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## THEORY AND PRACTICE OF OBTAINING COMPOSITE MATERIALS BASED ON POLYMER BLENDS

**Abstract:** - The regularities of the thermodynamic compatibility of various industrially produced polyolefins and heterochain polymers and the possibility of obtaining composite materials based on their mixtures with significantly increased performance properties based on existing production facilities and process equipment have been identified.

- The methods have been developed for the chemical and physical modification of individual polymers, their mixtures to improve the performance properties of composite materials; including the method of modification of polyethylene, which made it possible to significantly increase its thermal stability in air and in vacuum, anti-corrosion properties.

- The effectiveness of the use in composite materials of the petroleum resin PPC intended to produce the products operated under conditions of increased mechanical wear, temperatures, pressures and deformations.

- Developed composite materials based on mixtures of PVC, TPU, CCPE+PVC, CCPE+PU, LDPE+BR, technology of their manufacturing and processing, application of new efficient products with extreme operating conditions: injection molded tires for agricultural machines, casing stabbing baskets, nuclear magnetic logging probes, scrapers and bucket elevators, sealing rings for pneumatic radiators, indented surface of the grain cleaning machines.

**Key words:** compatibility, injection molded tires, processing, solubility parameter, chlorocarboxylated polyethylene (CCPE), polyvinyl chloride (PVC), composition, obtaining mixtures of polymers.

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### 1. Introduction

**Problem and its relevance.** The problem of obtaining polymer composites with the necessary properties for working under extreme conditions at the present time is solved in two ways: by synthesis new types of polymers and by creating polymer compositions, where the properties of the individual components additively complement each other.

The scientific and technological progress of manufacturing imposes more and new stringent requirements on the polymer products, and the demand of industry for new materials is constantly increasing. Thus, the development of various polymer

composites, greatly simplifying the technology of their production and processing, reducing the cost of obtaining materials with the necessary sets of properties is extremely relevant under current technological conditions.

In the polymer industry there is large-tonnage production of individual polyolefins and heterochain polymers, on the one hand to permit the realization of a certain range of performance properties of polymer products, and on the other hand, the constant development of technology requires expanding the range of application of polymer products increasing their technical level. This contradiction put forward as



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$$\chi_A = M_A/100,$$

where  $M_A$  is the molecular weight of polymer.

Thus, we have:

$$\chi_{BR} = \frac{350000}{100} = 3500$$

$$\chi_{LDPE} = \frac{300000}{100} = 3000$$

Hence, using the equation for calculating the critical value

$$(\chi_{BR-LDPE})_{cr} = 1/2 \times 1/3500^{1/2} + 1/3000^{1/2} = 6,18 \times 10^{-4}$$

we determine the probability of phase separation origin, for which purpose we calculate  $\chi_{BR-LDPE}$  for various phase compositions. The results are summarized in Table 1.

**Table 1. The solubility parameters of the BR-LDPE system**

$\Phi_{BR}$	$(\chi_{BR-LDPE})_{sp}$	$\Phi_{BR}$	$(\chi_{BR-LDPE})_{sp}$
0,00	-	0,55	6,3 x10
0,05	3,03 x10	0,60	6,55 x 10
0,10	1,61 x10	0,65	6,96 x10
0,15	1,15x10	0,70	7,60x10
0,20	9,23 x10	0,75	8,57x10
0,25	7,94x10	0,80	1,01x10
0,30	7,14x10	0,85	1,28x10
0,35	6,65 x10	0,90	1,83x10
0,40	6,35x10	0,95	3,48x10
0,45	6,20x10	1,00	-
0,50	6,19 x10	-	-

As is clear, with a decrease in the concentration of any component in the mixture, the spinodal solubility parameter increases and LDPE dissolves in BR much better than BR in LDPE. The concentrations were determined by variational method at which absolute combination is possible. This is 0,08 wt% for LDPE and 0,06 wt% for BR.

Thus, the calculation method shows that the BR-LDPE system is practically incompatible.

To find the critical point of the system in the phase diagram, it is necessary to calculate the  $G_{mix}$  for different composition of the system. The calculation was performed at  $T=298$  K, the results of which have been summarized in Table 2.

**Table 2. Heat of mixing BR-LDPE**

$\Phi_{BR}$	$G_{mix}$	$\Phi_{BR}$	$G_{mix}$
0,00	-	0,55	3,42 x10
0,05	6,58 x10	0,60	3,33 x 10
0,10	1,25 x10	0,65	3,16 x10
0,15	1,77x10	0,70	2,91x10
0,20	2,22 x10	0,75	2,60x10
0,25	2,60x10	0,80	2,22x10
0,30	2,91x10	0,85	1,77x10
0,35	3,16 x10	0,90	1,25x10
0,40	3,33x10	0,95	6,58x10
0,45	3,42x10	1,00	-
0,50	3,46 x10	-	-

The calculated data show that the so-called symmetric case with the lower critical solution temperature (LCST) is observed for the BR-LDPE system. Based on the additivity principle, we have  $T_{cr}=503$  K.

Thus, from the above calculation conclusions can be drawn:

1. The BR-LDPE system is practically incompatible;

2. The combination is possible at the concentration of BR in LDPE up to 0,06% and at the concentration of LDPE up to 0,08%.

To compare the compatibility of polymer blends depending on the polarity of the components, the compatibility parameters for the system of polar components PVC and TPU were calculated (compared with the non-polar system LDPE-BR).



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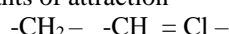
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### 2.3. Compatibility calculation for the system polyvinyl chloride - thermoplastic polyurethane (PVC-TPU) at temperature 298 K

We calculate the solubility parameters of individual components of the mixture using tabular values of the Small molar attraction constants for different chemical groups, taking into account the density of PVC at 298 K ( $\rho=1,41 \times 10^3 \text{ kg/m}^3$ ). In the calculation, we will consider the distribution of end groups due to the insignificance of their number and without taking into account the molecular weight distribution.

Unit link of PVC -  $[-\text{CH}_2-\text{CHCl}-]_n$

Molar constants of attraction



$$\sum F = 133 + 28 + 270 = 431$$

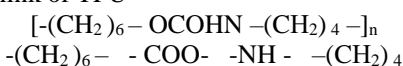
$$M = 12,2 + 1,3 + 35,5 = 62,5$$

Then the solubility parameter of PVC will be:

$$\delta_{PVC} = 1,41 \times 431 / 62,5 = 9,72$$

The solubility parameter of TPU, taking into account the fact that the density of TPU at 298 K ( $\rho_{298} = 1,1 \times 10^3 \text{ kg/m}^3$ ).

Unit link of TPU



$$\sum F = 133,6 + 310 + 180 + 133,4 = 757$$

$$M = 12,11 + 1,21 + 16,2 + 14 = 199$$

$$\delta_{TPU} = 1,10 + 1820 + 199 = 10,06$$

The calculation of the interaction parameter between the polymers in the system is performed by the equation:

$$\chi_{AB} = V_r / RT (\delta_A - \delta_B)^2,$$

where R is the gas constant equal to 1,987 kcal/deg<sup>-1</sup>mole<sup>-1</sup>; T is the temperature in degrees Kelvin and  $V_r$  is the reference volume in cm<sup>3</sup>/mole conveniently taken to be 100 cm<sup>3</sup>/mole. Thus, for T=298K, the equation becomes:

$$\chi_{AB} = (\delta_A - \delta_B)^2 / G$$

In this case, for the system PVC-TPU we have:

$$\delta_{PVC-TPU} = (10,06 - 9,72)^2 / 6 = 0,019$$

To calculate the critical value  $(\chi_{PVC-TPU})_{cr}$  is used the equation

$$\chi_{cr} = 1/2 [1/\chi_A^{1/2} + 1/\chi_B^{1/2}]^2$$

which includes the degree of polymerization of each polymer, expressed as a reference volume  $V_r$ . The degree of polymerization can be calculated based on the validity of the degree of polymerization  $\chi$ , if the molar volume of the repeating unit of the polymer is known, by the equation

$$\chi_A = (\bar{V}/V_r)_x$$

A fairly good approximation is obtained from the relation

$$\chi_A = M_A / 100$$

where  $M_A$  is the molecular weight of polymer.

Thus, we have:

$$\chi_{PVC} = \frac{90000}{100} = 900$$

$$\chi_{TPU} = \frac{18000}{100} = 180$$

Hence, using the equation for calculating the critical value:

$$(\chi_{PVC-TPU})_{cr} = 1/2 \times 1/\chi_A (\Phi_A/G_P) + 1/\chi_B (\Phi_B)_{sp} \quad (\text{Table 3}).$$

**Table 3. Values of the spinodal interaction parameter for different phase compositions:**

Item No	PVC	$(\chi_{PVC-TPU})_{sp}$
1.	0,00	-
2.	0,05	$2,78 \times 10^{-3}$
3.	0,10	$1,40 \times 10^{-2}$
4.	0,15	$8,64 \times 10^{-3}$
5.	0,20	$6,97 \times 10^{-3}$
6.	0,25	$6,25 \times 10^{-3}$
7.	0,30	$5,93 \times 10^{-3}$
8.	0,35	$5,82 \times 10^{-3}$
9.	0,40	$5,86 \times 10^{-3}$
10.	0,45	$6,02 \times 10^{-3}$
11.	0,50	$6,29 \times 10^{-3}$
12.	0,55	$6,67 \times 10^{-2}$
13.	0,60	$7,18 \times 10^{-3}$
14.	0,65	$7,87 \times 10^{-3}$
15.	0,70	$8,79 \times 10^{-3}$
16.	0,75	$1,01 \times 10^{-2}$
17.	0,80	$1,19 \times 10^{-2}$
18.	0,85	$1,46 \times 10^{-2}$
19.	0,90	$1,92 \times 10^{-2}$
20.	0,95	$2,84 \times 10^{-2}$

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21.	1,00	-
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Since 0,019 is significantly more than 0,006, that is  $(\chi_{PVC-TPU}) > (\chi_{PVC-TPU})_{cr}$ , then this system must be incompatible in a wide range of compositions. Using the equation

$$(\chi_{AB})_{sp} = 1/2[1/\chi_A(\Phi A)_{sp} + 1/\chi_B(\Phi B)_{sp}] \quad (1)$$

we determine the probability of the phase separation origin, for which we calculate  $(\chi_{PVC-TPU})_{sp}$  for different phase compositions.

