant attention both for the economic entity itself and the authorities that control its activities. A special place in the structure of costs is occupied by limited costs taken into account in taxation, which are described in Article 171 of the Tax Code of the Republic of Belarus [1].

In this regard, the issues of organizing control of limited costs are of particular

relevance. In their control, first of all, attention is paid to the correct allocation of costs by periods. There is one of the most important problems associated with the reflection of limited costs in accounting.

The sum of accounted for taxation limited costs determined at the time they are written off on financial results (to the debit of account 90.4 "Cost of products, goods, works, and services"), rather than at the time of their actual implementation and reflection on the cost accounts (to the debit of accounts 20 "Primary production", 25 "General expenses of production", 26 "General business expenses", etc.). Considering that a part of the limited costs "settles" in the finished but not sold products, the question arises about the correct distribution of these costs between the finished and sold products leftovers.

The methodology for determining the amount of limited costs written off for sold goods, works, and services is not established in legal terms. Therefore, organizations need to develop and consolidate it in their accounting policies on their own. For that purpose, it is possible to use a technique previously developed by the authors [3].

The next important step in limited costs monitoring is control of their aggregate standard, which cannot exceed 1 % of proceeds from the sale of goods (works, services), property rights and income from rental operations, including VAT (Clause 3 of Art. 171 of the Tax Code of the Republic of Belarus) [1]. Control invited to perform with the help of Table 1, which is compiled on the basis of the tax return and income statement.

Table 1 – Other limited costs standard control

Period	Revenue (according to the income statement)	Other limited costs standard	Other limited costs (according to the tax return)	Deviation
	(line 1)	*(line 1 x 1%)*	*(line 2.4.1)*	*(cl.3 – cl.4)*
Q2	2 974 715,24 rubles	29 747,15 rubles	29 747,15 rubles	-

Source: compiled by the author.

This table allows determining the existence and size of the deviation of the actual amount of other limited costs over the value accepted as normative. Its excess will indicate the existence of tampering made in order to increase the amount of tax deduction.

Some accountants are trying to bring financial and tax accounting data together in order to simplify their work. This leads to accounting violations. Let us give an example.

The employee was sent on a business trip for a period of three days to Orsha town (Belarus). The cost of accommodation paid for the days of a business trip is included in the accounting expenses in full, in the tax expenses – only in accordance with approved standards. According to the Decree of the Council of Ministers of the Republic of Belarus dated March 19, 2019 №176 [2], the standard amount of expenses for accommodation in regional centers for each day of being on a business trip in Belarus is 25 rubles. If the cost of accommodation exceeds the specified amount, the employer reimburses them based on supporting documents.

For each day of being on a business trip, the employee was paid 25 rubles per day. Upon return, the employee provided an invoice for accommodation for 27 rubles per day with supporting documents attached. The employer made a decision to compensate the employee for the difference. The reflection of these transactions is presented in Table 2.

Table 2 – Travel expenses accounting records

№	Transaction	Accounting record		Total
		Debits	Credits	
1	Cash was issued to the employee	71	50	75 rubles (25 rubles x 3 days)
2	The employee presented an advance report	20	71	81 rub. (27 rubles x 3 days)
3	The money for accommodation returned to the employee	71	50	6 rubles (81 rubles – 75 rubles)

Source: compiled by the author.

Thus, all expenses totaled 81 rubles are accepted for accounting. However, when calculating the tax base for income tax, expenses will be taken into account only within the standard, as part of other expenses, i.e., 75 rubles in total. (25 rubles x 3 days).

Often, accounting expenses include only the same amount that is accepted for tax purposes, and the amount in excess of the standard is attributed to the net profit of the organization. It distorts information about the real cost value and structure. This approach has already become a typical accounting mistake.

For the purposes of management control, analysis of the composition and

structure of normalized costs is of greater interest. For its implementation, it is proposed to use Table 3, which is filled on the basis of the accounting data.

Table 3 – Analysis of other limited costs dynamics

Line item	Period			
	1 quarter	2 quarter	3 quarter	4 quarter
Other limited costs accrued, rub.:	5 613,49	4 983,01	6 732,21	5 189,37
- as part of primary production costs	876,44	701,91	1 003,07	836,32
- as part of administrative expenses	4 737,05	4 281,1	5 729,14	4 353,05
Other limited costs allocated, rub.:	439,23	399,07	504,22	415,17
- to the cost of sales	83,86	61,23	95,02	80,95
- to administrative expenses	355,37	337,84	409,20	334,22
Other limited costs not included in taxation, rub.:	5 174,26	4 583,94	6 227,99	4 774,20
- as part of finished products	792,58	612,44	850,24	771,47
- as part of administrative expenses	4 381,68	3 971,50	5 377,75	4 002,73

Source: compiled by the author.

This table allows observing the dynamics of limited costs items in the context of tax periods. The nature of its change is essential for the management, as it allows to evaluate the effectiveness of the regulatory process of regulated expenses of the organization. For example, an increase in other limited costs not taken into account in taxation may indicate the ineffectiveness of the chosen method of writing off costs.

The proposed recommendations will help to optimize the financial and managerial control of limited costs and competently organize their management process. The information obtained using worksheets will create a sufficient information field for the analysis of limited costs, development of a methodological basis for their accounting, and future improvement of the control process.

Reference

1. Налоговый кодекс Республики Беларусь в редакции Закона Республики Беларусь от 30 декабря 2018 г. № 159-З «О в несении изменений и дополнений в некоторые законы Республики Беларусь» [Электронный ресурс].– Режим доступа: http://www.nalog.gov.by/uploads/documents/NK_ot_2018-12-

30_N_159-z.pdf.

2. Постановление Совета Министров Республики Беларусь от 19 марта 2019 г. № 176 «О порядке и размерах возмещения расходов, гарантиях и компенсациях при служебных командировках» [Электронный ресурс]. – Режим доступа: https://pravo.by/upload/docs/op/C21900176_1553202000.pdf.

3. Васёха, О. В. От бухгалтерского к налоговому учету нормируемых затрат / О. В. Васёха, Т. В. Касаева // Студенческая научная зима в Бресте-2019: сборник научных работ студентов и магистрантов XIII Международного студенческого научного форума. – Брест: БрГТУ. – 2019. – 268 с.

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TO THE QUESTION OF ECONOMIC SYSTEM MANAGEMENT OF THE TOURIST AND RECREATION COMPLEX

К ВОПРОСУ УПРАВЛЕНИЯ ЭКОНОМИЧЕСКОЙ СИСТЕМОЙ ТУРИСТИЧЕСКО-РЕКРЕАЦИОННОГО КОМПЛЕКСА

Yankevich E.

Belarusian State Economic University, Republic of Belarus

E-mail: Yankevich_em@mail.ru

Янкевич Е.М.

Белорусский государственный экономический университет, Республика Беларусь

ABSTRACT

DESTINATION, MANAGEMENT, EXPORT, TOURISM AND RECREATION COMPLEX

On the basis of the republican programs of the tourist and recreational complex, a structural and logical scheme for the development of tourism in Belarus is proposed. The main directions of management of the economic system of tourism development are indicated. Approaches of the conceptual influence of the tourism sector on the formation of socio-economic effects of a regional destination have been substantiated.

АННОТАЦИЯ

ДЕСТИНАЦИЯ, УПРАВЛЕНИЕ, ЭКСПОРТ, ТУРИСТИЧЕСКО-РЕКРЕАЦИОННЫЙ КОМПЛЕКС

На основании республиканских программ туристическо-рекреационного комплекса предложена структурно-логическая схема развития туризма Беларуси. Указаны основные направления управления экономической системой развития туризма. Обоснованы подходы концептуального влияния сферы туризма на формирование социально-экономических эффектов региональной дестинации.

The country's socio-economic development is impossible without a high-quality management strategy for all structural elements. Participants of the social production process in their activities are guided by program documents that include concepts and goals of sustainable development. Since one of the ways to improve the well-being of the population is a high standard of living, therefore we believe that the tourism and recreation sphere gives the population such an opportunity and fully contributes to the development of business activity in industries related

to tourism, creating an impulse for the formation of socio-economic effects of the formation of a regional destination.

The purpose of this study is to determine the main goals of the tourism industry and their detailing in the development of tourism in Belarus. The research uses the concepts of tourism development, program documents.

The strategic goal of tourism development for the period up to 2030 is the creation of a highly efficient and competitive tourist complex, where Belarus is joining the top 50 countries in terms of tourism development [1]. The part of tourism services export is planned for 4.1 % of the total volume of all services.

According to the management structure, the tourism industry of Belarus is adjacent to the Ministry of Sports. State funding is mainly aimed at developing sports and achieving results in this direction. This situation entails the problems of insufficient financing of tourism. The tourism sector has to earn money for its development by achieving a consolidated target – the export of tourism services (Fig. 1).

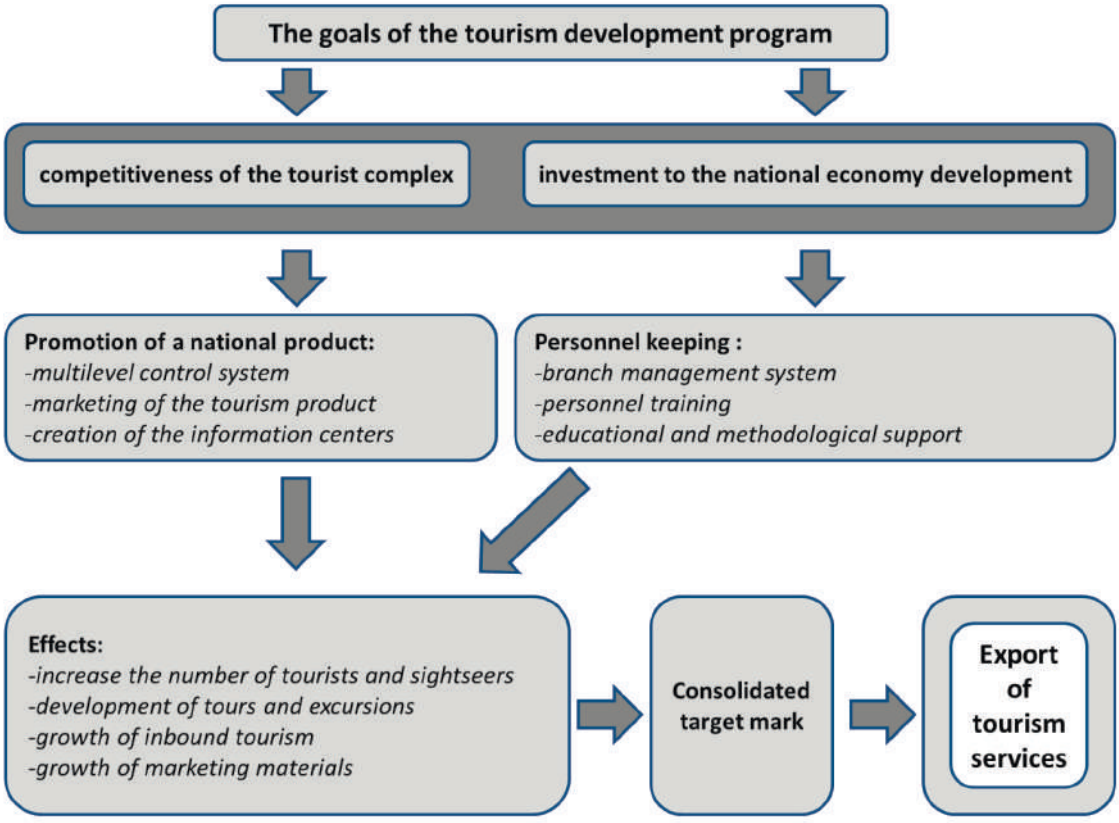

Figure 1 – Structural and logical scheme of tourism development in Belarus

Source: compiled by the author.

An essential point of management is the competitiveness of the tourist complex, which contributes to increasing demand for tourist services. The higher the competitiveness of tourist services, the more significant is the contribution to the development of the national economy. Let us emphasize the importance of the development of a tourist and recreational complex by promoting the national product and appropriated staffing. So the goals of the tourism development program in Belarus will be clearly demonstrated in a structural and logical scheme with focusing on two main areas, and are shown in Figure 1.