As seen, TPU dissolves in PVC much better than PVC, and at a content of less than 10% TPU, complete compatibility of the systems should be observed. The calculation shows that there is a so-called asymmetric case with two critical solution temperatures, the lower and the upper [12-16].

### 2.4. Preparation and study of compositions

However, such compositions have a low relative elongation (100÷200% at 293K), which is completely unsatisfactory for use in a number of RTG industries in particular for injection molded polyurethane tires manufacturing.

For the purpose of imparting optimum technological and physical-mechanical properties to mixtures based on TPU, the modifying role of CCPE serving as a "carrier" for PVC incompatible with TPU was investigated.

The studies were conducted using 3<sup>2</sup> full factorial design (FFD). Homogenization was carried out by mixing of research components on a double-roller mixer at a temperature of 438K for 15 minutes, then the blades were injected which 7 days of exposure were subjected to rupture on a P-0.5 tensile testing machine according to GOST 270-75 at a drawing rate of 130 mm/min and a temperature of 293K. Drawing on the literature data, optimal indicators for injection molded tires were determined:

$d_v=1,0=45,0$  kN/m is a tear resistance

$d_e=1,0= 375\%$  is a relative elongation, where  $d_v, d_e$  – desired factor functions.

The relationship of the desirability coefficient  $y^1$  with the desirability function has the form:

$$d = e^{-(y^1)^n},$$

where  $n$  is the exponent which value is determined by the requirement for the parameter.

Varying the indicator of desirability from -4 to +4, we define the type of regression equation that relates the current value of the studied indicator with the indicator of desirability, referring to the equation

$$y_6 = \alpha_0 + \alpha; \quad y^1$$

where  $y^1$  is the current value of the indicator.

The calculations found that:

$$y_\varepsilon^1 = -8,42 + 0,0276$$

$$y^1 = 17,35 - 0,0356$$

Taking the form of the desirability function  $d = x/y^1$  according to [17-19], we determine the indicators of desirability for resistance to tearing  $y_c^1$  and relative elongation  $y^1$ , as well as the corresponding functions of desirability. The results are summarized in Tables 4 and 5.

The generalized desirability function was determined by the formula:

$$D_i = \sqrt{d_i G d_i \varepsilon}$$

The results of the physical-mechanical tests of the obtained compositions and the generalized desirability function are shown in Table 5.

The analysis of tabular data shows that CCPE behaves as a typical polymeric plasticizer, due to the plasticizing effect of which the relative elongation of the composition increases by 2,5÷5 times. The introduction of PVC enabled to reduce the negative impact of the plasticizing effect of CCPE on the breaking strength value.

An analysis of generalized desirability functions shows that:

1. an increase in the PVC content from 5 to 10 by w/w leads to an increase in  $D_i$  from 0,067 to 0,078;
2. an increase in the content of CCPE from 5 to 20 by w/w leads to  $D_i$  with an extremum at the level 12,5 weight fraction.

$$X_2=5 \text{ w/w} \quad D_i=0,067$$

$$X_2=12,5 \text{ w/w} \quad D_i=0,089$$

$$X_2=20 \text{ w/w} \quad D_i=0,078.$$

3. In one pair of the system (for example 3a-2b, etc.) is maximum with an increased content of petroleum resin PPC.

To study the polymer mixtures a polarizing microscope MIN-8 equipped with a purpose made photo nozzle with a Zenit-TTL reflex camera with magnification  $x 480$ , quartz wedge  $L = 1/2 \lambda$  was used, polymer mixtures were studied at a temperature of 298 K.

**Table 4. Desirability function and desirability indicators for breaking strength and relative elongation**

Item No.	$Y_{iG}^1$	$d_i G$	$Y_{i\varepsilon}^1$	$d_i \varepsilon$
1.	-2,78	0,01	4,78	1,0
2.	-3,40	0,01	0,37	0,45
3.	-2,97	0,01	-3,40	0,01
4.	-3,33	0,01	1,22	0,80

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5.	-3,25	0,01	-3,23	0,01
6.	-3,67	0,01	0,81	0,61
7.	-2,99	0,01	-0,98	0,01
8.	-2,59	0,01	-1,73	0,50
9.	-2,84	0,01	-3,23	0,01
10.	-	-	-	-
11.	-3,84	0,01	-2,19	0,02
12.	-4,01	0,00	-3,01	0,01
13.	-3,01	0,01	-0,49	0,20
14.	-2,95	0,01	0,80	0,61
15.	-2,44	0,01	-2,69	0,01
16.	-2,74	0,01	-2,76	0,01
17.	-2,93	0,01	-2,41	0,01
18.	-3,16	0,01	-3,58	0,01

**Table 5. Physical-mechanical properties and generalized desirability function of the composition**

Item No.	Variables				Responses			
	Temperature range, K	PVC	CCPE	PPC	Breaking strength, MPa, Y <sub>0</sub>	Relative elongation, % Y <sub>1</sub>	Remanent elongation, % Y <sub>2</sub>	Generalized desirability function, D
	X <sub>0</sub>	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>				
1a 1	373	5,0	5,0	0,55	20,4	354	57,5	0,1
1b 2	373	5,0	5,0	2,2	18,2	477	89,5	0,067
2a 3	373	5,0	12,5	0,588	19,7	583	89,6	0,01
2b 4	373	5,0	12,5	2,35	18,4	453	81,3	0,089
3a 5	373	5,0	20,0	0,626	18,7	578	89,8	0,01
3b 6	373	5,0	20,0	2,5	17,2	510	77,1	0,078
4a 7	373	7,5	5,0	0,562	19,6	515	90,5	0,032
4b 8	373	7,5	5,0	2,25	21,1	536	87,4	0,071
5a 9	373	7,5	12,5	0,6	20,0	578	102,1	0,01
5b 10	373	7,5	12,5	2,4	-	-	-	-
6a 11	373	7,5	20,0	0,638	16,5	549	91,5	0,014
6b 12	373	7,5	20,0	2,55	15,9	572	106,4	0,00
7a 13	373	10,0	5,0	0,576	19,5	501	91,5	0,045
7b 14	373	10,0	12,5	2,3	19,8	465	80,0	0,078
8a 15	373	10,0	12,5	0,612	21,6	563	91,5	0,01
8b 16	373	10,0	12,5	2,45	20,5	565	84,4	0,01
9 a 17	373	10,0	20,0	0,65	19,8	555	89,8	0,01
9 b 18	373	10,0	20,0	2,6	19,1	588	89,6	0,01

### 2.5. Investigation of solubility and thermodynamic parameters of polymer mixtures by method of inverse gas chromatography and turbidimetric titration (in block and solution)

The solubility parameters of substances characterize the relationship between the mixing energy and mutual solubility. The value of the solubility parameter of the polymer is necessary to obtain valuable information about the behavior of the polymer when mixed with other polymers or low molecular weight substances. By Hildebrand's definition, the solubility parameter is defined as the square root of the cohesive energy density, that is, the evaporation energy per unit of volume.

Direct determination of the heat of vaporization, and hence the solubility parameters of polymers are impossible due to their non-volatility. Presently, methods for determining the cohesive energy of polymers based on the examination of the interaction of a polymer-solvent with known solubility parameters became the most common.

The swelling of cross-linked polymers was studied in the research [20] and it was found that swelling is maximal in solvents that have the same cohesive energy density as the polymer. Bristow and Watson obtained the solubility parameters of polymers from measuring viscosity in a number of solvents using Flory-Huggins interaction parameters  $\chi_{12}$ . Furthermore, the solubility parameter of the

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polymer was assumed to be equal to the solubility parameter of the solvent, in which the limiting viscosity is maximum.

Small obtained additive molar attraction constants for various molecular groups from measurements of the vapor pressure of volatile substances and used these values to calculate the solubility parameters of the polymers. Subsequently, these constants were revised by Hoy and Van Krevelen.

Sokh and Clark proposed to determine the cohesive energy density from the data of turbidimetric titration (TT) of solutions by polyprecipitators. The solubility parameters of polystyrene and poly-*o*-chlorostyrene determined by them well correspond to the known values obtained from swelling measurements.

Ito and Gillet showed that when using polymers as the stationary phase and various sorbates with known solubility parameters, can be used inverse gas chromatography to determine the solubility parameters of polymers.

Both of the latter methods for determining the solubility parameters of polymers are characterized by the diametrically opposite state of the “polymer-solvent” system, namely, in the TT method the solubility parameter of the polymer is determined under conditions corresponding to the “infinite” dilution of the polymer in a solvent, which can be denoted as  $\delta_2^0$ . In the case of inversed gas chromatography, the solubility parameter is determined by the “infinite” dilution of the low molecular weight substance in the polymer and the maximum interaction between the polymer molecules. The solubility parameter is correctly designated as  $\delta_0^\infty$ .