It follows from the above that: in order to increase the competitiveness of a tourist product, it is necessary to focus management on the creation of a developed infrastructure, formation of a comfortable and accessible tourist environment, which will entail direct positive and strongly marked socio-economic effects for the formation of the regional destination and, as a result, increase the export of tourist services. Successfully developing regional destinations with the participation of tourist and recreational complex gives an impulse and opportunities for the formation of various socio-economic effects. Thus, the problem of managing the tourist and recreational complex as an economic system for Belarus remains the most actual.

Reference

1. Проекты: до 2030 года Беларусь должна войти в число 50 ведущих стран по уровню развития туризма [Электронный ресурс]. – Режим доступа: https://www.tio.by/info/turbiznes/proekty-do-2030-goda-belarus-dolzhna-vojti-v-chislo-50-vedushhix-stran-po-urovnyu-razvitiya-turizma/. – Дата доступа: 08.09.2020 г.

UDC 339.138

ELECTRONIC MARKETING IN THE ANTI-CRISIS STRATEGY OF THE INDUSTRIAL ENTERPRISE

ЭЛЕКТРОННЫЙ МАРКЕТИНГ В АНТИКРИЗИСНОЙ СТРАТЕГИИ ПРОМЫШЛЕННОГО ПРЕДПРИЯТИЯ

Yashava G.
Vitebsk State Technological University, Republic of Belarus
E-mail: gala-ya@list.ru
Яшева Г.А.
Витебский государственный технологический университет, Республика Беларусь

ABSTRACT

ANTI-CRISIS STRATEGY, DIGITAL, ELECTRONIC MARKETING, INTERNET MARKETING, INTEGRATED MARKETING SYSTEMS, SEO-SITE OPTIMIZATION, CRM SYSTEM

The purpose of the article is to develop e-marketing methods used as an anti-crisis management strategy for an industrial enterprise. The article considers the theoretical foundations of e-marketing, including the concept, advantages, and offers an algorithm for developing a strategy for anti-crisis management of an enterprise. Strategies as part of the company's anti-crisis strategy are substantiated: SEO-site optimization and customer relationship management based on CRM systems. The proposed methods and algorithms were tested on the example of industrial enterprises of Belarus.

As a result of the COVID-19 coronavirus pandemic, a global economic crisis has occurred in the world economy. According to the IMF forecast, the world economy will decline by 3 % this year, and the current economic downturn will be the most serious in the past 90 years. For the Belarusian economy, the IMF forecasts a 6 % decline in gross domestic product this year. Some economists believe that the drop in GDP in Belarus may be more severe due to inflation: up to 15% [1].

The main problem for business is a drop in demand in both domestic and foreign markets. Anti-crisis programs are being developed at various levels.

In the conditions of external factors that have developed in this period, the use of IT technologies in all business processes is relevant at the micro level. To

create and develop demand for industrial products, it is proposed to develop an e-marketing strategy as part of the overall anti-crisis strategy of the enterprise.

Electronic marketing is a specialty and sphere of professional activity, the subject area of which is the establishment and development of long-term cost-effective relationships of commercial organizations with their customers and buyers through the use of information and communication technologies and systems, including search promotion of websites on the Internet, the use of contextual and banner advertising, marketing in social networks and media, electronic PR, content management, marketing through mobile applications and web Analytics [2].

The integrative nature of e-marketing (i.e., the use of several Internet promotion tools at once) determines the need for comprehensive use of methodological approaches in the processes of their forecasting and planning, monitoring, and evaluation. These and many other factors in the context of crises, in the search for ways out of company's difficulties, determine the complexity and risk of management decisions and processes for the formation of mechanisms and systems of marketing management.

The use of a complex of electronic marketing communications and their interaction with consumers of the organization's products will allow the company to create goodwill and "established connections", which, in turn, will have a positive impact on the company's development and achievement of the most positive results.

The main idea of e-marketing is that the object of management is the relationship of communication with participants in the purchase and sale process. The only way to retain a customer is to individualize the relationship with them, which is possible as a result of long-term interaction of partners and personalization of customer satisfaction. Long-term interaction of partners takes place using information and communication technologies, including the implementation of information and network models that work with the network structures of consumers.

The algorithm for developing an anti-crisis management strategy includes the following stages:

- analysis of the current market situation;
- analysis of internal factors of the company;
- analysis of risks and opportunities;
- the formation of a tree of objectives;
- development of a program of action in the crisis and post-crisis periods;
- development of SEO methods;
- development of customer relationship management methods.

The SEO abbreviation stands for Search Engine Optimization. Site optimization

is an increase in the efficiency with which a site performs its assigned functions. Typical functions are representative (PR), sales (B2C) and lead generation of potential buyers (B2B). Accordingly, in the first case, the site's performance is measured by the image and "visibility" of the resource; in the other cases, it is measured by the volume of sales or the number of potential buyers.

The developed algorithm for SEO optimization of the company's website is shown in Figure 1.

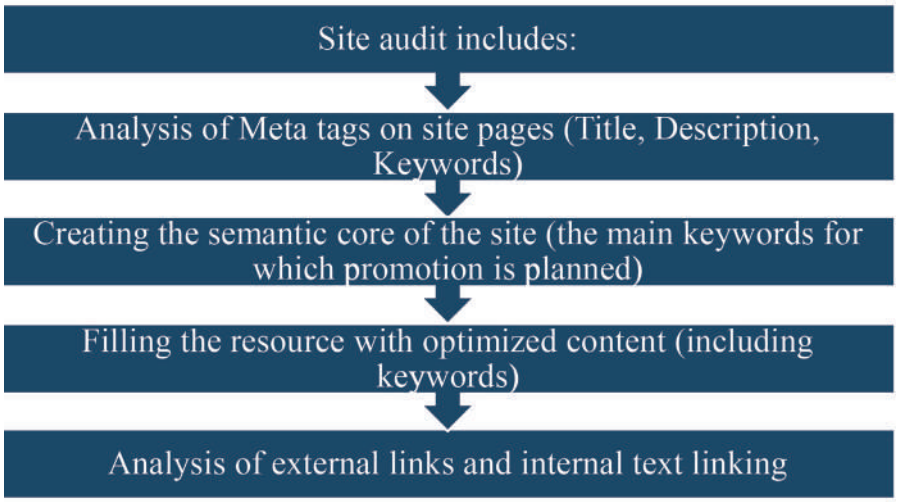

Figure 1 – Algorithm for SEO optimization of the site

Source: Compiled by the author.

Results of SEO optimization on the example of a site www.artezio.ru are shown in Figure 2.

Figure 2 – SEO optimization algorithm of www.artezio.ru

Source: compiled by the author.

The effectiveness of SEO optimization of the website is evaluated with the use of Alexa Rank indicator [3]. Alexa Rank (AR) is a ranking of the popularity of websites, in which the most popular Internet resource is located in the first place. A special feature of AR is that webmasters try not to increase it, as traditional TIC and PR do, but rather to lower it. The closer to the first place an Internet resource is located, the more successful it is. The position in this rating depends on the following parameters: site traffic; average user time on the site; bounce rate; availability of international traffic [3].

Alexa Rank before SEO optimization of the site www.artezio.ru equaled to 4,338,569, followed by 2,094,785. Thus, the site's position has improved by 2 times.

One of the main factors for the success of enterprises is the competent automation of all its business processes and the use of IT technologies. In a crisis, demand is falling. In order to retain customers and maintain the customer base, it is proposed to include the customer relationship management (CRM system) under the strategy as part of the anti-crisis strategy. CRM systems are Customer Relationship Management systems. Customer relationship management system is an application software for organizations designed to automate strategies for interacting with customers (clients), in particular, to increase sales, optimize marketing and improve customer service by storing information about customers and their relationship history [4].

The comparative results of the most popular CRM systems are presented in Table 1.

Table 1 – Presentation of the analysis results in summary form and development of the direction of work

Functionality	CRM system				
	CRM «Simple business»	amoCRM	Mega-plan	Pipe-drive	Bitrix24
1	2	3	4	5	6
IP-telephony	1	2	1	1	3
Working with a transaction	1	1	3	1	2
Functional	2	1	1	1	1
Business processes	1	0	0	0	3
E-mail newsletter	2	1	1	1	2
API	1	1	2	1	1
Tasks	1	1	2	1	1

End of table 1

1	2	3	4	5	6
Split into leads and contacts	no	no	no	no	yes
Quality of documentation	average	average	high	low	average
Reporting	2	1	1	1	2
Possibility of improvement	1	1	1	1	1
	11	7	11	7	13

Source: Compiled by the author based on [5].

As can be seen from Table 1, the Bitrix24 CRM system is the leader in almost every metric considered. It offers the closest contact with the client and comprehensive support for each stage of sales. The presence of leads will allow not to miss a single request and turn every visitor into a client. Well-designed business processes will ensure the smooth operation of each employee, reduce the number of errors to a minimum and make it easier for management to control the work remotely. Easy integration with 1C will make the implementation as convenient and unobtrusive as possible.

The Gantt chart is used to illustrate the work schedule. It is one of the methods of project planning. The diagram for implementing a CRM system is shown in Figure 3

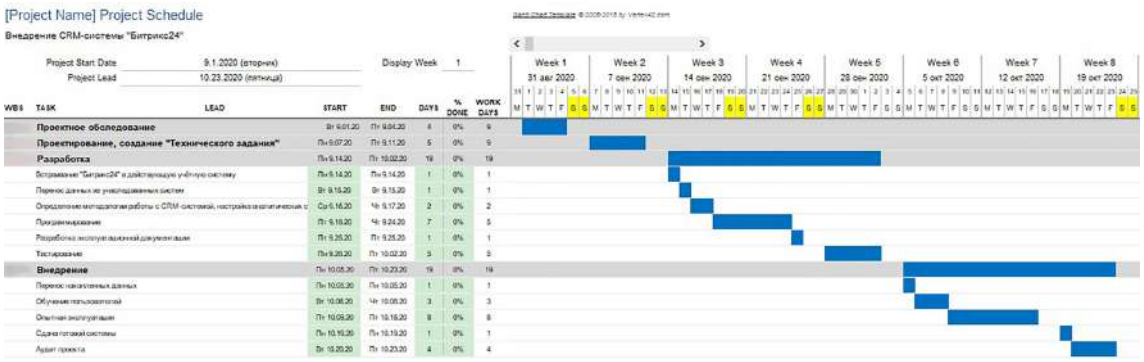

Figure 3 – Gantt Chart on CRM system implementation

Source: compiled by the author.

The effectiveness of the CRM system is shown in Table 2.

Table 2 – Comparison of the organization's activities before and after implementation of the system

Without a CRM system	With the Bitrix24 CRM system
Sales managers keep records of customers individually, in notebooks or e-mail correspondence, stored only in the seller's mailbox. They are not available to the management. Important e-mails may be lost or be removed. It is impossible to reconstruct the history of work with the client.	All customer and transaction data is stored in a single secure database with shared access: employees have access to the information in accordance with their role and authority. The probability of misrepresentation and falsification of transaction data is reduced.
When managers are dismissed, they take customers with them, leaving no detailed information about the client and its features.	The company does not lose a customer when the manager is dismissed – all information about the customer and transactions is saved.
Managers often forget to call the client back or send the necessary information, do not fight for every transaction, and choose the ones that bring the greatest benefit to themselves and not the companies. Errors in the work are justified by a large load.	It becomes possible to automate routine operations: telephone conversations with the client, sending faxes and e-mails, printing stickers on letters, and so on. The system helps to comply with the rules of working with clients.
The company's management depends on sellers, they cannot make forecasts, and they do not have information about the reasons for the growth and decline in sales. If the manager is not at work (business trip, illness, vacation), it is impossible to get information about the client and transactions with them, and transactions are disrupted.	The system allows to consider individual characteristics, customer preferences, and their significance for the company. It's clearly seen how the transaction was carried out (by stages). Each client interacts with a manager who is personally responsible for sales results.

Source: based on [6].

Comparative analysis shows clear advantages of the Bitrix24 CRM system. The economic effect is to reduce labor costs, save on transaction costs, improve the quality of customer service, and increase customer loyalty.

In an unstable external environment and an increasing economic crisis, enterprises must develop anti-crisis strategies. The theoretical bases of the anti-crisis marketing strategy developed in the article will allow enterprises to use

the advantages of IT technologies in reengineering business processes: customer relationship management, product and brand promotion on the Internet. Strategies as part of the company's anti-crisis strategy are substantiated: SEO-site optimization and customer relationship management based on CRM systems. Testing of the proposed methods and algorithms on the example of industrial enterprises of Belarus proved their advantages and effectiveness.