Therefore, considering the presence of strong specific intermolecular interactions in polar polymers, we should expect an increase in the difference between  $\delta_2^0$  and  $\delta_2^\infty$  solvents and precipitators as the intermolecular interaction strength increases.

On the basis of Hildebrand-Scatchard and Flory theory, provided that the volume does not change when mixed, the parameter  $\chi$  is related to the solubility parameter by the relation:

$$\chi = V_1/RT \times (\delta_1 - \delta_2) + \chi_5 \quad (2)$$

where  $V_1$  is the molar volume of the solvent;  $\delta_1$  and  $\delta_2$  are the solubility parameters of the solvent and the polymer, respectively;  $R$ ,  $T$  is the gas constant and absolute temperature;  $\chi_5$  is the entropic contribution to the interaction parameters.

Opening brackets and dividing variables, we have

$$2 \delta_2/RT \times \delta_1 - (\delta_2^2/RT + \chi_5/V_1) \quad (3),$$

which is a linearized form of equation (2).

As established by Gray, the contribution of the  $\chi/V$  term for good solvents (having least value  $\chi$  for

particular polymer) is insignificant and for these sorbates the linearization  $\delta_1^2/RT - \chi/V_1$  relative to  $\delta_1$  is not very different from a parabola.

Accordingly, the polymer solubility parameter  $\delta_i^\infty$  can be found from the slope of the linear dependence  $\delta_1^2/RT - \chi/V_1$  relative to a number of sorbates. The values in the left-hand side of the equation (3) can be found from the condition that samples in the vapor state behave like an ideal gas at infinite dilution.

Then,

$$\delta_1 = [(\Delta H_v - RT)/V_1]^{0.5}$$

Here the values of the molar volume of the solvent  $V_1$  and the heat of evaporation  $\Delta H_v$  are easily determined or are available in the literature [22-23].

The Flory-Huggins interaction parameter is calculated using the equations proposed by Patterson and his co-workers

$$\begin{aligned} \ln \Omega^\infty &= \ln \times 273,2 \\ &\times R/P_1^0 \times V_g^0 \times M_1 - P_1^0/RT \times (B_{ii} - V_1) \\ \chi_{12}^\infty &= \ln \Omega^\infty - \ln(V_1/V_2) - 1 + M_1 + v_1/M_2 + v_2 \end{aligned} \quad (4)$$

where  $M_1$ ,  $P_1^0$ ,  $V_1$ ,  $v_1$  is the molecular weight, saturated vapor pressure, molar and specific volumes of the solvent at temperature  $T$ , respectively;  $B_{ii}$  is the second virial coefficient;  $M_2$ ,  $v_2$  is the molar weight of the segment and the specific volume of the polymer at  $T$ ;  $V_g^0$  is the reduced to 273 K characteristic retention volume obtained in the usual way.

In return the values of  $\chi$  in the case of titration with two different precipitants, one of which has a lower value  $\delta_1(\chi_{CL})$  and the other – a higher value of  $\delta_1(\chi_{Ch})$  will be

$$\chi_{CL} = V_{mL}(\delta_2 - \delta_{mL})_{Ch}^2/RT \quad (5)$$

$$\chi_{Ch} = V_{mh}(\delta_{mh} - \delta_2)_{Ch}/RT + (\chi_s)_{Ch} \quad (6)$$

Here the indices mL and mh are assigned to the mixture of solvent and precipitant at the turbidity point. Equating both expressions (5) and (6) to each other, taking  $(\chi_s)_{CL} = (\chi_s)_{Ch}$  for a low concentration of the polymer in the solution and solving for  $\delta_2^0$ , we have

$$\delta_2^0 = \sqrt{V_{mL} \times \delta_{mL}} + \sqrt{V_{mh} \times \delta_{mh}} / \sqrt{V_{mL}} + \sqrt{V_{mh}}$$

where

$$\begin{aligned} V_m &= V_1 \times V_2 / \Phi_1 V_3 + \Phi_3 V_1 \\ \delta_m &= \Phi_1 \delta_1 + \Phi_3 \delta_3. \end{aligned}$$

Here  $\Phi_1$  and  $\Phi_3$  are the volume fractions of the solvent and precipitant in the solvent;  $\delta_1$  and  $\delta_3$  are the solubility parameters of the solvent and precipitant;  $V_1 \times V_3$  - molar volumes of the solvent and precipitant.

Thereby, the values  $\delta_2^0$  и  $\delta_2^\infty$  can be determined from the experiment and, using the extrapolation

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method of reducing to the same temperature, we can compare them.

We have investigated industrial polymer samples, which were subjected to additional purification by reprecipitation of the wt% solution in an appropriate solvent in the precipitant - standard, with a solvent-precipitant relationship of 1:10.

As sorbates, solvents, and precipitators organic liquids of various chemical structures were used, the qualification was C.P.

Studies using the IGC method were performed on a Tsvet-100 gas chromatograph with a flame ionization detector. Nitrogen was used as carrier gas. A solid carrier was a silanized carrier Chromaton N-

AW-DMCS with a particle diameter of 0,20–0,25 mm.

The nozzle was prepared by evaporation method. The solvents were: in the case of EPR – carbon tetrachloride, in the case of chlorocarboxylated LDPE (CCPE), chlorinated LDPE (CPE), PVC and PU – tetrahydrofuran. The percentage of stationary phase in the nozzle was determined by sequential weighing after 1 week of polymer extraction in a Soxhlet extractor. We used stainless steel columns with a length of 1,0 m, which were filled with nozzles containing polymers 10÷12 wt%.

Characteristics of the columns are presented in Table 6.

**Table 6. Characteristics of the columns**

Polymer	Nozzle weight in the column, g	Polymer content in the nozzle, %	Polymer mass in the column, g
CCPE	5,750	10,0	0,575
CPE	4,520	10,1	0,558
PVC	5,750	10,3	0,592
PU	6,300	10,0	0,630
EPR	4,802	10,7	0,514

The experiments were carried out at 353, 373, 393 K, which is higher than the glass transition temperature of all polymers. The sorbate sample volume was 0,02–0,5 µl. The value of the retention time ( $\delta$  interaction) was determined by gaseous methane.

Equilibrium values of retention volumes were obtained by extrapolation to zero flow rate of the gas-carrier.

For the solubility parameter of polymers, solutions with a concentration of 0,05 g/dl were prepared by the TT method. A precipitant was slowly added to the 15 ml polymer solution while stirring.

The change in the optical density of the solution was recorded on a photoelectric colorimeter FEC-M, after which the precipitator concentration corresponding to the beginning of the precipitation polymerization (turbidity point) was determined by extrapolation to zero optical density. For the titration of polymer solutions at 298 K, two different precipitants were used – one with a higher solubility parameter and the other with a lower solubility parameter.

Predictably, polar and non-polar chlorine derivatives of hydrocarbons turned out to be good solvents for CPE and CCPE.

Polar chlorinated hydrocarbon derivatives and ketones turned out to be good solvents for PU, and non-polar compounds for EPR. Notably, for all the polymers studied, tetrahydrofuran and chloroform proved to be good solvents at temperatures of 353 - 393 K. It is known [22-23] that halogen atoms (or oxygen) activate a hydrogen atom and it becomes capable of forming hydrogen bonds, which are poorly realized between homogeneous molecules, what makes such compounds universal solvents of polymers. The small size of the molecules, which facilitates diffusion into the mass of the polymer is favorable for this.

After processing, the obtained values of  $\delta_1^2/RT - \chi/V_1$  and  $\delta_1$  for different classes of sorbates (saturated hydrocarbons, chlorine-containing hydrocarbons, ketones, alcohols, etc.) were smoothed over the aggregate data set of the straight line  $y = A + BX$ , after which were calculated  $\delta_2^\infty$  and the mean square error  $\sigma^2$ . The results are summarized in Table 7.

**Table 7. The solubility parameters of polymers  $\delta_2^0$  and  $\delta_2^\infty$**

Polymer	$\delta_2^0$			$\delta_2^\infty$ Calculation 298 K	Experim. 298 K
	393 K	373 K	353 K		
CCPE	6,75 ± 0,31	7,26 ± 0,49	7,75 ± 0,33	9,16 ± 0,36	9,86 ± 0,35
CPE	7,11 ± 0,49	7,53 ± 0,56	7,93 ± 0,44	9,06 ± 0,50	9,91 ± 0,35
PU	7,06 ± 0,57	7,50 ± 0,41	8,05 ± 0,65	9,49 ± 0,55	12,07 ± 0,35
EPR	7,11 ± 0,15	7,36 ± 0,57	7,59 ± 0,11	8,25 ± 0,28	8,55 ± 0,35

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PVC	7,11±0,51	7,52±0,56	7,91±0,98	9,14±0,42	9,89±0,35
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The contribution of  $\chi_{12}^{\infty}/V$  in  $\delta/RT - \chi/V_1$  is different for a number of sorbates used, the value of which also varies with temperature.

Therefore, by the criterion of the contribution  $\chi/V_1$  we selected for CCPE - 7 sorbates, PU - 7 sorbates, CPE - 6 sorbates and EPR - 7 sorbates, which were used to calculate  $\delta_2^{\infty}$ .

As can be seen, all  $\delta_2^{\infty}$  values are a decreasing function of temperature, which allows extrapolating the obtained results to 469 K with sufficient confidence [11-16].

The obtained value  $\delta_2^{\infty} = 8,25 \pm 0,28$  for the EPR was in fairly good agreement with  $\delta_2^{\infty} = 7,70 \pm 0,11$  obtained by the IGC method considering the influence of the nature and composition of the polymer on its solubility parameter.

It should be noted that the measurement error increases with an increase in the number of functional

groups in the macromolecule, reaching a maximum value for PU.

It is demonstrated that in all cases the  $\delta_2^0$  values obtained from the titration data in aliphatic solvents are more widely scattered and consistently lower than the values obtained from the titration data in aromatic solvents. Hildebrand showed that good agreement with experiment can also be obtained for hydrocarbons if we assume that the values of their solubility parameters are 0,6 higher than those calculated from the evaporation energy. Nevertheless, an amendment to  $\delta_1$  of about 0,3 was practically required. This creates uncertainties in the value of  $\delta_2^0$  for aliphatic solvents leading however to an error in determining  $\delta_2^0$  not more than  $\pm 0,35$ . This value of the error was taken for all determinations of the solubility parameters of polymers by the method of TT.

The change in  $\chi_{1(23)}^{\infty}$  with the composition for the CCPE-CPE-PVC systems is shown in Fig. 1

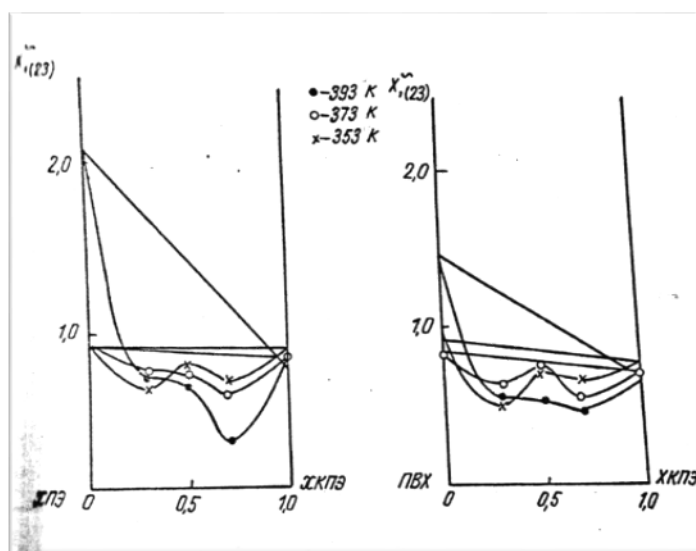


Fig. 1. The change in  $\chi_{1(23)}^{\infty}$  with the composition for the CCPE-CPE-PVC systems

There is a definite trend to increase the difference between  $\delta_2^0$  and  $\delta_2^{\infty}$  denoted as  $\Delta \delta_2^{0/\infty}$  as the number of polar groups increases.

Thus, if for a practically non-polar polymer - EPR the value  $\chi_{1(23)}^{\infty}$  fits into the experimental error  $\Delta \delta_2^{0/\infty}$ , then for CCPE and CPE, which contain highly polar chloromethylene groups, the halogen of which is able to activate a hydrogen atom to form a hydrogen bond, the solubility parameters differ by an amount significantly higher than the instrumental error and  $\Delta \delta_2^{0/\infty} = 0,7 - 0,8$ . In the event of a highly polar PU polymer having a large amount of hydrogen bonds like NH...O, the difference in solubility parameters reaches a very large value  $\Delta \delta_2^{0/\infty} = 2,58$  (for example: in the form of a dimer, acetic acid has  $\delta_1 =$

9,19, while in the form of a monomer,  $\delta_1 = 13,01$ ). The calculations are presented in Table 8.

Consequently, an experimental comparison of the values of solubility parameters of polymers, obtained by two methods IGC and TT, characterized by an extremely opposite state of the polymer in relation to the solvent, showed a significant difference in solubility parameters for polymers with strong specific interactions between macromolecules, which requires attention when using the solubility parameter theory to predict the compatibility of polymer pairs to the method by which the used value is obtained. It is apparent that for crystallizing polymers there should also be a difference in solubility parameters.

Thus, having determined two values of the solubility parameter by the TT and IGC method, it can

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be said that to predict the solubility parameter of such polymers as CCPE, CPE, PU, EPR and PVC, both of these values should be used [8-14].

**Table 8. Calculation of solubility parameters of polymers with each other at different temperatures**

Substance	393 K				473 K				353 K			
	CCPE	CPE	PU	EPR	CCPE	CPE	PU	EPR	CCPE	CPE	PU	EPR
Methanol	2,083	2,294	1,829	2,780	2,634	2,52	1,951	2,857	3,097	2,921	1,881	3,232
Etanol	2,057	2,225	2,038	2,291	2,272	2,311	1,462	2,333	2,892	2,644	1,734	2,712
Pentane	0,887	1,702	1,950	0,752	1,318	1,460	0,707	0,730	1,197	1,725	1,369	0,825
DEE	0,651	2,349	1,081	0,617	0,895	1,217	1,207	0,638	0,977	1,261	0,933	0,610
CP	0,746	2,112	0,809	0,526	0,819	0,892	0,543	0,452	0,883	0,883	0,436	0,530
Acetone	1,321	0,250	1,155	1,778	1,509	1,261	1,093	1,274	1,501	1,342	1,046	1,276
Hexane	0,566	1,649	1,713	0,809	1,331	1,237	1,539	0,812	1,298	1,761	1,463	0,837
EDC	0,947	1,114	0,917	0,553	0,987	1,160	0,795	0,262	1,038	1,137	0,792	0,457
CCl <sub>4</sub>	0,867	1,094	1,472	0,729	1,069	1,118	1,299	0,740	1,245	1,166	1,165	0,741
THF	0,647	0,923	0,949	0,543	0,678	0,754	0,829	0,522	0,756	0,725	0,709	0,362

With a view to examine the processing conditions of the compositions based on the studied polymers, work was done to determine the influence of the mixing temperature on the physicomechanical properties of the compositions: PVC+CCPE, TPU+PVC, BR+PVC+CCPE, TPU+PVC+CCPE+PPC.

The data obtained are shown in Tables 9, 10 and 11.

Concerning question of reducing or raising the temperature, in the first case, along with a decrease in temperature, which is considered to be a desirable element in terms of processing, there is also a decrease in physical-mechanical parameters, moreover, the test film has an unattractive appearance, turbidity is observed and there is an attachment of unmelted polymer particles. As the temperature increases, processes of destruction develop, a reddening of the

film is observed, which is explained by the formation of polyene segments in the PVC macromolecule.

### 3. Results and Discussion

Thus, the processing interval for PVC modified by chlorocarboxylate polyethylene should be considered as the temperature range between 416-423 K.

Reducing the concentration of the modifier leads to the loss of a number of valuable properties of modified PVC. The decrease in elasticity is observed and the incombustibility is lost. A preliminary assessment of the PVC film prototypes on resistance to aggressive effects (sulfuric acid, hydrochloric acid), as well as a number of solvents indicates the favorable impact of the introduction of CCPE+PVC.

**Table 9. Physical-mechanical properties of the developed composition based on PVC**

Composition	Onset temperature, K	Breaking strength, MPa	Relative elongation, %	Residual elongation, %	Tear resistance, MPa
Original PVC	431	16,7	10,0	4,0	4,3
PVC+CCPE	463	18,7	20,0	12	5,9

**Table 10. Physical-mechanical properties of composition based on PU**

Item No.	Composition	Weight fraction	Breaking strength, MPa	Relative elongation, %
1.	PU	87	18	230
	PVC	10	-	-
	PPC	3	-	-
2.	PU	93	20	280

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	PVC	5	-	-
	PPC	2	-	-
3.	PU	100	17	150

**Table 11. Physical-mechanical characteristics of the developed compositions based on polyurethane (PU)**

Parameter name	System, the ratio of components, weight fraction		
	PU+PVC+ CCPE 80:10:10	PU+PVC+ CCPE 70:10:20	PU+PVC+ CCPE 90:6:4
Tensile strength, MPa (kgf/cm <sup>2</sup> )	42	38	36
Relative elongation, %	90	100	120
Combustibility	burns	burns	fades away
Breaking temperature, K	523	533	543

#### 4. Conclusions

Thus, from the conducted study of the compatibility of polymers in various systems of thermodynamic, chemical and other features we can point to the conclusion:

a) compositions based on TPU and PVC are used for the manufacture of molded tires, centralizers on

the casing strings, pneumatic rings for pneumatic radiators, etc.;

b) compositions based on BR+PE+PVC+EPR+CCPE are recommended for production a nuclear (magnetic) logging probe, a tiering surface for grain cleaning machines, elevator buckets.

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Section 31. Economic research, finance,  
innovation, risk management.

## DEVELOPMENT OF ENSURING A RESOURCE BASE OF JOINT-STOCK BANKS BASED ON INNOVATIONS

**Abstract:** The article discusses the development of the provision of resource base of joint-stock banks on the basis of innovation in Uzbekistan. The author has done a statistical analysis of the structure of commercial banks in Uzbekistan, and identified the main indicators of the credit operation. Based on the econometric analysis, the main factors affecting the efficiency of lending and small business development are identified.

**Key words:** innovation, credit, joint-stock banks, small business, benefits, operations, resource base.

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### Introduction

One of the main obstacles to the development of the banking system of the Republic of Uzbekistan is to improve the quality of banking services, expand the range of services and bring them to the level of developed banks.