Reference

1. Official website "Belarusian guerrillas" [Electronic resource]. – 2020. – Access mode: https://yandex.by/turbo/s/belaruspartisan.by/economic/498309/. – Access date 03.05.2020.

2. Electronic Marketing [Electronic Resource]: Wikipedia. Free Encyclopedia. – Access mode: https://ru.wikipedia.org/wiki/Электронный_маркетинг. – Date of the address: 03.05.2020.

3. Official site "Seovelvete" [Electronic resource]. – 2020. – Access mode: https://seovelvet.com/blog/alexa-rank/. – Access date 12.05.2020.

4. Official website "ActiveTraffic" [Electronic resource]. – 2020. – Access mode: https://yandex.by/turbo/s/activetraffic.ru/wiki/crm/. – Access date 12.05.2020.

5. Official website "Bitriks24" [Electronic resource]. – 2020. – Access mode: https://www.bitrix24.by. – Access date 12.05.2020.

6. Official website "StudBooks .net" [Electronic resource]. – 2020. – Access mode: https://studbooks.net/2051157/buhgalterskiy_uchet_i_audit/ustanovka_programmy_upravlenie_otnosheniyami_klientami. – Access date 20.05.2020.

UDC 658.78

WAREHOUSE IN THE LOGISTICS SYSTEM: FEATURES OF EFFECTIVE MANAGEMENT

СКЛАД В ЛОГИСТИЧЕСКОЙ СИСТЕМЕ: ОСОБЕННОСТИ ЭФФЕКТИВНОГО УПРАВЛЕНИЯ

Zhuchkevich O.
E-mail: olga_zh17@ mail.ru
Vitebsk State Technological University, Republic of Belarus
Жучкевич О. Н.
Витебский государственный технологический университет, Республика Беларусь

ABSTRACT

WAREHOUSE, LOGISTICS, LOGISTICS SYSTEM, OPERATION, EFFICIENCY, MANAGEMENT, COMPETITIVE ADVANTAGE

The importance and place of warehouses in the logistics system are considered. The features of warehouse management in the micro-logistics system are analyzed, the main problems are identified, and the directions for improvement are determined.

АННОТАЦИЯ

СКЛАД, ЛОГИСТИКА, ЛОГИСТИЧЕСКАЯ СИСТЕМА, ОПЕРАЦИЯ, ЭФФЕКТИВНОСТЬ, УПРАВЛЕНИЕ, КОНКУРЕНТНОЕ ПРЕИМУЩЕСТВО

Рассмотрены значение и место складов в логистической системе. Проанализированы особенности управления складом в микрологистической системе, выявлены основные проблемы и определены направления совершенствования.

For a long time the management of warehouse facilities was not given much importance, since in the production structure of most economic entities, the warehouse does not belong to the main divisions, and it is considered as a service facility. The only exception was the sphere of wholesale trade, where the attention was always paid to the organization of warehousing due to the peculiarities of the trade functioning. With the development of logistics, the understanding came that a warehouse is an integral link in the supply chain of a logistics system, without the effective functioning of which it is impossible to organize commodity movement. This is connected with the fact that warehousing takes place on different stages

of commodity movement, starting from the warehouse of raw materials of the manufacturer and ending the warehouses of retail trade organizations (Fig.1).

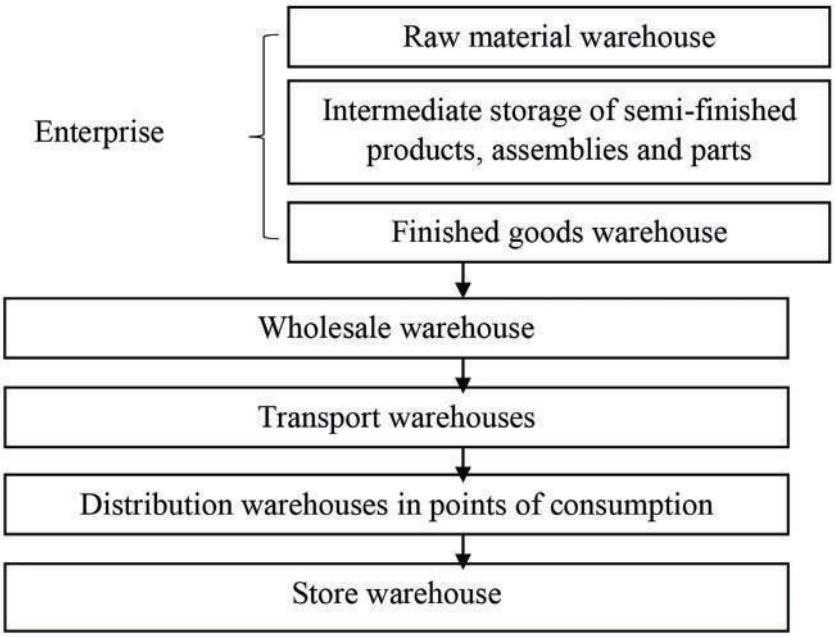

Figure 1 – Warehouses in the logistics system

Since a warehouse in logistics is viewed as the main logistic activity, it is important to introduce effective warehouse management methods, which allows it to be considered as a source of the company's competitive advantages. The warehouse becomes a significant competitive advantage of the organization on the following conditions:

- a high level of synchronization of warehouse operations with the work of other divisions of the enterprise;
- flexibility, accuracy and timeliness of order fulfillment;
- optimal logistics costs [1].

Improving the efficiency of warehouse management requires the allocation of strategic, tactical, and operational management levels.

Strategic warehouse management supposes:

- substantiation of the capacity of the warehouse system and the possibilities of changing it in accordance with the strategic objectives of the enterprise: entering new markets, significantly expanding the scope of activities, organizing interaction with strategically important partners.
- ensuring the commodity specialization of the warehouse and its changes, taking into account the expansion (renewal) of the range, which is associated with

the peculiarities of the interaction of the enterprise with suppliers and buyers, in which a significant change in the warehouse technological process is possible.

- improvement of technical equipment and increasing the level of information service of warehouse processes; the solution of these problems is associated with additional costs, and, therefore, with the need to agree on the sources of financial resources and areas of investment.

The tactical level of decision-making involves the coordination of the parameters of procurement and shipment, methods of transportation, as well as the specifics of the implementation of planned activities in the short term. The solution of these issues is often associated with the elimination of various kinds of conflicts of the logistics system: inter-functional, inter-operational, interspecific, etc. For example, the delivery of goods in large batches allows to reduce delivery costs but significantly increases the cost of storing warehouse stocks; transportation using air transport requires increased costs but allows to fulfill urgent orders; expanding the range of services attracts customers, but can significantly increase costs, etc. The effectiveness of management at this level is ensured by the quality of agreements with partners and the accuracy of analytical assessments.

At the operational level, coordination of actions requires solving current problems when accepting or shipping goods, providing conditions for fulfilling urgent orders, organizing the release of inventory items into production. It is important to specify the composition and sequence of actions of certain categories of personnel. In other words, we are talking about the formalization of business processes, that is, the development of a set of standard procedures for specific employees. It allows, on the one hand, to more clearly represent individual operations and to perform them better, and, on the other hand, to optimize the composition of operations and accelerate the degree of their development.

Optimization of operations can be carried out on the basis of their combination, elimination and improvement [1].

Combination takes place, for example, when there are combining operations of acceptance and control of goods arriving in the warehouse; selection of assortment according to customer orders in the storage area without moving them to the picking area; picking several orders at the same time; exclusion of empty movements in the warehouse, etc.

Elimination of operations is possible due to efficiency of interaction with partners: work with reliable suppliers, which allows to exclude control operations at the acceptance stage; coordination of packing parameters and formation of cargo units on standard commodity carriers, which reduces the number of operations; accounting of the forecast demand indicators for more accurate formation of

warehouse stock and exclusion of additional movements in the storage area, etc.

At the present stage, the improvement of existing operations is associated with the use of more advanced information technologies, progressive types of equipment, as well as the reorganization of planning solutions, optimization of warehouse space, and improvement of labor organization. Improving the efficiency of warehousing is also largely related to the quality of accounting and analytical work. With regard to warehouse accounting, it is well established at enterprises of various types of activity. However, the accounting system used does not reflect the specifics of logistics management. So, the costs in the field of warehousing are reflected in a generalized way and are based on the results of a specific time period (staff salaries, costs of maintaining buildings and equipment, electricity costs, etc.). At the same time, current costs are not kept in the context of specific areas, warehouse operations, types of activities or types of products.

There is practically no analytical work in the warehouse. Among indicators of the warehouse, as a rule, the cargo turnover and the utilization rate of the warehouse area are determined. At the same time, neither in the warehouses of material and technical supply nor in the sales area, other indicators of the warehouse premises use, equipment and personnel efficiency are calculated. Moreover, the amount of material flow and the cost of cargo handling, which are the main indicators of warehousing logistics, are not analyzed.

In such a situation it is impossible to identify the most costly operations, to evaluate the performance of individual sections and performers, to determine the time and costs of storing specific types of goods, to analyze the effectiveness of various types of services and to ultimately reveal the reasons for ineffective work and to develop measures to optimize warehouse activities.

The question of assessing the effectiveness of the work of the personnel is also not worked out. The time-based wage system prevails, and the bonus system is based, as a rule, on the general performance of the organization, without taking into account the specifics of the functioning of the warehouse facility. The practice of many organizations that successfully apply logistics management shows that the most effective tool here is the system of key performance indicators (KPI). Their main characteristics are:

- completeness, that is, the presentation in the KPI system of all significant parameters of the warehouse operation;
- relevance – implies the provision of reports no later than the next day;
- objectivity, that is, an assessment of the real quality of work [1].

Depending on the type of work, it is advisable to refer to such indicators as productivity, accuracy and speed of execution, coefficient of time use, work

efficiency. At the same time, the objectivity and accuracy of the assessment depend on the degree of development of business processes and the quality of the accounting system used.

Thus, the improvement of management in the field of warehousing should be carried out in the following areas:

- specification of management decisions depending on the level of management: strategic, tactical, operational;
- standardization of business processes;
- accounting of costs by type of activity, areas, operations, types of goods or services;
- improving the current accounting and improving the quality of analytical work;
- development of a system of indicators for assessing the quality of personnel work.

Such development of management, together with the using of modern automated information systems for warehouse management, provides concretization of management decisions, streamlining warehouse operations, increasing employee motivation and, as a result, increasing the efficiency of the warehouse and turning it as a source of competitive advantage.

Reference

1. Ван ден Берг, Йерун Питер. Склад как конкурентное преимущество / Йерун Питер Ван ден Берг ; пер с англ. – Москва : AXELOT : Альпина Паблишер, 2017. – 337 с.

Section 3. LANGUAGE EDUCATION FOR SPECIFIC PROFESSIONAL SKILLS

UDC 74.48+(800:37)

COMMUNICATIVE ORIENTATION IN PROFESSIONALLY FOREIGN LANGUAGE TRAINING OF NON-LINGUISTIC STUDENTS

КОММУНИКАТИВНАЯ НАПРАВЛЕННОСТЬ ПРОФЕССИОНАЛЬНО-ЯЗЫКОВОЙ ПОДГОТОВКИ СТУДЕНТОВ НЕЯЗЫКОВЫХ ВУЗОВ

Burdyko O.

Vitebsk State Technological University, Republic of Belarus

Бурдыко О. В.

Витебский государственный технологический университет, Республика Беларусь

ABSTRACT

COMMUNICATIVE COMPETENCE, THE PROCESS OF MASTERING, EXTRACURRICULAR ACTIVITIES, FACTORS FOR IMPLEMENTING, EXTERNAL FEEDBACK, PROFESSIONAL ACTIVITY

This article deals with the issues of learning a foreign language in a non-linguistic higher education institution. The importance of using the author's distant Moodle-based student courses to increase the efficiency of control in teaching students a foreign language in a non-linguistic higher education institution is shown. The factors for implementing external feedback are proposed: the content of control; control functions; types of control;

АННОТАЦИЯ

КОММУНИКАТИВНАЯ КОМПЕТЕНТНОСТЬ, ПРОЦЕСС ОСВОЕНИЯ, ВНЕУЧЕБНАЯ ДЕЯТЕЛЬНОСТЬ, ФАКТОРЫ РЕАЛИЗАЦИИ, ВНЕШНЯЯ ОБРАТНАЯ СВЯЗЬ, ПРОФЕССИОНАЛЬНАЯ ДЕЯТЕЛЬНОСТЬ

Эта статья определяет проблемы изучения иностранного языка в неязыковом вузе. Показана актуальность использования авторских дистанционных учебных курсов, размещенных на платформе Moodle, для повышения эффективности контроля обучения студентов иностранному языку в неязыковом вузе. Предложены факторы реализации внешней обратной связи: содержание контроля; функции контроля;

control methods; forms of control. The specifics of the content of control are revealed. The functions of control are stated. The features of internal feedback are presented.