The head of our state said in particular that it is necessary to pay special attention to the development of modern banking services and popularization of banking services. The Strategic Action Strategy for the five main priorities of Uzbekistan's development in 2017-2021, adopted by the Presidential Decree of 7 February 2017, intensification of banks' capitalization and increasing the stability of their deposit base, strengthening their financial stability and credibility, promising investment in projects and small businesses and entrepreneurship". [1]

A number of measures have been undertaken to accomplish this task. As of January 1, 2018, the number of users of Remote Control Systems of the Bank exceeded 2 042 111. Thus, the number of users of the "Internet Banking" and "Bank-Client" software systems is 135 629, and their number increased by 1.9 times compared to the beginning of 2016. [2] Nevertheless, we can see that the use of banking services and its popularity are somewhat weak in our country as compared to some developed countries, and the mechanism for implementing services is not sufficiently improved. The Resolution of the President of the Republic of Uzbekistan "On Additional

Measures to Increase Public Officership of Banking Services" No. PP-3620 of 23 November 2018 also emphasized this fact. The Resolution states that the current problem in the banking system is that the retail banking services market does not have a low level of development and there are no modern approaches to establishing partnerships with clients. The decree sets out the best international practices of banking, as well as the introduction of new types of banking services and products.

Indeed, the development of the services market in commercial banks not only allows the distribution of capital to the population, but also informing the population, accelerating payments, and many other conveniences and opportunities. In this regard, the experience of foreign countries in the field of retail banking services and the introduction of positive experience of this experience in the banking system of our country is one of the urgent issues of today.

### Analysis and results

Dynamics and current state of the assets of commercial banks of the Republic of Uzbekistan Development of scientific recommendations and practical recommendations aimed at optimizing the composition of assets of commercial banks of the Republic of Uzbekistan, formation of scientific conclusions requires the assessment of the actual composition of assets in terms of liquidity, profitability and risk. we will evaluate. [3]

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**Table 1. Structure of assets of commercial banks of the Republic of Uzbekistan**

Actives	Years				
	2009	2010	2011	2012	2013
Cash and other cash transactions	2,97	2,38	2,98	2,99	2,42
Funds in the Central Bank of the Republic of Uzbekistan	21,11	20,87	15,74	16,69	14,42
Funds from other banks	13,2	13,82	17,31	17,99	16,31
Securities are in pure condition	0,42	0,39	0,43	0,1	0,14
Investments	1,68	3,04	2,71	2,44	2,49
Securities purchased on a re-sale basis	0,08	0,04	0,03	0,02	0
Loans and lease transactions are in good condition	51,68	48,43	50,25	50,28	56,22
Responsibilities of customers on financial instruments	0,9	2,16	2,31	1,55	1,11
Basic tools are pure	3,33	3,22	3,27	3,28	3,07
Funds on calculated accounts	0,65	0,65	0,61	0,62	0,59
Others	3,9	5,0	4,36	4,04	3,23

Source: The author estimates the author's data on the Central Bank of the Republic of Uzbekistan.

Table 1 shows that in the period 2009-2013 the share of assets of commercial banks of the Republic occupies the first place. This is explained by the fact that lending is the main type of activity for banks. As noted in the structure of assets of commercial banks of the Republic of Uzbekistan, the share of loan and leasing operations was 48.43% in 2010 and 50.25% in 2011. In 2012 amounted to 50.28% and 56.22% in 2013. The volume of these operations increased by 4.54% in 2013 compared to 2009. Commercial banks' assets are subsequently repaid in the Central Bank and other commercial banks. In 2009, the funds of the Central Bank of the Republic of Uzbekistan amounted to 21.11% of total assets, while in 2013 it decreased to 14.42% of total assets. And in 2012 it was 16.69%. In other banks, funds in contrast to total assets in 2009 were 13.20%, while their share in 2013 increased to 16.31%. And in 2012 it was 17.99%. Following the lending operations in the structure of assets of commercial banks, the main reasons for borrowing funds in the Central Bank of the Republic of

Uzbekistan and other commercial banks are the availability of requirements for commercial banks to reserve reserves in the Central Bank of the Republic of Uzbekistan and the development of interbank market in Uzbekistan. Stable position of the banks of the country is the confidence in the banking system, in particular, on the volume of deposits of the population and business entities in commercial banks has increased by 30.2% compared with the beginning of 2013, As of January 1, 26.1 trln. soum. Also, within the framework of the measures to create a long-term resource base in the banks, the issue of issuance of bank securities, which is one of the financial tools for attraction of free funds to the banks, was also accelerated. As of January 1, 2014, the circulation was made by banks, Savings and savings certificates of commercial banks placed among businesses amounted to 592 billion soums. The long-term bonds of commercial banks, placed among investors, amounted to \$ 330 billion. soums.

**Table 2. Main Indicators of Credit Operations of the Banking Sector (in%)**

Indicators	Years				
	2009	2010	2011	2012	2013
Loan portfolio-total	100,0	100,0	100,0	100,0	100,0
Loans to nonbank financial institutions and enterprises	83,89	82,88	87,97	82,03	80,03
Loans to other banks	0,02	0,01	0	0	0
Loans to government institutions	0,001	0	0	0	0
Loans to individuals	16,08	17,11	17,03	17,97	19,96

As it is seen from the table data, loans to non-financial organizations and enterprises in the loan portfolio have a tendency to decline. In 2009, the share of loans extended to non-financial organizations and

enterprises in the loan portfolio made up 83.89%, which is 80.03% in 2013, which declined by 3.86%. One of the main reasons for this is the growth in the number of loans issued by individuals to commercial

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banks for many years. More precisely, this indicator indicates that today the demand for loans by individuals, such as consumer loans, mortgages and others, is rising. In the structure of credit portfolio of commercial banks, the share of loans to state-owned and other banks is almost 0%. This, in turn, pays great attention to this area and emphasizes that the loans

given to this sector are more reliable than other sectors. At the same time, the smaller size of these indicators means that today the development of the interbank resources market is one of the pressing issues.

**Table 2. Securities of commercial banks.**

	2009		2010		2011		2012		2013	
	billion soums	%	billion soums	%	billion soums	%	billion soums	%	billion soums	%
Total investments	226,84	100	484,52	100	590,8	100	661,9	100	858,9	100
of which:										
trading portfolio	46,76	20,61	55,52	11,46	82,9	14,04	25,5	3,85	47,2	5,5
investment portfolio	180,08	79,39	428,99	88,54	507,9	85,96	636,5	96,15	811,6	94,50

During 2009-2013, there was a structural shift in the share of commercial banks' securities. In 2013, the investment portfolio of commercial banks amounted to 94.50% of the total portfolio. The reason for this change was the fact that on the basis of the report on the results of the year 20 rating agency "Ahbor-Reyting" was put on the market. and the active participation of commercial banks in the establishment of new enterprises and organizations in

different sectors of the economy. In general, the share of commercial banks in the securities market was at a slow pace, and amounted to 858.9 billion sums in 2013. As compared to 2009, this indicator increased almost 4 times. It is important to study the role of credit investments in GDP in assessing the role of commercial banks in the activities of commercial banks. [4,5]

**Table 4. Dynamics of commercial banks' credit investments**

Indicators	01.01.2010	01.01.2011	01.01.2012	01.01.2013	01.01.2014	Change in January 1, 2014 compared to January 1, 2009
GDP (trillion soums)	48,9	61,8	77,8	96,6	119,0	70,1
Loan Deposits to GDP (in%)	17,8	18,9	20,1	21,3	22,3	4,5

The table data shows that during the period of 2009-2013 there was an increase in the share of credit investments and their share in GDP. This, of course, is a positive phenomenon, indicating a high share of loans in the development of our economy and their contribution to the development of the economy. At the same time, in order to further improve the practice of lending to commercial banks, we consider it appropriate to apply the following scientific recommendations and practical recommendations: Setting up the network limits on their credit policy.

Central Bank of the Republic of Uzbekistan established the author's calculations.

The level of diversification of the loan portfolio of the commercial banks of the Republic should be increased. Over 25 per cent of commercial bank loans are concentrated in a single-industry enterprise, indicating a low level of diversification of the bank's loan portfolio and increased credit risk. table data, analyzing the assets of OAITB "Silk Road" and their share of loans. [6]

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**Table 5. Indicators of assets of the OJSC Ipak Yoli Bank**

Indicators	2010 y.	2011 y.	2012 y.	2013 y.
Total assets, bln UZS	522,6	638,8	816,5	1014,5
Loan portfolio, bln UZS	185,2	273,9	333,9	423,5
The share of loans in assets, in percentages	35,4	42,9	40,9	41,7

The above table shows that the assets of the OAITB Silk Road Bank have been growing over the years. At the same time, the amount of loans has grown over the years. However, the share of bank loans in assets is slightly lower than other commercial banks. The share of loans in assets in 2010 amounted to 35.4%, which is 41.7% in 2013. The author has been identified by the Ipak Yuli Bank on the balance sheet data. [7]

One of the main indicators characterizing the quality of assets of commercial banks is the indicator of profitability of actives. One of the key factors affecting profitability of assets is the change in the share of non-profitable assets. Assessment of the Return on Assets of Commercial Banks According to the recommendations of the experts of the International Bank for Reconstruction and

Development, interest income should be at least 70% of the total gross profit of commercial banks. Experts of the bank believe that interest income of commercial banks should consist of the following elements: Interest received from deposits placed in other banks; [8] - Revenues from securities with a fixed rate; The following table shows that interest income from loans, deposits, and other funds placed in the structure of banks' revenues is high, in 2009 - 56.42%, in 2013 - 59% , Which is 76%. Revenues from commercial operations and revenues from investment in the structure of banks' revenues have the lowest rates, while revenues from investment have increased in 2011, which has increased by 1.46 percent in total revenues. In 2012, revenues from investment in 2011 decreased by 0.19 percentage points and in 2013 to 0.39 percentage points versus 2011. [9]

**Table 6. Income structure of commercial banks of the Republic of Uzbekistan**

№	Income	2009 y.	2010y.	2011y.	2012y.	2013y.
1	Interest received from placement of loans, deposits and other funds	56,42	56,87	56,17	57,46	59,76
2	Commission income	34,70	33,18	33,91	31,97	29,91
3	Income from foreign currency	4,65	4,55	3,43	3,43	4,25
4	Income from trading operations	0,02	0,0001	0,0007	0,0008	0,0016
5	Income from investment	0,48	0,91	1,46	1,27	1,07
6	Other Income	3,78	4,49	5,03	5,25	5,00
<b>TOTAL</b>		100,0	100,0	100,0	100,0	100,0

At the same time, commissions' revenues in the structure of revenues of commercial banks are also significantly higher. In 2009, commercial banks' commission revenues totaled 34.70%, while in 2013 this figure dropped 4.79%. Experts of the International Bank for Reconstruction and Development (EBRD) noted that the share of interest-earning loans in total interest revenues should be no less than 60% need to think. For this purpose, the share of commercial banks in the volume of brutto loans should not be less than 60%. Therefore, it is important to determine the reasons for the change in the share of interest income in the gross incomes, and to develop measures to prevent its sharp decline. , as well as the high level of passivity of the analytical report on the banking sector of the rating agency "Ahbor-Reyting". You may also be assessed. The reason for this is that as a rule, commercial banks, which do not have their own

resource base, use commercial banks as a source of interbank loans. The reason of this situation is that commercial banks with profitable projects attract loans from other banks and earn higher profits by lending their investment projects. The Bank has been one of the factors directly affecting profitability and liquidity of banks' assets, Today, mandatory reserve requirements are used as one of the most important instruments of monetary policy in the regulation of money supply through the impact on the credit resources of commercial banks. In particular, in 2013, based on the forecasted inflation and cash outflow indicators, in order to expand the long-term resource base in the banks, the use of diversified reserve requirements was used for commercial purposes For legal entities attracted by banks, deposits were withdrawn for 15 years and up to 1 year - for deposits up to 15 percent, for deposits with 1 year to 3 years -

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for 12 percent, for deposits with a maturity of more than 3 years - at 10.5 percent. The volume of mandatory reserves of the Central Bank amounted to 463.1 billion soums. The amount of mandatory reserve is reflected in the separate account of the commercial banks (account 10309), which is 6.0%. This means that interest rates on the deposit market have fallen. The interest rate index also dropped by 1.56 percentage points in 2013 compared to 2009. The share of interest income in income-generating assets in 2009 was 10.6 percent in 2013, down 0.72 percent to 9.88 percent. The share of interest expense on interest bearing liabilities increased by 0.85 percentage points in 2013 compared to 2009. In 2013, the share of income-generating assets in total assets increased by 8.42 percent compared to 2009. That is, in 2009 this figure was 67.8%, in 2013 - 76.22%. The table below analyzes the income-generating assets of OATB Kapitalbank. [10]

At present, the profitability of commercial banks is being used in the following areas: distributed among founders; dividends to shareholders; payments to the budget are being made; distributed among bank staff; Increasing the bank capital (capitalization); special and general reserve funds of the bank are being created.

Short-term bonds and medium-term treasury liabilities), the Central Bank's bonds are recognized. The exemption from taxation of profits of investors from government securities will increase their investment attractiveness. Cash flows of commercial banks in the Republic of Kazakhstan, in contrast to the banking practice of developed foreign countries, are an asset that directly and indirectly affects the profitability of the Bank's assets. Their direct impact on the profitability of bank assets is reflected in the fact that the cashless payments to the cashier and the expense are not paid by the customers. Reducing the amount of mandatory reserves to cashless cash in a turnover cashcourse of a bank means indirect effects of cash inflows on the bank's assets. This is because the reduction of the amount of mandatory reserves is the increase in the amount of banking resources. There are no Nostro correspondent accounts in national currencies of the country's commercial banks in the Republic of Uzbekistan. In most developed foreign countries and in many CIS member states, including deposits in profit-making assets, The Russian Federation, the Republic of Kazakhstan, the Kyrgyz Republic and Tajikistan in the Republic of Turkey, each commercial bank has two Nostro representative accounts in national currency. One of them is opened on the balance of the Central Bank of the country and is called vertical representation account. The second one is the horizontal correspondent account opened with the balance of other commercial banks in the country. [9,10]

All operations of commercial banks with other banks are carried out only through horizontal correspondent accounts. This, in turn, accelerates the payment process and helps to increase their efficiency. Commercial banks of the Republic of Uzbekistan do not have horizontal correspondent accounts, which negatively affects the effectiveness of payments through banks. Therefore, we would like to invite commercial banks to open horizontal correspondent accounts in national currency by the Central Bank. At the same time, it is necessary to strengthen control over the interbank operations by the Central Bank. Formation of the assets of commercial banks in accordance with the principle of declining liquidity varies greatly from the order of formation of existing assets in the international banking practice. In the structure of assets of commercial banks of the Republic of Uzbekistan, the second place is cash assets, third place is the main instruments, the last, the fourth and securities in the form of securities. In the banking sector of the developed foreign countries, the second one after the credits occupies the form of securities, while the share of cash assets occupies the third place in the structure of assets. The absolute majority of all commercial banks' securities are invested in government short-term bonds and medium-term treasury coming. For example, as of January 1, 2011, the total amount of investments made by banks of the Republic of Uzbekistan to securities amounted to 55.4 billion soums. The share of investments in government securities amounted to 83.1%. The main reason for this is that, first of all, the payment in the UDC is guaranteed; Secondly, banks' profits from the SDRP are not taxable. At the same time, this situation shows that our republic has not developed securities transactions with commercial banks. Short-term government short-term bonds, which are the source of non-inflationary deficit of state budget deficit, have been put into circulation since March 1996. Since then, the government's short-term bond market has grown rapidly and in the short run it has become one of the major segments of the financial market. In the initial stages of development of the DKMO market only 3-month bonds were issued, then 6-9 and 12-month bonds were issued. Rapid growth of the DGMO market. The absence of discount transactions in the banking practice of our country was estimated by the author on the basis of the statistical data of the Central Bank of Uzbekistan to increase the profitability of assets of commercial banks. Significantly adversely affected. Because discounting operations enable banks to receive significant interest income. In addition, discounting operations will increase the liquidity of banks, without damaging the profitability of assets of commercial banks. This option is generated by recalculation of the balances of commercial banks in the Central Bank. Thus, the lack of discount operations in the banking practice of the republic negatively affects the liquidity

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of commercial banks and increases the profitability of their assets. Forfeiting operations of commercial banks enable them to achieve considerable profits. [13]

The reason for this is that in the off-shift operations commercial bills are accounted for without a regressive right, so the discount rate of banks is high. 2.3. In the second part of the study, the following conclusions were drawn up in the light of the survey: - Loans occupy the first place in the structure of assets of commercial banks of the republic for the period of 2009-2013. This is due to the fact that lending is the main type of activity for banks. The share of loans and leasing operations in the structure of assets of commercial banks of the Republic of Uzbekistan is high, in 2010 it amounted to 48.43%, in 2011 it was 50.25%, 28 percent and 56.22 percent in 2013. The volume of these transactions increased by 4.54% in 2013 compared to 2009. - Loans to non-financial organizations and enterprises in the loan portfolio had a tendency to decline. In 2009, the share of loans extended to non-financial organizations and enterprises in the loan portfolio made up 83.89%, which is 80.03% in 2013, which declined by 3.86%. One of the main reasons for this is the growth in the number of loans issued by individuals to commercial banks for many years. In particular, this indicator indicates an increase in the demand for individuals, such as consumer loans, mortgages, and other types of loans. In the period of 2009-2013, there was a tendency for credit investments and their share in GDP. This, of course, is a positive phenomenon, indicating a high share of loans in the development of our economy, and their contribution is growing from year to year. Commissions in revenues of commercial banks are also significantly higher. In 2009, the share of commercial banks' revenues in total revenues amounted to 34.70%, while in 2013 this figure dropped to 4.79%. It is one of the factors directly

affecting profitability and liquidity of assets of commercial banks. The return on assets of the bank (ROA) in 2009 was 2.6%, in 2013 it was 1.59%. However, it should be noted that the profitability of the bank's assets in 2011 increased from 1.47% in 2012 to 1.49%. The return on equity (ROE) of banks in 2009 was 15.0 percent, in 2013 - 13.73 percent. - In the structure of income-generating assets of OJSCB Kapitalbank there is a high share of loans, in comparison with 2009, 232.8 billion soums. This indicates that today the practice of credit operations in the structure of interest-earnings of commercial banks is important. In other words, credit operations are the main sources of income for commercial banks. Credit and leasing operations have a high share in the structure of interest-earnings in the OATBlooksbank, its share at the beginning of this year is 75.40%. This, in turn, illustrates the role of credit operations in the formation of commercial banks' revenues. [11]