виды контроля; методы контроля; формы контроля. Выявлена специфика содержания контроля. Изложены функции контроля. Представлены особенности внутренней обратной связи.

Presently training highly qualified personnel who know the basics of intercultural communication is one of the most important objectives of higher education.

It is impossible either to develop skills of intercultural communication or to have an adequate attitude to intercultural interaction without linguistic and cultural knowledge.

Therefore, the main task is to develop intercultural professional competence, which is understood as the readiness and ability for intercultural professional communication, based on the ideas of universal human values, orientation on them in the field of intercultural communication on the basis of empathy, allowing people to understand the national and cultural characteristics of the cultural object, to see similarity and difference between contacting cultures and to achieve mutual understanding. Taking into account the peculiarities of studying at technical university and especially the lack of educational disciplines or special courses in intercultural communication, it is necessary to pay special attention to mastering intercultural competence in foreign language classes.

The main stage of the educational process, organized on the basis of the intensity of the textual material, is characterized by the implementation of mechanisms for the foreign language competence development – from the value implication of an individual to value transformation and the design of foreign language activities. The main stage is focused on the formation of concepts, value orientations, and skills in foreign language professionally significant activities.

Due to the application of communication approach to the learning process, the students' creative potential is to develop when interactive methods are used in the English language teaching which, in their turn, are the source of sustainable motivation and cognitive interest to the discipline. The use of MOODLE and its capacities helps to make the learning process more effective and efficient because students can explore the educational resource anytime anywhere.

Working with students in MOODLE we faced one more problem: students are not used to deadlines, they often fail to submit their works in time when the access to the tasks is not available anymore. This situation is rather paradoxical considering that students spend hours in the Internet and social networks but they lack some

time to complete tasks in their English language course in MOODLE.

During e-learning of foreign languages by students in non-linguistic higher educational institutions there are realized the following control functions:

- the testing function showing the results and evaluation of students' study;
- the educating function coming by means of recollection, consolidation, specification, updating of the acquired knowledge;
- the developing function consisting in developing the student's personality, his or her cognitive abilities, concentration, memory, thinking, imagination.

The purpose of our experiment was the development of goal-skilled communicative competence within the framework of variable educational aspects. At the developing stage of research and exploratory work, the study was conducted in areas organically associated with the ascertaining stage and was focused on: analysis of the content of academic disciplines developing the university students' foreign language competence. The content of integrated, professionally significant courses comprising various educational aspects was analyzed; an experimental study of the foreign language competence development in the course of interdisciplinary integration that constitutes variable educational aspects and special professional disciplines.

In the process of mastering the educational content of special courses related to professionally oriented interpretation, in terms of creative value-oriented forms and teaching methods, students of various specialties: engineers, economists, designers, showed in most cases high – creative proficiency in professionally significant vocabulary, proficiency in business documentation in English, participation in scientific conferences, mastering the basics of professionally significant behavioral style.

According to the criterion of the integration degree of professionally significant foreign language skills as a result of the experiment, there were substantial differences in the development of the activity block of foreign language competence of the students of both experimental and control groups. Methods for assessing the development of integration in the field of foreign language professionally essential skills included the analysis of the results:

- participation in student scientific conferences;
- writing of additional papers during the final state exam in the final language;
- participation in meetings with the specialists from abroad on relevant professional activities;
- translation and processing of original texts taken from the Internet, and intended to create technical innovative instruments and tools.

The basis for the development of the axiological block of foreign language

competence was the students' knowledge of the foreign language values, a foreign language culture, dialogue of cultures. In the process of formation of professional intercultural competence, all its components-ethnographic, sociolinguistic; socio-cultural; subject-professional – are developed. All these components are interconnected, each of them interacts with the others, which leads to the growth of intercultural competence at large.

The effectiveness of the proposed model of the development of intercultural competence can be ensured when the following pedagogical conditions are created:

- taking into account the individual characteristics of students, the level of their linguistic and general cultural training;
- communicative training of professionally oriented foreign language considering the specifics of the university;
- unity of classroom and extracurricular activities;
- use of authentic teaching and methodological material;
- interdisciplinary integration;
- reliance on the comparative principle of languages and cultures studies and the dialogue of cultures.

Communication barriers were reduced and the students developed confidence in the situation of intercultural communication. There was a growth in the level of skills to compare and understand similarities and differences in socially-conditioned behavior of native speakers and to use creatively cultural knowledge to solve communicative problems in professional intercourse. The students demonstrated emotional-value attitude to culture, tolerance and respect for foreign culture, readiness to take an active part in intercultural interaction.

It can be stated that there was an evident increase in the level of intercultural competence: the number of students at a low level decreased by 64 percent, the number of students classified as having a high level of intercultural competence increased by 35 percent.

Thus, it can be considered that the proposed model of the development of intercultural competence is rather efficient and can serve as a basis for the development of educational trajectory of students and is recommended to be introduced into practice of professionally-oriented foreign language teaching.

Reference

1. Andreassian, I. M. Innovative technologies mastering foreign language communication // Zamezhnyya Respublitsy Language Society in Belarus. – 2006. – № 2. – With. 18-22.

2. Anisimov, A. M. Work in the Moodle-based E-learning System. – Kharkov: KhNUUE, 2009. – 292 p.

3. Galskova, N. D. Theory of learning foreign languages. Didactics and methodology. – Textbook. – 3rd ed., Sr. – Moscow: Academy, 2006. – 336.

3. Prutchenkov, A. Socio-psychological training of interpersonal communication – [Text] / A. Prutchenkov. – Moscow: The New School, 1991. – P. 45.

4. Passow, E. I. Lesson foreign language in high school. – 2nd ed., Dorab. – M.: Education, 1988. – 223 p.

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SCIENCE COMMUNICATION: BASIC TERMS, COMPONENTS OF THE COMMUNICATION PROCESS

НАУЧНАЯ КОММУНИКАЦИЯ: ОСНОВНЫЕ ТЕРМИНЫ, КОМПОНЕНТЫ КОММУНИКАЦИОННОГО ПРОЦЕССА

Dzinkevich A.[1a], Duktava L.[2b]

[1]Mogilev State A. Kuleshov University, Republic of Belarus

[2]The Economy Research Institute of the Ministry of Economy of the Republic of Belarus, Republic of Belarus

E-mail: [a]alevtina797979@mail.ru, [b]docent2020@yandex.ru

Динькевич А.В.[1a], Дуктова Л.Г.[2b]

[1]Могилевский государственный университет имени А. А. Кулешова, Республика Беларусь

[2]Научно-исследовательский экономический институт Министерства экономики Республики Беларусь, Республика Беларусь

ABSTRACT

SCIENCE COMMUNICATION, SCIENTIFIC COMMUNICATION, SCIENCE, MASS MEDIA, SCIENTIST, THEORY OF COMMUNICATION

This article examines the main approaches to the definition of the terms "science communication" and "scientific communication". Scientific communication is the interaction of scientists for creating new scientific knowledge. Science communication is viewed as the interaction of the scientific community with a mass audience, the presentation of the results of scientific activity for non-experts, the popularization of scientists as well as the results of the scientific activities in mass media. The authors

АННОТАЦИЯ

НАУЧНАЯ КОММУНИКАЦИЯ, КОММУНИКАЦИЯ В НАУКЕ, НАУКА, МАСС-МЕДИА, УЧЕНЫЙ, ТЕОРИЯ КОММУНИКАЦИИ

В статье рассмотрены основные подходы к трактовке терминов «science communication», «scientific communication». Scientific communication представляет собой взаимодействие ученых по созданию нового научного знания. Science communication рассматривается как взаимодействие научного сообщества с массовой аудиторией, представление результатов научной деятельности для неэкспертов, популяризация ученых и результатов научной деятельности в масс-

point out a new approach when the concept of "scientific communication" is included in the concept of "science communication".

медиа. Авторы отмечают новый подход, когда понятие «scientific communication» входит в понятие «science communication».

Researchers use two terms regarding science-related communication: "scientific communication" and "science communication". In the first case, they refer to communication as the interaction of scientists for creating new scientific knowledge. E. V. Reshetnikov defines scientific communication as "a specifically ordered system of social interactions aimed at search, accumulation, and dissemination of scientific knowledge about the reality, carried out through various channels, by different means, forms and institutions of communication" [2]. In the study "Scientific communication: the evolution of forms, principles of organization" the author considers three types of communication networks that functioned in three historically established forms of scientific communication: "Republic of letters" (XVII century), "Invisible college" (XIX–XX centuries), "Electronic invisible college" (late XX–early XXI centuries). Scholar A. A. Shirokanova in several works terms such mechanisms of scientific communication functioning as "invisible colleges", "Matthew effect", creation of remote network scientific teams ("collaborations"), and others [5].

The target audience in scientific communication includes the representatives of the scientific community. In the communication process, the following formats act as channels for transmitting information within the scientific community:

- scientific conferences (seminars, congresses);
- scientific publications (they serve as a means of replication (dissemination) of scientific knowledge);
- "direct connections" (personal conversations, online communication), etc.

Besides, due to the development of digital technologies, the presence of a scientist’s profile at Google Academy, the use of scientometric databases (such as WoS, Scopus, RSCI, and others) for organizing links to scientific publications are growing increasingly important.

However, more and more attention has recently been paid to considering specific features of building communication of a scientist and scientific organization with external audiences [3], [4].

In the second case, another term – "science communication" – is used to mean the interaction of the scientific community with a mass audience, the presentation of the results of scientific activity for non-experts, and the popularization of scientists and their activities via mass media.

The terminology associated with the concept of science communication includes such terms as "popularization of science", "scientific journalism", "scientific PR", "scientific communicator", "scientific journalist", and others.

The main means of scientific communication with a mass audience can be as follows:

- work with journalists (i.e. advising media representatives on issues within the competence of a scientific organization (institution); arranging events with the participation of journalists: press conferences, briefings, press lunches, press tours, etc.);
- composition and distribution of press releases, other materials for mass media (publishing of scientific information in a printed periodical, placing it on television and radio, posting it on the Internet; maintaining a column on science in socio-political publications; working with the aggregators of scientific news and press releases (e.g. EurekAlert, AlphaGalileo, Tass, etc.);
- posting science news on the website of a scientific organization, institution, or in the corporate print media;
- coverage of scientific events (e.g. scientific conferences, symposia, etc.) in mass media;
- participation of the representatives of the scientific community in special popular science events (e.g. in international projects Science Slam, International Fame Lab, "Kurilka Gutenberga", etc .);
- management of the organization’s communicative resources that can be used as sources of information and platforms for communication (e.g. the design of a scientist’s page on a scientific organization (institution) website; work with accounts on social networks and instant messengers).

The risks of the current situation regarding scientific communication include the distortion of the image of a scientist as well as of academic profession in general, the spread of pseudo-scientific knowledge, etc.

Scholar S. M. Medvedeva considers scientific communication to be "the movement of scientific ideas from a scientist through the scientific community to the mass consciousness". Under such an approach, the concept of "scientific communication" can be included in the concept of "science communication".

Taking into account the importance of science popularizing, S. M. Medvedeva suggests a five-step model of the movement and transformation of scientific ideas:

- first is the stage of the scientist (idea generation);
- the second is the stage of the scientific community (promotion of an idea within the scientific community, its design according to the rules of the paradigm);
- the third is the stage of interest groups (communication of scientists with

state and business, training of future specialists);

- the fourth is the stage of popular science (promotion of scientific ideas in popular culture);
- the fifth is the stage of artistic creation (the subject of communication is not knowledge, but the myth of science) [1, p. 278].

In this model, the emphasis is placed on the fact that science can be considered a kind of an intermediary for the triad "state-business-society". There are many obstacles in construction of such a communication process which Russian practices note in the following way: "Now the majority of universities are more interested in GR-service, that is, the main page of the site should display a photograph of the university rector with the president or prime minister, rather than tell about scientific achievements and developments of the professors of the university. <...> The other side of the problem is that press services of higher educational establishments have very little media expertise and resources to be engaged in educational activities themselves, which is the task that the media can help them with" [3].