As a result of large-scale reforms in financial support of entrepreneurship, the volume of loans provided by commercial banks and the volume of provided microfinance services grow from year to year. In particular, the volume of credit resources allocated to small business and private entrepreneurship from all sources in 2017 amounted to 19564.0 billion soums. At the same time, the volume of microcredits increased by 3.6 times and amounted to 4015.0 billion soums. soums (Table 1). [12] In particular, in 2017, 490.3 billion soums will be allocated for the development of family entrepreneurship and craftsmanship. UZS 2782.2 billion for the development of women's entrepreneurship. UZS 3381.4 bn., for foodstuffs production. The enterprises producing non-food products accounted for UZS 3915.8 bn. UZS 360.2 billion to finance business projects of graduates of professional colleges. The bank has allocated loans worth a total of over 2 billion soums.[14]

**Table 7. Volume of Loans of Commercial Banks to Small Business and Private Entrepreneurship, UZS bn. soums**

Years	CME production and services (Y1), bn. soums	Loans to commercial banks Investments, bn. soums	By commercial banks small business loans, bn. soums (X1)	By commercial banks small businesses microfinance services (X2), billion soums
2010 y.	32753,86	11539,3	2700,0	485,2
2011 y.	42532,67	15651,5	4000,0	752,3
2012 y.	52881,82	20392,0	5346,0	1023,0
2013 y.	65990,38	26530,0	6982,0	1366,0
2014 y.	81382,29	34809,0	9158,0	1907,0
2015 y.	97415,31	42685,0	12112,0	2526,0
2016 y.	108996,4	53400,0	15870,1	3326,0
2017 y.	139469,7	110600,0	19564,0	4015,0

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According to the Table 7, regression equations and correlation coefficients can be used to analyze the development of small business with the volume of lending-based financing to small businesses and private entrepreneurship entities. It is desirable to use the "excel" program. At the Republican level, the volume of goods and services (Y) created by the

CBRT sector in 2010-2017 will be calculated by the commercial banks for the impact of small business loans and microfinance services. The results of the following regression analysis are based on the processing of the tablet data by computer using the Microsoft Excel program (Table 8).

**Table 8. The result of regression analysis**

<b>Regression statistics</b>	
Multitude R	0,99281
R-square	0,985673
Normalized R-square	0,979942
Default error	5136,445
Tracking	8

<b>Dispersion analysis</b>					
	df	SS	MS	F – account	F – table
Regression	2	9075247770	4537623885	171,9	2,45
Remaining	5	131915347,5	26383069,5		
Total	7	9207163117			

<b>Regression statistics results</b>				
Variables	Coefficients	Default error	t- statistics	p- value
Y- variable	20477,7	5724,7	3,6	0,0
X1	6,1	10,8	0,6	0,04
X2	-0,4	50,7	0,0	1,0

Based on the results of Regression statistics, Y is the expression of the regression equation, which correlates the correlation between the factors (X1, X2) that affects the factor (s) using the least squares method:

$$Y = 6,1X_1 - 0,4 X_2 + 20477,7$$

$$\text{Calculated } R^2 = 0,985;$$

$$F(\text{account}) = 171,9 > F(\text{жадавал}) = 2,45;$$

The result of the analysis is that  $p = 0.99$ , taken in X2, should be less than 0.05. Therefore, the model adopted according to this variable is not intended. Thus, by deducting the variable X2 we find the effects of the variables separately:

$$Y = 6,03X_1 + 20513,4$$

$$R^2 = 0,985; F(\chi\text{уcoб}) = 412,7 > F(\text{table}) = 9,24;$$

This model testifies to the strong linkage between the size of bank loans and the development

of small businesses. The results of the model will allow to increase the volume of production to 6 units in the amount of UZS 1 billion allocated to small businesses. This situation should set targeted strategies aimed at further expanding the practice of lending to small businesses and private entrepreneurship.

Also, the focus on the availability of high-security mortgage facilities in the crediting of small businesses contributes to the further increase in the volume of crediting of small businesses. This is due to the fact that the highly liquid mortgaged facilities that banks require are not available in most of the small businesses.

### Conclusion

One of the problems posed by the problem of lending to investment projects of small businesses is the high level of investment credit attracted through foreign credit lines.

Lack of resources for small business lending in banks has a negative impact on the stability of cash



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flows of all undertakings, including small businesses. This is a low level of financial support of the economy, which does not allow solving problems of payments between business entities.

At the same time, there is a sharp contrast in the structure of loans issued by commercial banks to the sector of small businesses, which shows the growing rates of lending rates in developing sectors.

Taking into account the above, it is necessary to carry out the following work to increase the role of banks in the development of small business and private entrepreneurship:

- Taking into account the shortage of highly liquid mortgage facilities in small businesses, it is important to pay attention to crediting based on leasing, returnable lease and property liability insurance;

- increasing the share of the state in the authorized capital of banks and directing these resources to preferential crediting of small businesses

in order to increase the volume of low interest loans issued to small businesses by commercial banks;

- Optimization of mechanisms of free money resources of large enterprises and organizations taking into account shortage of resources on short-term crediting of commercial banks by commercial banks;

- placement of free funds of the pension fund and state-owned insurance companies at low interest rates on commercial banks with the condition that they are channeled to crediting of small businesses;

- introduction of the calendar sequence of payments for these subjects to reduce the level of credit risk arising from overdraft and contocurrent crediting of small businesses.

Based on the above, the practical implementation of our proposal to increase the efficiency of crediting by small businesses in commercial banks will significantly increase the volume of their lending.

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## SIMULATION AND ANALYSIS OF HIGH-PRECISION ITERATIVE CODE WITH INCREASED EFFICIENCY

**Abstract:** In the article, based on computer simulation environment, a model of noise-resistant coding system was developed, which works on the basis of the algorithm of parallel-cascade high-precision coding and iterative decoding. A comparative analysis of the energy gain high-precision iterative algorithm with Gray coding algorithm is made. The results of modeling in Simulink error-correcting code and an iterative high-precision Gray code in digital transmission of information.

**Key words:** digital television, decoding, decoder, iteration, model.

**Language:** English

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### I. INTRODUCTION

With a large-scale transition to digital television, ensuring high noise immunity of signals presented in digital form is an urgent task. When transmitting digital television signals on a point-to-point basis,

there is always a possibility that the received signals contain errors.

In digital television (DTV) image quality is estimated using the probabilistic-energy characteristics (PEC). To date, in the field of digital communication, the development and implementation

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of new effective methods and algorithms that increase the noise immunity of digital signals are widely implemented [1].

But, basic principles that determine the properties and design of the optimal code have not yet been improved, allowing the system as a whole to achieve maximum noise immunity.

For example, in most parity-checking codes, you only need to add one character to the information sequence to detect the error, and in order for this code to correct a single error, for example, nine more information symbols will need to add seven more verification ones.

Thus, the redundancy of this code turns out to be very large, and the correcting ability is comparatively low.

Therefore, the scientific works and efforts of specialists in the field of noise-immune encoding have always been aimed at finding such codes and methods of encoding and decoding, which, with minimal redundancy, would provide the maximum correcting capability.

## II. MATERIALS AND METHODS

### A. NC model by the Gray method using MPSK modulation

In DTV, a noise-resistant coding (NC) system based on Gray code (Gray coding) is often used.

This method is used in multi-level modulation schemes to minimize the bit error rate by ordering the modulation symbols so that the binary signals of the adjacent symbols differ only by one bit.

Figure 1 shows the Gray coding model using MPSK (multiple phase shift keying, or  $M$ -ary phase shift keying, here  $M$  is the modulation level) modulation developed in the Matlab 7.0 Simulink environment.

The novelty of the work is that computer modeling and research of PC processes is of great importance in the information and communication field. The simulation results allow analysis and investigation of many complex processes in the paths and channels with noise.

The model includes the following blocks:

- a block of a random number generator that produces a sequence of integers (serves as a source of digital signals);

- converter block Integer to Bit, converts each integer number into the corresponding binary signals;

- AWGN (additive white Gaussian noise) channel block, adds white Gaussian noise to the modulated data;

- MPSK demodulator, demodulates the main band and blocks the corrupted data.

- converter block Bit to Integer, this unit converts each binary representation of signals into a corresponding integer;

- Error Rate Calculation 1, compares the demodulated integer data with the original data, which gives statistics of symbolic errors. The output of the error rate calculation unit is a three-element vector containing the estimated error rate, the number of observed errors, and the amount of data processed.

- Error Rate Calculation 2, compares the demodulated binary data with the original binary data, which gives the statistics of the error bits.

### B. The error probability (BER-Bit Error Rate) for the Gray code

When transmitting MPSK signals, the value of the bit error probability  $P_B$  is less than or equal to the error probability for  $P_E$  symbols, as well as for the transmission of MFSK signals.

For orthogonal signaling, the selection of one of the  $(M-1)$  erroneous symbols is equally probable. When transmitting in the MPSK modulation, each signal vector is not equidistant from all the others.

Figure 2, a shows the octal solution space, where the decision areas are denoted by 8-digit symbols in the binary notation.

When the symbol (011) is transmitted and the error appears in it, the nearest neighboring characters, (010) and (100) are most likely. The probability of the transformation of the symbol (011) due to an error in the symbol (111) is relatively small.