Thus, the issue of promoting information about scientists and scientific studies for a larger audience is becoming increasingly important in the context of the theory of communication. There are various approaches to the use of terms that are related to the construction of communication on scientific activity. When optimizing the work with target audiences, it is important to determine the channels for the distribution of information as well as possible communication barriers.

Reference

1. Медведева, С. М. От научного творчества к популяризации науки: теоретическая модель научной коммуникации / С.М. Медведева // Вестник МГИМО. – 2014. – № 4. – С. 278–284.

2. Решетников, Е. В. Научные коммуникации: эволюция форм, принципов организации / Е. В. Решетников [Электронный ресурс] / Сибирский государственный университет телекоммуникации и информатики. – Режим доступа: https://sibsutis.ru/upload/publications/9b3/uxofvwfphpyfwz%20nlcieeuzqkvzohdcsxzhcvdi.pdf. – Дата доступа: 06.07.2020.

3. Формула научного PR 3.0. Сборник лучших практик в области научных коммуникаций. – СПб : Университет ИТМО, 2017. – 109 с. [Электронный ресурс]. – Режим доступа: https://www.rvc.ru/upload/iblock/ef6/formula_3_0.pdf. – Дата доступа: 06.07.2020.

4. Шипман, М. Научная коммуникация. Руководство для научных пресс-

секретарей и журналистов / М. Шипман ; пер. с англ. – М. : Альпина нонфикшн, 2018. – 186 с.

5. Широканова, А. А. Новая роль и формы научной коммуникации в информационную эпоху / А. А. Широканова // Социология. – 2013. – № 1. – С. 103–116.

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THE FORMATION OF COMMUNICATIVE SKILLS OF STUDENTS IN THE PROCESS OF TRAINING

ФОРМИРОВАНИЕ КОММУНИКАТИВНЫХ НАВЫКОВ У СТУДЕНТОВ В ПРОЦЕССЕ ОБУЧЕНИЯ

Imperovich V.

Vitebsk State Technological University, Republic of Belarus

Имперович В. В.

Витебский государственный технологический университет, Республика Беларусь

ABSTRACT

COMMUNICATIVE SKILLS, SYSTEM OF LEVELS, CRITERION, PEDAGOGICAL TASKS, ANALYTICAL, CONSTRUCTIVE, COMMUNICATIVE COMPETENCE, PROFESSIONAL ACTIVITY

This article deals with the development of forming communicative competence of students during their training. The formation of communicative competence of students is a part of the system of their formation. The development of the system to determine the degree of communicative competence formation of the students will contribute to the improvement of their training. The formation of communicative competence facilitates the process of students entering the professional activity.

АННОТАЦИЯ

КОММУНИКАТИВНЫЕ НАВЫКИ, СИСТЕМА УРОВНЕЙ, КРИТЕРИЙ, ПЕДАГОГИЧЕСКИЕ ЗАДАЧИ, АНАЛИТИЧЕСКИЕ, КОНСТРУКТИВНЫЕ, КОММУНИКАТИВНАЯ КОМПЕТЕНТНОСТЬ, ПРОФЕССИОНАЛЬНАЯ ДЕЯТЕЛЬНОСТЬ

Эта статья определяет развитие формирования коммуникативной компетентности студентов во время их обучения. Формирование коммуникативной компетентности студентов является частью системы их образования. Развитие системы для определения степени формирования коммуникативной компетентности студентов будет способствовать улучшению их обучения. Формирование коммуникативной компетентности способствует процессу вступления студентов в профессиональную деятельность.

The process and the result of the development of the system of forming communicative competence of students during their training is a part of the education. The formation of communicative competence of students is a great part of the system of their formation. The development of the system to determine the level of communicative competence formation of the students will contribute to the improvement of their training. The system of improvement of communicative competence facilitates the process of students entering the professional activity.

Communicative skills are a number of actions aimed at the exchange of information and understanding of communication partners, management of interaction, the use of communication knowledge, means of communication in accordance with the goals of interaction. The formation of communicative competence which students need in the communication goes through several stages:

1) acquaintance with the importance of communicative competence;
2) the use of standard techniques of the communicative impact;
3) bringing communication knowledge to automaticity;
4) the development of use in the application of skills.

Each student at any of these grades reaches a certain level of proficiency in communicative competence. These grades are often different because of many reasons: the tendency to the communicative activities, qualities of character, knowledge of the characteristics of the communication partner, the knowledge about the forms and methods of improvement of their own methods of communication and explanation of communicative behavior.

The development of the grade system of formation of communicative skills of students in the process of university training and specification of indicators of formation of communicative competence of students of different specialties for each level is a part of education.

Different students over the years of training at the University assimilate different kinds of models of any activities, differing in their performance and skill levels. This is due to the different kinds of motivation of mastering the skills and characteristics of the individual. One of the most important aspects of improving the psychological and any other training of students is the development and improvement of the levels of forming communicative competence, contributing to the determination of the models of the University education effectiveness, the degree of professional readiness of students. To take into account all the difference of aspects of the formation of communicative competence, it is necessary to present the system of skills developed by scientists in the form of level formation and arrange its elements in accordance with their importance.

To improve a level system of communicative skills, it is necessary to analyze typical mistakes of interaction between students, communicative partners in order to clarify the gaps in knowledge about professional communication and the ability to organize, implement and control this way. Among these mistakes were the following: inability to reveal the ways of different situations; making the decision based on intuition, on any kinds of knowledge; low variety of decisions and inability to determine the selected communication skills and methods in the immediate activities. And if we take into account the fact that the process of any professional communication is the decision of countless communicative tasks, the listed mistakes indicate the inability of solving these tasks. In scientific fields a "level" is the ratio of "higher" and "lower" stages of development and improvements of objects or processes.

Some kinds of attempts to determine levels of general knowledge and skills, including communicative aims, have been undertaken by many researchers. They have developed different kinds of systems of levels. For example, the classification of levels including reproductive, reproductive-creative, creative-reproductive and creative is offered by many researchers. Some of them add an intuitive level at which the students possess a certain set of an "initial" skill. And some scientists extend the number of levels of communicative skills through imitating-reproducing, combining-productive and creative.

It should be noted that all of these levels equally apply to the intellectual, labor, organizational and other competencies in any field of science. As well as the system of levels supported by many scientists. It includes low, medium and high degrees of development of communicative skills. In the opinion of some researchers , it is the best division, as it reflects the theory of the gradual development of skills. In addition to these three we can determine the initial or elementary level, which is characterized by the lack of students' knowledge and skills in the field of educational communications and any other communication.

A multi-level system of formation of communicative competence improves the process of student's entering the professional activity. For this reason, the presented system determines a great complication of the student activity on several parameters:

- the object of activities (interaction with an individual and with a group);
- the content of activities (from mastering the elementary skills of communication to generalized communicative skills involving proficiency in methods and techniques of any activities);
- the nature of activities (reproductive or creative).

In the first level of the development of the degree system, the level of mastery

was distinguished, in which search and experiments are making new forms and methods of any influence. But gradually some scientists came to the conclusion that the degree of mastery characterizes the activity of any person, and its formation is unlikely possible in the period of University training. That is why we limit ourselves to the four named levels. Each of the levels interacts with preceding and subsequent degrees. In the changes from one stage to the next the degree of readiness of students to the process of communication and to the solution of professional problems with the use of communicative skills increases. Very often, passing the elementary level, the student can move from low through medium to a high level.

Here is a brief definition of the listed levels of development of communicative skills.

The initial or elementary level is characterized by a lack of knowledge about the essence of the system of communicative abilities; a lack of psychological readiness to implement educational actions and motivations; non-possession of the ways of communication (verbal and non-verbal); a primitive implementation of any action.

The low level is characterized by a lack of knowledge for proper communication of partners; controversial motives; inappropriate, slow, and inaccurate actions; the construction of any action on everyday experience; a passive attitude to communication of partners.

The medium level is characterized by good knowledge needed to establish appropriate relationships of partners; conscious motives; the conformity of the action with the targets of the communication; a predominance of stereotyped forms of influence.

The high level is characterized by deep and strong knowledge of communicative skills; psychological readiness for communication of partners; appropriateness and effectiveness of communicative actions; the possession of the means and ways of communication, elements of originality and innovation; active attitude to communication with each other.

Early experimental work on forming future professionals communicative competence was preceded by the choice of certain models characterizing the process of mastering the above competence. Criteria of formation were chosen as the indicators. Criterion is a sign on the basis of which the evaluation is carried out. The methods of research that allowed to identify and develop the level system of communicative competence of students forming include the analysis of the responses, interview, observations, expert assessment, self-assessment, survey, self-analysis and analysis of communication situations.

After the analysis of specificity of the studied skills and realizing that the process

of formation of the system of communicative skills is complex and different, as it implies the level of knowledge about their nature and structure, some changes in patterns of communication, development of an own style of interaction, mastery of self-selection of common communicative skills the conclusion was made about the impossibility of choosing a single indicator that would quantitatively and qualitatively measure different changes in the level of the named skills. Therefore subsequently for each degree the criteria for the formation of communicative skills were developed, which allowed to determine more accurately the dynamics of the development of communicative competence. Undoubtedly the criterion-level system to a certain extent relative and creative. These features are not strictly differentiated and not mutually exclusive, but also can serve as a guide to identify the dynamics and trends of formation of communicative skills.

Reference

1. Andreassian, I. M. Innovative technologies mastering foreign language communication // Zamezhnyya Respublitsy Language Society in Belarus. – 2006 – № 2. – pp. 18–22.

2. Galskova, N. D. Theory of learning foreign languages. Didactics and methodology. – Textbook. – 3rd ed. – Moscow: Academy, 2006. – 336.

3. Prutchenkov, A. Socio-psychological training of interpersonal communication – [Text] / A. Prutchenkov. – Moscow: The New School, 1991. – P. 45.

4. Passow, E. I. Lesson on foreign language in high school. – 2nd ed. – M.: Education, 1988. – 223 p.

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THE NATURE OF EDUCATIONAL RESEARCH AND ITS QUALITATIVE AND QUANTITATIVE METHODS

СУЩНОСТЬ ИССЛЕДОВАНИЯ В ОБРАЗОВАНИИ, ЕГО КАЧЕСТВЕННЫЕ И КОЛИЧЕСТВЕННЫЕ МЕТОДЫ

Izmailovich O.
Vitebsk State Technological University, Republic of Belarus
E-mail: izov@tut.by
Измайлович О.В.
Витебский государственный технологический университет, Республика Беларусь

ABSTRACT

EDUCATIONAL RESEARCH, QUALITATIVE AND QUANTITATIVE RESEARCH METHODS, WAYS OF KNOWING

Our report deals with the process of pedagogical study. It is presented a brief overview of research: qualitative and quantitative research methods and explain why knowledge of various research methods can be of value to educators. We made an attempt to explain the purpose of the analysis in a comparative study of the problem. Thus, having examined the educational research, we can say that its methods of research are intended to determine the cause for or the consequences of differences between groups of people.

АННОТАЦИЯ

ИССЛЕДОВАНИЕ В ОБРАЗОВАНИИ, КАЧЕСТВЕННЫЕ И КОЛИЧЕСТВЕННЫЕ МЕТОДЫ ИССЛЕДОВАНИЯ, СУЩНОСТЬ ИССЛЕДОВАНИЯ

В нашем докладе рассматривается процесс выполнения педагогического исследования. В нем дается обзор сущности исследования, представлены способы получения знаний, объясняется необходимость постановки проблемы научного исследования. Таким образом, рассмотрев сущность педагогического исследования и его типы, можно сказать, что в зависимости от цели, предмета, объекта научного исследования, мы используем соответствующий тип изучения.

Educational research takes many forms. In our report we introduce you to the subject of educational research, research problems and explain why knowledge of various research methods can be of value to educators as research is but one way

to obtain knowledge. This is why knowledge of scientific research methodology can be of value.

Ways of knowing: Sensory experience. We see, we hear, we smell, we taste, we touch. The data we take in from the world through our senses is the most immediate way we have of knowing something.

Sensory data, to be sure, can be refined. Seeing the temperature on an outdoor thermometer can refine our knowledge of how cold it is; a top-quality stereo system can help us hear Beethoven's Fifth Symphony with greater clarity; smell, taste, touch – all can be enhanced, and usually need to be. Many experiments in sensory perception have revealed that we are not always wise to trust our senses too completely. Our senses can (and often do) deceive us: The gunshot we hear becomes a car backfiring; the water we see in the road ahead is but a mirage; the chicken we thought we tasted turns out to be a rabbit.

Sensory knowledge is undependable. Sensory knowledge is also incomplete. The data we take in through our senses do not account for all (or even most) of what we seem to feel is the range of human knowledge. To obtain reliable knowledge, therefore, we cannot rely on our senses alone but must check what we think we know with other sources.

Agreement with others. One such source is the opinions of others. Not only can we share our sensations with others, we can also check on the accuracy and authenticity of these sensations: "Does this soup taste salty to you?" "Isn't that John over there?" "Did you hear someone cry for help?" "It smells like mustard, doesn't it?"

Obviously this is a great advantage. Checking with others on whether they see or hear what we do can help us discard what is untrue and manage our lives more intelligently by focusing on what is true. The problem with such common knowledge is that it, too, can be wrong. A majority vote of a committee is no guarantee of the truth. My friends might be wrong about the presence of an approaching automobile, or the automobile they hear may be moving away from rather than toward us. Hence, we need to consider some additional ways to obtain reliable knowledge.

Expert opinion. Perhaps there are particular individuals we should consult. Experts in their field. People who know a great deal about what we are interested in finding out. We are likely to believe a noted heart specialist. Well, maybe. It depends on the credentials of the experts and the nature of the question about which they are being consulted. Experts, like all of us, can be mistaken. For all their study and training, what experts know is still based primarily on what they have learned from reading and thinking, from listening to and observing others, and

from their own experience. No expert, however, has studied or experienced all there is to know in a given field, and thus even an expert can never be totally sure. All any expert can do is give us an opinion based on what he or she knows, and no matter how much this is, it is never all there is to know.

Logic. We also know things logically. Our intellect – the capability we have to reason things out – allows us to use sensory data to develop a new kind of knowledge. Consider the famous syllogism:

All human beings are mortal.

Sally is a human being.

Therefore, Sally is mortal.

To assert the first statement (called the major premise), we need only generalize from our experience about the mortality of individuals. We have never experienced anyone who was not mortal, so we state that all human beings are. The second statement (called the minor premise) is based entirely on sensory experience. We come in contact with Sally and classify her as a human being. We don't have to rely on our senses, then, to know that the third statement (called the conclusion) must be true. Logic tells us it is. As long as the first two statements are true the third statement must be true, too [2].

There is still another way of knowing to consider: the method of science.

The scientific method. When many people hear the word "science," they think of things like white coats, laboratories, test tubes, or space exploration. Scientists are people who know a lot and the term "science" suggests a tremendous body of knowledge. What we are interested in here, however, is science as a method of knowing. It is the scientific method that is important to researchers.

What is this method? Essentially it involves the testing of ideas in the public arena. Almost all of us humans are capable of making connections – of seeing relationships and associations – among the sensory data we experience. Most of us then identify these connections as "facts" – items of knowledge about the world in which we live. We may speculate, for example, that our students may be less attentive in class when we lecture than when we engage them in a discussion. But we do not really know if what we think is true. What we are dealing with are only guesses or hunches, or as scientists would say, hypotheses.

What we must now do is put each of these guesses or hunches to a rigorous test to see if they hold up under more controlled conditions. Such investigations, however, do not constitute science unless they are made public. This means that all aspects of the investigation are described in sufficient detail that the study can be repeated by any who question the results – provided, of course, that those interested possess the necessary competence and resources. Private procedures,

speculations, and conclusions are not scientific until they are made public. The general order of the scientific method, then, is as follows:

1. Identification of a problem;
2. Definition of the problem;
3. Formulation of hypotheses;
4. Projection of consequences; 5. Testing of hypotheses.

Almost all research plans include a problem statement, an exploratory question or hypothesis, definitions, a literature review, a sample of subjects, instrumentation, a description of procedures to be followed, a time schedule, and a description of intended data analyses.

The problems touched upon in the report are of great importance. There are many different ways of obtaining information, including sensory experience, agreement with others, expert opinion, logic and the scientific method. The scientific method is considered by researchers the most likely way to produce reliable and accurate knowledge. The scientific method involves answering questions through systematic and public accumulation of knowledge. The description of some of the most commonly used scientific research methodologies in education was given. They are experimental research, correlational research, causal-comparative research, survey research, qualitative research, and historical research.

Reference

1. College and university organization: insights from the behavioral sciences. – New York and London University Press, 1984.

2. Fraenkel, J. R. Wallen, N. E. How to design and evaluate research in education. – New York, 2012.

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SELF-EDUCATION IN THE SYSTEM OF CONTINUOUS PROFESSIONAL LANGUAGE EDUCATION

САМООБРАЗОВАНИЕ В СИСТЕМЕ НЕПРЕРЫВНОГО ПРОФЕССИОНАЛЬНОГО ЯЗЫКОВОГО ОБРАЗОВАНИЯ

Kondratyeva I.
Belarusian Institute of Law, Republic of Belarus
E-mail: rominnna@mail.ru
Кондратьева И.П.
БИП – институт правоведения, Республика Беларусь

ABSTRACT

INSTITUTION OF HIGHER EDUCATION, SELF-EDUCATION, FOREIGN LANGUAGE, VOCATIONAL EDUCATION, DEVELOPMENT OF FOREIGN LANGUAGE SKILLS, VOCATIONAL-ORIENTED TECHNOLOGIES, INNOVATIVE TECHNOLOGIES, LIFELONG LEARNING

The article is devoted to the problem of self-education of law students. The key to the effectiveness of vocational education is to increase attention to the process of foreign language training in a non-linguistic institution of higher education, as well as to the formation of foreign language competence, which is due to the demand of time and the labor market.

АННОТАЦИЯ

УЧРЕЖДЕНИЕ ВЫСШЕГО ОБРАЗОВАНИЯ, САМООБРАЗОВАНИЕ, ИНОСТРАННЫЙ ЯЗЫК, ПРОФЕССИОНАЛЬНОЕ ОБРАЗОВАНИЕ, ФОРМИРОВАНИЕ ИНОЯЗЫЧНЫХ НАВЫКОВ, ПРОФЕССИОНАЛЬНО-ОРИЕНТИРОВАННЫЕ ТЕХНОЛОГИИ, ИННОВАЦИОННЫЕ ТЕХНОЛОГИИ, НЕПРЕРЫВНОСТЬ ОБУЧЕНИЯ

Статья посвящена проблеме самообразования студентов юридических факультетов. Усиление внимания к процессу иноязычной подготовки в неязыковом учреждении высшего образования, а главное ее результату – формированию иноязычной компетенции – это объективная необходимость, обусловленная требованием времени, рынка труда и являющаяся залогом эффективности профессионального образования.

The task of the higher school includes training specialists with a sufficient level of key competencies to effectively continue their professional and personal self-improvement in the future as part of lifelong education. A great deal of hours is devoted to independent work with students in recent foreign language curricula, both for classroom and extracurricular work. A large proportion of this type of educational activity requires the search for new forms of work, which, on the one hand, is facilitated by the variety and availability of Internet resources. On the other hand, it is complicated by the need for a clear organization of the process itself and a system of control over the performance of tasks, the degree of independence and originality of their implementation.

The search for new methods of work in the classroom and outside it is associated with the transition to the paradigm of student-centered learning. This is especially true in the field of teaching business communication, since it is in the professional field that a future specialist will need the ability to transfer skills and abilities of effective speech and communicative behavior into identical situations of professional communication. Teaching the skills of self-educational activity allows a young specialist in the future to solve independently various language problems in the field of his/her professional activity. The implementation of the concept of independent activity in mastering a foreign language allows to maintain and develop a system of continuous language education, provides the student with the opportunity to independently maintain and improve their language level in various educational situations in a variable educational context, a variety of educational systems, changing social needs in the field of foreign languages.

It is important to stress that the effectiveness of independent activity concerns not only the academic success of students but also indicators of the development of their intellectual independence and creative thinking. We consider the teaching of independent activity in a foreign language in the context of classroom practice, guided independent work, educational language practice, work at home, which corresponds to our understanding of the essence of continuous learning.

Experience shows that a higher level of formation of independent activity skills provides students with a more successful solution of simulated professional tasks in the field of business communication. It is in this area that communication failures are most noticeable and fraught with consequences. [1; 22].

We teach professional English on the basis of a communicative system-activity approach, which involves:

1. Unity of goals, process and methods of teaching a foreign language;
2. Combination of practical orientation with the systematization of linguistic and speech material in the minds of students;

3. Combining active communication with a conscious analysis of the native and foreign languages and reliance on the speech experience of students;

4. Consistency in the organization of training for all types of speech activity;

5. Effective management of controlled and independent forms of work;

6. The use of intensive teaching methods and the use of innovative technologies;

7. Individualization of the learning process.

In our practice, we use an integrated technology that includes collaboration pedagogy and differentiated tasks. This technology helps to strengthen the professional orientation, enhance the experience of cognitive activity, the ability to independently design their knowledge, which will allow students to develop the ability to self-esteem, teach them to make decisions and be responsible for them.

Guided independent work is carried out in the following areas:

1. Research work: supervising the preparation of reports for participation in conferences in the direction of the specialty;

2. Preparing students for participation in the competition of presentations in English (presentation skills);

3. Development of teaching materials for additional work, as well as assignments for independent work;

4. Development of complex cases, work with articles, reports, video and audio materials, solving the problematic tasks, translation, abstracting on the subject of the course.

We understand out-of-class independent work in a foreign language as an activity organized by students themselves according to the program proposed to them, deepening and complementing the classroom work, and at the same time as independent preparation for subsequent work in the classroom, for example, a discussion, role-playing, business game as an effective form of reinforcing the result of independent educational activity. The development of intellectual independence of students is carried out on the basis of a phased organization of independent work, taking into account the level of problematic nature of cognitive and communicative tasks. As the student's independence increases, the content of the activity changes accordingly.

When preparing the tasks for independent work, the need to create a student's communicative and cognitive needs as part of the general system of his/her motivation is taken into account. To form a specific motivation for learning a foreign language in the process of extracurricular independent work, the following conditions must be met:

1. The student's awareness of the relevance and importance of in-depth independent work as an effective way of preparing for active speech activity in the

classroom; the novelty of the acquired knowledge, the ability to go beyond the program;

2. A variety of forms of extracurricular independent work (in a computer class and at home), which contributes to the development and maintenance of activity and a positive emotional attitude towards independent work;

3. The use of visualization means, supports, and keys that provide self-correction and a feeling of successful independent work;

4. Informative richness of materials that are diverse in content and style, taking into account the cognitive interests of this contingent of students.

In our work, we widely use innovative technologies. E.A. Borisova points out that among innovative technologies the most promising are:

1) "case-technology" (learning based on specific educational situations);

2) reflection as a method of self-knowledge and self-assessment and as a technology itself – diagnostic and developmental;

3) training technologies (training in business communication, personal development, communication skills);

4) project method [2, c. 43].

In the senior courses, we use case technology: "Creative stations". This technology is used to consolidate and systematize knowledge on the studied topic. Participants are divided into groups of three (in a group on average up to 15 people). Working time at each station is 10-15 minutes. Each group should work on the material at 5 to 10 stations. At practical classes we actively use the training "Public speaking"; intellectual workout "Brainstorming"; round table on topics: "Euthanasia - mercy or murder?", "Problems of the European Union", "On the matter of the death penalty. The main ways of carrying out a sentence to execution", "Modern terrorism"; computer-oriented methods: performing tasks using pedagogical software and information resources of the Internet to monitor students' knowledge on the legal aspect. The first and second-year students in the specialty "International Law" are proposed to prepare a project on the topics studied: "Criminal Case", "Civil Case", etc. The process of developing students' cognitive independence is complex and contradictory. It is necessary to look for such ways of guiding the educational process that would contribute to the development of the cognitive powers of students. A person engaged in self-education is always able to find themselves, if necessary, retrain, to compete in the labor market. Therefore, when preparing a modern specialist, it is important for each teacher to pay attention to how students relate to the process of self-education, to help them develop the necessary skills and abilities and to stimulate them. Only in this case higher educational institutions will train competent graduates.

References

1. Бессараб, Т. П. Иностранный язык как способ профессиональной подготовки студентов-юристов / Т. П. Бессараб // Актуальные вопросы современной педагогики: материалы VII Междунар. науч. конф. (г. Самара, август 2015 г.). – Самара: ООО «Издательство АСГАРД», 2015. – С. 136–138.

2. Борисова, Е. А. Формирование готовности учащихся к самообразованию в процессе обучения иностранному языку: автореф. дис. канд. пед. наук 13.00.01 Общая педагогика, история педагогики и образования / Е. А. Борисова. – Самара, 2013. – 26 с.

3. Crosswell, A. Self-monitoring in Student-Writing Developing Learner Responsibility / A. Crosswell. – ELT Journal, July 2000. – 54 p.

UDC 800:37

INTERPRETING ESSAYS: THE BASIS FOR ELEGANT THOUGHT ARTICULATION

ИНТЕРПРЕТАЦИЯ ЭССЕ: ОСНОВА ДЛЯ ФОРМИРОВАНИЯ И ВЫРАЖЕНИЯ МЫСЛИ

Kostyreva S.
Vitebsk State Technological University, Republic of Belarus
E-mail: kostyrevasv@mail.ru
Костырева С.С.
Витебский государственный технологический университет, Республика Беларусь

ABSTRACT

ESSAY, COMMUNICATIVE STRATEGY, WRITTEN ACCURACY, EXPLICIT INFORMATION, NON-LINEARITY, IMPLIED MEANING, PARAGRAPH DEVELOPMENT

The article highlights the strategy of essay functioning in the terms of artistic thought articulation as one of the basic soft skills listed as a top requirement. The author claims the importance of interpreting other people's works in order to be efficient while writing an essay. It is essential to be aware of possible ways of coding and decoding the message addressed to the recipient.

АННОТАЦИЯ

ЭССЕ, КОММУНИКАТИВНАЯ СТРАТЕГИЯ, АККУРАТНОСТЬ ИЗЛОЖЕНИЯ, ЭКСПЛИЦИТНАЯ ИНФОРМАЦИЯ, НЕЛИНЕЙНОСТЬ, ПОДТЕКСТ, ПАРАГРАФИРОВАНИЕ

В статье освещаются вопросы функционирования эссе для решения коммуникативной задачи, с точки зрения стратегии изложения мысли, что является одним из основных навыков, являющихся приоритетными в списке требований нанимателя к работнику. Автор считает важным интерпретацию работ других людей, чтобы повысить качество и результативность собственного эссе. Отмечается необходимость овладения способами кодирования и декодирования информации, адресованной реципиенту.

Our teaching experience has shown that a very good understanding of the theoretical issues of some notion or phenomenon not only greatly increases the students' chance of getting a pass, but also passing it with a very good result.

It is obvious that considering some written papers instead of different samples from the textbooks is much more efficient for producing something new and authentic. Examining a number of realistic papers prior to some written assignment will prepare your students for the actual tasks in the professional sphere they specialize in.

There are many ways of training the students on the example of original written papers. We can interpret some paper in class, so it would be a real practice for them. We can use the whole or parts of each written paper to practice different skills. We can acquire a general impression of the essays by studying them in the frame of one topic under study.

Teachers may focus on some issues under evaluation:

- formal accuracy (Morphology, Syntax);
- written accuracy (Paragraphing, Punctuation and Spelling);
- vocabulary (Range and Activation);
- style (Pragmatic / Sociolinguistic Aspects);
- communicative effectiveness (Appropriate Task Completion).

The most intriguing moment is the following: no complete answer key could be provided, along with the comments and remarks of the teacher. However, students may need the help of a teacher to arrange the essay in the same way as it has been discussed during the preparatory training course. The writing skills required for arranging an essay are quite demanding.

Students are trained and expected to demonstrate:

- confident and varied use of the grammatical structures required at the required level; almost no inaccuracies (syntactical errors) are admitted;
- appropriate organization of text paragraphing; there might be some mistakes with spelling and punctuation that are never confusing;
- precise use of a wide range of well-chosen vocabulary relevant to the topic; repetitions should be avoided; some idiomatic expressions are worth using;
- effective use of cohesive devices; all ideas should be organized in a clear and coherent way following the characteristics of the given genre;
- effective elaboration of thoughts and opinion relevant to the topic; adequate elaboration and coverage of all the bullet points.

The mentioned above criteria for assessing writing should be applied while considering the essays in the class.

In order to make a good start with writing an essay, the teacher needs first

to ask the students to find the theme or topic sentence which summarizes what they are going to write about, and then make a plan. This strategy will enable the students to write quickly and clearly, help them think of a title more easily, and the work will have cohesion.

Using this method gives the topic sentence of each paragraph and connects it to the other paragraphs. These topic sentences can be made into one paragraph and then developed into a whole article. Conversely, these topic sentences, when taken together, can be used to cut down the entire article into a one-paragraph summary of the whole piece.

We have outlined an efficient scheme which helps to satisfy the criteria for assessing students' abilities of elegant thought articulation through interpreting essays. Here it follows:

1. How is the ***main idea*** expressed?
- in a single sentence;
- not expressed explicitly;
- the author has only implied it.
2. What is the topic (subject)? and the controlling idea?
3. How is the main idea supported?
- by facts;
- statistics;
- reasons;
- observations;
- details;
- examples;
- illustrations;
- explanations.
4. In which sentence does the ***topic sentence*** come?
   Which sentences represent supporting details/conclusion?
   Is it the standard paragraph pattern or the delayed topic sentence pattern?
5. What ***modes of discourse*** does the author employ? With what purpose?
- **narration** – to relate events in chronological order;
- **description** – to paint a picture in words;
- **exposition** – to explain, to make clear, to discuss, to set forth. The author relies on facts rather than opinions;
- **persuasion** – to convince the reader in smth, to win the reader over to a certain point of view, to get the reader to change his/her mind.

If several modes:

… is used along with…

… appears in combination with …

… the dominant purpose is …

… with the elements of …

What ***inferences*** can you make from the text?

6. What ***methods of paragraph development*** does the writer use to reinforce, develop or support the main idea? With what purpose?

- **examples or illustration** – a series of specific relevant examples or a single, longer illustration;
- **process**:

directive kind – the author explains the steps in chronological order – manuals, how to write books;

informative type – describes a phenomenon – how smth works, or how smth developed. The reader is not supposed to duplicate the process;

- **comparison** – a discussion of similarities between two unrelated or unlike things;
- **contrast** – between two related or like things;
- **definition, definition by negation** – describe the word in an unfamiliar way, define a word, completely new to the reader, define a word with an unusual etymology, explain different interpretations of a term;
- **classification** – to divide a group of things into classes or types in order to describe the distinguishing features of each;
- **analysis** – to examine a single idea by looking at its separate parts;
- **cause and effect** – to find reasons to explain events, problems and issues along with their results; to show a chain of events, resulting from a single cause;
- **analogy** (extended, sustained metaphor) – attention getting device, to provide a more convincing and interesting point of view than a simple description.

7. What ***patterns of paragraph organization*** does the author use?

- chronological order;
- spatial order;
- deductive order;
- inductive order;
- emphatic order.

8. Are there any transitions in the text? What is their function?

9. What are the peculiarities of the language?

- denotation and connotation;
- slanted language (weasel words, euphemisms, doublespeak, jargon, sneer words);
- cliches,

- figurative language.

10. ***Thesis:***

is formulated in the first sentences;

comes in the first sentence;

is located in … ;

the writer delays stating the thesis until nearly the end of the essay;

expressed in a single sentence; not expressed explicitly, the author has only implied it;

paragraph … serves to move the author's ideas forward;

the thesis statement can be found in the beginning sentences;

the author saves the main idea by the end;

the supporting paragraphs lead up to a combined thesis and conclusion;

the author doesn't state the thesis at all, preferring to let the supporting paragraphs reveal the main idea (implied thesis).

This thoroughly developed plan has proved its worth while training students for taking international exams.

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PROFESSIONAL TRAINING IN PANDEMIC SITUATION

ПРОФЕССИОНАЛЬНАЯ ПОДГОТОВКА В УСЛОВИЯХ ПАНДЕМИИ

Radion T.
Belarusian Institute of Law, Republic of Belarus
E-mail: tania_r@tut.by
Радион Т.П.
БИП – Институт правоведения, Республика Беларусь

ABSTRACT

VOCATIONAL TRAINING, PANDEMIC, SUBJECT "FOREIGN LANGUAGE", EDUCATIONAL PLATFORMS AND SERVICES, ONLINE CLASSES

The article touches upon the problem of self-isolation caused by the coronavirus pandemic and the need to provide educational services to Belarusian students. A new stage in the development of vocational training occurred during the period of self-isolation during the pandemic. Teachers had to carry out online training sessions in the form of seminars, conferences and lectures, working remotely from home. That recent experience has shown both positive and negative aspects of educational platforms and services, the capabilities and the limitations of the pedagogical impact using online services by teaching the discipline "Foreign language".

АННОТАЦИЯ

ПРОФЕССИОНАЛЬНАЯ ПОДГОТОВКА, ПАНДЕМИЯ, ДИСЦИПЛИНА «ИНОСТРАННЫЙ ЯЗЫК», ОБРАЗОВАТЕЛЬНЫЕ ПЛАТФОРМЫ И СЕРВИСЫ, ОНЛАЙН ЗАНЯТИЯ

В статье затронута проблема самоизоляции, вызванная пандемией коронавируса, и необходимость продолжить оказывать образовательные услуги белорусскими УВО. Именно нацеленность на безопасность обучения явилась стимулом развития профессионального образования, так как преподаватели столкнулись с необходимостью проведения занятий, вычитки лекций и организации конференций удалённо, работая из дома в режиме онлайн. Такой опыт выявил как положительные, так и отрицательные стороны образовательных платформ и сервисов для педагогического воздействия на примере дисциплины «Иностранный язык», которые освещаются в данной статье.

The functioning of higher educational establishments (HEEs) as a social institution is carried out according to standard curricula approved by the Ministry of Education of the Republic of Belarus. Introduction of competency-based vocational education in Belarus has made it possible to train specialists according to market demands. In particular, Belarusian graduates are experts who are ready to mobilize their personal resources necessary for the qualified conscious solution of professional tasks in typical and atypical situations.

Researchers (O. M. Bobienko, A. V. Khutorskaya and others) propose to distinguish all competencies of a specialist on two basic grounds: universal and professional. Universal competencies are divided into general scientific, social-personal and instrumental ones. Professional competencies can be divided into general professional and professional-specialized ones [1, c. 10].

The researchers and scientists, working on the matter of "professional competence" (S. Ya. Batyshev, V. S. Bezrukova, V. I. Mestechkin, Yu. G. Tatur, A. Shelten, O. N. Shakhmatova and others) agree that special professional competencies can be formed and assessed within the framework of one or several academic subjects. They stress that universal competencies are acquired as an integrated result of education and are fundamentally supra-subject. The first ones represent the ability of an individual to effectively solve a certain class of professional tasks (diagnostic, design, etc.) adequately to a specific situation, the latter are invariant with respect to the type of professional activity [2, c. 14].

The study of foreign languages in non-linguistic higher educational establishments is conditioned by the content aspect of the standard curricula for the academic discipline "Foreign language" for non-linguistic specialties. According to the program, training takes place within the framework of classroom practical classes in direct educational cooperation with the teacher. For the intensification of learning, as well as the effective formation and development of competencies, a symbiosis of traditional and newest teaching methods with the use of information and communication technologies (ICTs) is widely used: the project method, game technologies, "case-study", "portfolio" technology, technology of small groups, modular competence technology and others.

The need for self-isolation caused by the COVID-19 pandemic revealed the wide possibilities of ICTs. The situation showed the primary pre-condition of Belarusian HEEs for successful distance learning, carrying out training indirectly through modern educational platforms and services such as Moodle, Zoom, Skype and others.

The need for self-isolated indirect interaction involuntarily forced teachers to demonstrate their creativity and use all the capabilities of ICT to the full as

effectively as possible. In particular, teachers had to use a computer with Internet access from home as the main teaching tool. They've also gained experience in conducting online classes, training sessions, consultative workshops, delivering lectures and organizing conferences, working remotely from home.

Analysis of existing methodological and multimedia resources of the contemporary educational milieu, trends, challenges and perspectives allows us to assert that most of the known technologies and teaching methods can be used in a remote-controlled education. The most effective methods are innovative computer aided language learning (CALL) ones. Such information and communication technologies can help students develop critical thinking, problem solving and decision making skills that are necessary both for work with large amounts of information and for taking the best decisions in each professional situation.

Among the advantages of remote online classes have been identified the following:

- access to wide educational Internet resources, which might be impossible in poorly technically equipped classrooms;
- saving of time and commuting expenses for both students and teachers;
- Internet-based training sessions provide an opportunity for the dispatcher to draw up a flexible and convenient schedule for everyone;
- opportunity to attend classes without the risk of infecting others;
- physical isolation of students contributes to the better discipline in the classroom due to the concentration on learning materials, and not on creating a favorable social group status through interpersonal interaction;
- a change in the role of a teacher: from the traditional one of a "classroom mentor" to the role of a "supervisor-organizer" due to the indirect pedagogical impact;
- online approach may lead to recruitment teaching staff on the criteria of territorial convenience, but only on the criteria of competence up to the involvement of native speakers in the educational process in future;
- remote online conferences on the Zoom platform allow to expand the number and geography of participants;
- to develop not only speaking but also listening skills, and not in an ideal environment of sound perception, but as a conversation via video communication, which is more expected in future employment;
- formation of communication skills on professional topics through telecommunications in a foreign language, which is even more important for professional growth than direct communication, owing to the specific nature of the Belarusian labor market;

- formation and development of online communication skills on the platforms Zoom, Skype, Navek Meet, as well as studying these service capabilities.

However, after such online classes, teachers feel more tired than after on-site classes with students. Great fatigue is caused by the novelty of teaching methods, the fact that communication is no longer as natural as in the classroom, and a number of other disadvantages:

- quality training is impossible without high-speed Internet;
- inability of platforms to provide simultaneous feedback of the interlocutors due to a real-time mode failure;
- interrupting the speaker cuts off the end of the interlocutor's phrase, so the naturalness of a conversation with expression of opinions and dissents turns into a lonely speech of the speaker in the unnatural silence of listeners. Though there is an opportunity to express the attitude to the information in the chat or by using emoji. Nevertheless, it doesn't represent the full picture to the speaker on how his message is perceived (that is particularly true when delivering lectures);
- technical illiteracy; lack of a comfortable separate workplace at home, both regarding students and teachers;
- home environment prevents the change of the atmosphere of "relaxation and rest" to the atmosphere of "student cognitive activity";
- students' choice to study online by hiding their faces and workplaces behind graphic avatars, which makes it impossible even to imitate real communication;
- lack of centrally developed teaching aids with electronic support for students and teachers in accordance with the standard educational program.

On the basis of the considerations outlined above, it can be argued that the effectiveness of using educational online platforms is based on the principles of the joint creative process of students and the teacher, mutual desire to exchange experience, interaction and correction of learning.

The use of active methods equips students with basic knowledge and forms the competencies necessary for a qualified specialist. It should be noted that the activation of the educational process presupposes the assimilation of professionally significant knowledge through the search for ways and means of solving important theoretical and practical problems independently or carried out under the guidance of a teacher.

Thus, further modernization of the educational process, taking into account the positive experience of using educational platforms, is inevitable. The resources of the subject "Foreign language" are multi-faceted and they are a fertile ground for the formation and development of personal competencies of the future professional. Mastering a foreign language is a specially organized activity based on a certain

teaching method that takes into account the individual and age characteristics of students. Consequently, many hours should be devoted to study such a discipline as “Foreign language” by the Ministry of Education of the Republic of Belarus, both in class and online. Along with all of the above, it should be borne in mind that the guarantor of the rapid and high-quality formation of professional and linguistic competencies of students in any type of study (online and offline) is the teacher’s methodological literacy, and not the access to Internet resources itself.

References

1. Сидоренко, Т. В. Формирование профессиональных компетенций студентов в процессе самостоятельной работы при обучении иностранному языку: автореф. дис. ... канд. пед. наук : 13.00.02 / Т. В. Сидоренко. – Ярославль, 2011. – 22 с.

2. Бобиенко, О. М. Ключевые компетенции личности как образовательный результат системы профессионального образования: автореф. дис. ... канд. пед. наук : 13.00.08 / О. М. Бобиенко. – Казань, 2005. – 23 с.

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BENEFITS OF USING INFORMATION TECHNOLOGIES AT THE ENGLISH LESSON

ЭФФЕКТИВНОЕ ИСПОЛЬЗОВАНИЕ ИНФОРМАЦИОННЫХ ТЕХНОЛОГИЙ НА УРОКЕ АНГЛИЙСКОГО ЯЗЫКА

Stepanov D.
Vitebsk State Technological University, Republic of Belarus
E-mail: stepanoff.dm@gmail.com
Степанов Д.А.
Витебский государственный технологический университет, Республика Беларусь

ABSTRACT

ICT; ENGLISH LANGUAGE TEACHING; AUTONOMOUS LEARNING; UTILITY AND EFFICIENCY

Research has shown that the use of Information Technologies at the English lesson can improve and enhance students' language acquisition and substantially motivate them to continue their learning and stimulate their creativity and passion. However, the challenges and barriers that many English teachers and professors encounter while attempting to incorporate ICT in their teaching have triggered debates and growing concerns about the real utility of ICT use in the language classroom. Research findings show that the use of information technology in the language classroom boosts autonomous learning, maximizes targeted outcomes, motivates learners and helps them

АННОТАЦИЯ

ИНФОРМАЦИОННО-КОММУНИКАТИВНЫЕ ТЕХНОЛОГИИ, САМОСТОЯТЕЛЬНОЕ ИЗУЧЕНИЕ, ПРИМЕНЕНИЕ И ЭФФЕКТИВНОСТЬ

Использование информационных технологий на уроке английского языка способствует формированию речевых навыков и в значительной степени повышает мотивацию студентов к дальнейшему изучению языка и к творческому подходу в этом процессе. Однако проблемы, с которыми сталкиваются многие преподаватели в ходе использования ИКТ в преподавании иностранного языка, вызывают дискуссию о фактической пользе информационных технологий на занятиях. Результаты данного исследования показывают, что применение информационных технологий способствует самостоятельному изучению, повышает успеваемость,

improve their performance in the learning process. However, using ICT without careful planning and well-defined objectives will more likely be a waste of time and effort.

мотивирует студентов и помогает им улучшить свои результаты. Тем не менее, использование информационных технологий без тщательного планирования и целеполагания может оказаться и безрезультатным, и затратным по времени процессом.

Research has shown that the use of instructional technology and ICT in particular in the English language classroom can improve and optimize students' language acquisition and substantially motivate them to continue their learning and stimulate their creativity and passion. Technology in language learning can boost variety and increase the diversity of learning environments and opportunities and enhance the quality of the learning experience by making class content more varied and accessible to almost each individual learner; thus ensuring more participation and engagement among learners.

Curricular integration of ICT offers access to a set of electronic facilities such as interactive video, the Internet, email and the World Wide Web. These ICT tools can help learners acquire linguistic skills, establish contact and interaction with other language users and broaden their minds about different cultural practices, values and contemporary lifestyles in countries where English is used as a mother tongue or as a second language. ICT-aided teaching is believed to create more liveliness and interaction in the English language classroom.

The challenges and barriers that many English teachers and professors encounter while attempting to integrate Information and Communication Technologies in their teaching have triggered substantial debates and growing concerns about the real utility of ICT use in the language classroom. So, do perceived benefits of ICT use in the language classroom provide palpable evidence for the improvement and optimization of English language teaching and learning or are they just ornaments that are beautiful rather than useful? Does the use of ICT at the English lesson bring about positive changes into the classroom and provide an optimal environment for more varied and productive learning?

Motivating students in the language classroom is not always an easy function to fulfil because it involves a multiplicity of psycho-sociological and linguistic factors. Most foreign language professionals acknowledge the importance and utility of motivation to optimize language learning and maximize targeted outcomes. So to what extent can information technology increase motivation and involve students more in their learning? Many researchers argue that information technology can

influence students' motivation to learn and can increase their interest and attention and ensure more involvement and engagement in the classroom.

Students are more likely to display positive attitudes when computers are used in the classroom. They are more motivated and interested to communicate with native speakers from other countries. Most students believe ICT motivates them in gaining more interest in the learning process. By increasing the amount of authentic material in the classroom (blogs, podcasts, and digital videos) and providing students with appropriate skills to approach authentic material, teachers promote meaningful interaction, raise students' interest and motivation; and ensure more participation and engagement in the classroom.

Given these claims, there seems to be little dispute about the potential benefits of ICT use on motivation and engagement in the language classroom. However, the introduction of ICT materials as class content requires the use of advanced cognitive processes which may, and against the expected outcomes, de-motivate low achievers and those whose learning style is far more adapted to a teacher-dominated classroom.

The use of a computer by teachers in the classroom has also brought about a change in the role of the teacher, taking them from the role of a lecturer to a facilitator of learning. Recent foreign language teaching approaches and methods have been part of a broad reform that supports and extends students' participation and ensures more involvement in their learning.

Information technology and computers in particular have been used to implement a large set of innovative teaching practices in the language classroom. Standards-based approach, competency-based approach, project-based learning and task-based learning have largely benefited from web technology and helped students develop a set of learning strategies and styles that promote autonomous learning and offer platforms for more individualized learning.

Advocates and supporters of ICT in language teaching argue that unlike traditional instruction, Computer-Assisted Language Learning (CALL) fosters learners' autonomy and helps them develop individual learning strategies. This advantage pre-supposes an exchange of roles in the language classroom. A teacher is no longer expected to be the only provider of knowledge in the classroom and students are required to play a new role. They need to take ownership of their learning and contribute to its construction and organization.

In many parts of the world, teachers of English assign project work to students as a way to enhance and boost classroom learning. Most students use the Internet as a research and resource tool. This enables them to take charge of their learning through participating in real world projects. Multimedia applications and

programmes allow students to do a reading assignment in the target language, use a dictionary, study grammar and pronunciation related to the reading material, take a comprehension test on the reading content, and receive immediate feedback, all within the same programme. This will be enough to maximise targeted outcomes and offer more opportunities and facilities for autonomous learning.

Web-based teaching and web quest in particular is believed to promote autonomous learning and help students develop efficient learning skills and strategies. Bernie Dodge (1995) defines "web quest" as an inquiry-oriented activity in which most or all the information used by learners is drawn from the web. The outcome of such a task is usually a presentation or a report which requires students to invest great individual efforts and use pre-acquired skills and knowledge. This boosts achievement and reinforces autonomous learning as well.

Information and communication technology has promoted and enhanced interaction and authentic communication among English language users and learners. Other methods and approaches would simply not offer the ease and speed of communication that ICT can now allow. It is true that there is no substitute for face-to-face communication, but learners do not have the time or the money to travel and learn from students in other parts of the world. A simple Internet video or audio link can allow language users to exchange information and ideas, discuss issues and engage in authentic conversations and exchanges.

Web technology and Internet video links in particular allow exposure to non-verbal communication as well. Facial expressions, gestures and posture, which are culturally overloaded, enable learners to make appropriate interpretations of different speech acts and help them develop a sense of communication commonality. This allows them to avoid blenders that may impair communication. Moreover, computer-enabled communication provides teaching environments that support learning conditions and back up meaning-oriented communication. Learners maintain a balance between fluency and accuracy and develop their intercultural communication skills to engage in successful authentic conversations and exchanges with native speakers. This makes of text-based chat a powerful and efficient mediating and learning tool.

However, computer-enabled communication does not allow users to take advantage of social aspects of oral interaction such as body language and prosodic features. Learners resort to express their feelings and emotions using emoticons and smiley faces. These electronic illustrations may help users express themselves and exchange messages but they are of no value when it comes to language learning development and improvement of performance on written class assessment. They may even cause inappropriate and careless usages of the language.

Most studies reveal and demonstrate through research that the appropriate implementation of information technology in the language classroom promotes learning, enhances interaction and communication, boosts autonomous learning, maximizes targeted outcomes, motivates learners and helps them improve their performance at the English lesson.

However, using ICT without careful planning and well-defined objectives will more likely be a waste of time and effort. ICT uses in English language teaching and multisensory delivery in particular have their limitations as well. The cultural component of teaching material can be challenging and confusing. Moreover, an appropriate use of ICT in English language teaching and multisensory delivery in particular requires adequate training and pedagogical planning. Blake (2008) insists that "Teachers inexperienced in using technology often harbour the belief that merely transforming an activity into a web or CALL format will guarantee its success for students. Again, any activity without adequate pedagogical planning-technologically enhanced or not- will produce unsatisfactory results with students, even if it’s attractive from a multimedia point of view". Poor pedagogical planning is likely to undermine the use of ICT at the English lesson.

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Corrector: Stepanov D.
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