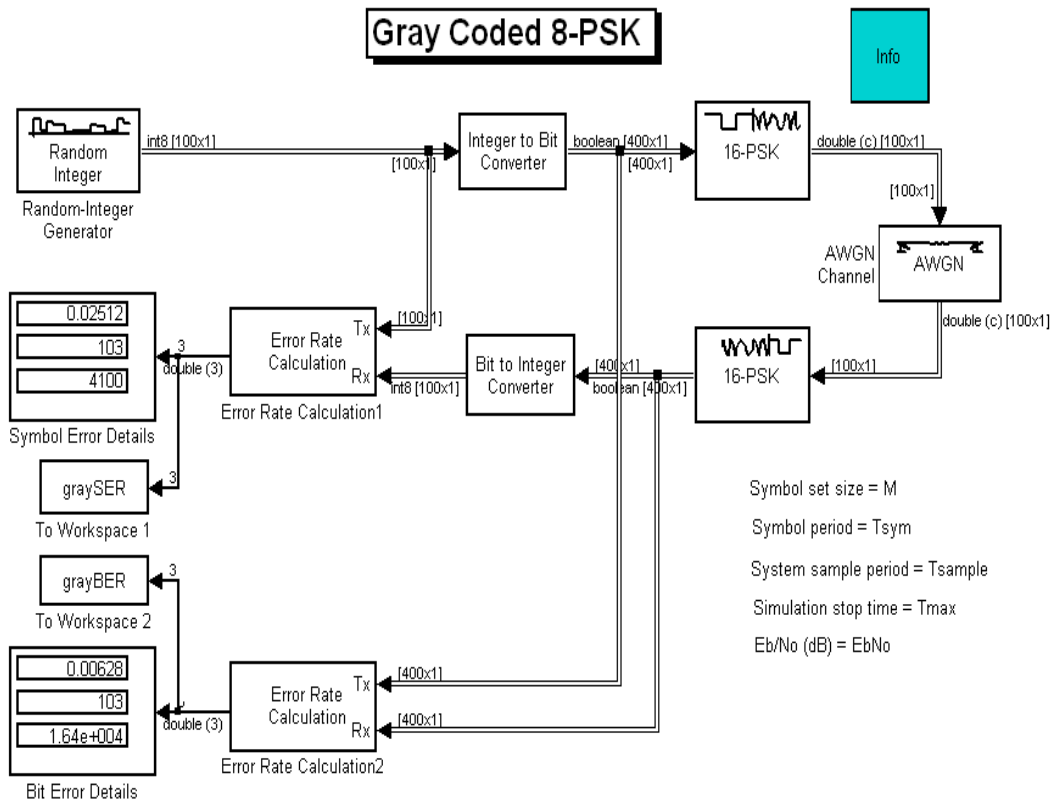


Figure 1. NC model by the Gray method using MPSK modulation

If the bits are allocated according to the symbols according to the binary sequence shown in Figure 2a, then some character errors will always produce two (or more) bit errors, even with a significant signal-to-noise ratio. For non-orthogonal schemes, such as MPSK, the code for converting binary symbols to M-

ary is often used, such that binary sequences corresponding to neighboring symbols (phase shifts) differ by a single bit position; Thus, when an error occurs in the M-ary symbol, the probability is high that only one of the k arrived bits is erroneous.

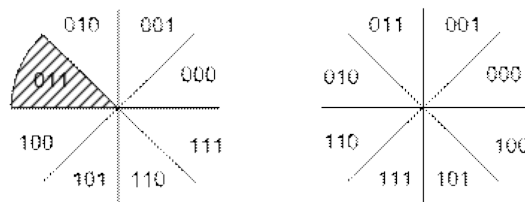


Figure 2. Areas of solution in the MPSK signaling space: a) in binary coding; b) Gray encoding.

The code providing this property is Gray code [2]; Figure 2, b for the octal scheme PSK shows the bit allocation by symbols using the Gray code. It can be seen that adjacent symbols are distinguished by a single bit. Therefore, the probability of the appearance of a multi-bit error with a given character error is significantly smaller than the non-coded distribution of bits shown in Fig. 2a.

The implementation of such a Gray code is one of the rare cases in digital communication, when a certain benefit can be obtained without the attendant shortcomings. The Gray code is just an assignment

that does not require special or additional schemes.

It can be shown [3] that if you use Gray's code, the error probability will be as follows.

$$P_B \approx \frac{P_E}{\log_2 M} \approx \frac{2Q \left[ \sqrt{\frac{2E_s}{N_0}} \sin\left(\frac{\pi}{M}\right) \right]}{\log_2 M} \quad (1)$$

here the function  $Q(x)$  is called the Gaussian error integral,  $E_s/N_0$  is the ratio of the symbol energy to the spectral noise density.

The function  $Q(x)$  is defined as follows:

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$$Q(x) = \frac{1}{\sqrt{2\pi}} \int_x^{\infty} \exp\left(-\frac{u^2}{2}\right) du. \quad (2)$$

The transmission of BPSK and QPSK signals has the same bit error probability.

Formula (1) proves that the probability of symbolic errors of these schemes is different. For BPSK modulation,  $P_E = P_B$ , and for QPSK  $P_E \approx 2P_B$ .

### C. Probability of error for high-precision iterative code (HPIC)

HPICs are formed by parallel cascading of two or more components of systematic codes. The transmitted data is mixed before encoding by each of the constituent codes using the interleavers included in the encoder. The channel can only transmit the original sequence and the test outputs of each of the encoders. As a result, the total code rate of the HPIC when using component codes at a rate of 1/2 turns out to be  $R=1/(C+1)$ , where C is the number of constituent encoders. When constructing the HPIC encoder, two identical recursive systematic convolutional (RSC) encoders are used.

The HPIC decoder is a cascade connection of two elementary decoders, two interleavers and two deinterleavers that perform the restoration of the original (before interleaving) symbol order. The decoder has a single output that the output components are soft decisions with respect to decodable bits, and the logarithm of the likelihood ratio (LLR-log-likelihood ratio) is usually used to represent soft decisions, the sign of which determines the decoded bit value (negative value corresponds to zero, positive value to one), and the module is the reliability of this value.

The logarithm of the likelihood ratio  $L(u_k)$  for the information symbol  $u_k$ , as its name implies, is defined as follows:

$$L(u_k) = \ln \left[ \frac{P(u_k = +1)}{P(u_k = -1)} \right], \quad (3)$$

where  $P(u_k = m)$  – is the probability that  $u_k = m (m = \pm 1)$ .

The operation principle of the HPIC decoder consists in performing several decoding iterations, for the first of which there is no a priori information at the input of the decoder of the first constituent code, i.e. it generates an estimate of the information bits using only the sequence received from the channel.

Further from the received estimation the so-called external information allocated, determined by an exception from an estimation of decoded symbols of the a priori information is allocated (on the first iteration the a priori information is equal to zero) and the systematic symbols received from the channel:

$$L_e(u_k) = L(u_k | \bar{y}) - L_C y_{ks} - L(u_k), \quad (4)$$

where  $L_C$  determines the reliability of the channel (for the channel with AWGN  $L_C = 2/\sigma^2$ , where  $\sigma^2$  is the noise variance).

Then, the decoder of the second code uses this external information as a priori to obtain its own information bit estimate. At the second iteration, the first decoder again processes the received sequence from the channel, but with the a priori information generated from the second decoder evaluation at the first iteration, this additional information allows the first decoder to obtain a more accurate estimate of the decoded bits then used by the second decoder as a priori.

In HPIC decoders, algorithms such as MAP (Maximum A Posteriori) [4], Log-MAP [5], Max-Log-MAP [6,7], SOVA (Soft Output Viterby Algorithm) [8] can be applied.

Knowing the complexity of implementing decoding methods for constituent codes  $N_{cocom}$ , one can estimate the complexity of decoding the whole HPIC:

$$N_{BIK} = I \cdot N_{cocom} \cdot C, \quad (5)$$

where I is the number of decoding iterations; C is the number of constituent codes.

For an analytical evaluation of the HPIC efficiency, one can use the expression for the additive bound of the bit error probability of the block code

$$P_b \leq \sum_{i=d}^N \frac{w_i}{L} P_i, \quad (6)$$

where  $N$  is the length of the code block;  $L$  is the number of block information symbols;  $d$  is the minimum code distance;  $w_i$  is the total information weight of all codewords of weight  $i$ ;  $bP_i$  is the probability of choosing an incorrect codeword, which differs from the correct one in  $i$  positions.

For a HPIC with a code rate  $R = 1/2$ , consisting of two identical encoders with a constructive length  $K$  and an interleaver of length  $L$ , the length of the code block will be  $N = 2(L + K - 1)$ .

Given that the total information weight  $w_i$  of all codewords of weight  $i$  is  $w_i = \tilde{w}_i N_i$  ( $\tilde{w}_i$  – average information weight of codewords of weight  $i$ ;  $N_i$  – total number of codewords of weight  $i$ ), expression (6) looks like this:

$$P_b \leq \sum_{i=d}^N \frac{\tilde{w}_i N_i}{L} P_i, \quad (7)$$

When calculating the boundary (7), they are often limited only by the first term, which approximates the probability of a bit error at medium and high values of the signal-to-noise ratio:

$$P_b \approx \frac{\tilde{w}_d N_d}{L} P_d. \quad (8)$$

For example, consider the efficiency of a HPIC with a code rate  $R = 1/2$  obtained from two identical

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components of RSC codes with generating polynomials  $g_0=37_8$  and  $g_1=21_8$  and a pseudo-random interleaver of length  $L=65536$  bits.

This HPIC can be designated as (37, 21, 65536). Since for (37, 21, 65536) HPIC  $d=6$ ,  $\tilde{W}_d=2$ ,  $N_d=3$

[53], the expression (7) for the channel with AWGN takes the form

$$P_b = \frac{2 \cdot 3}{65536} Q \left( \sqrt{6 \frac{E_b}{N_0}} \right). \quad (9)$$

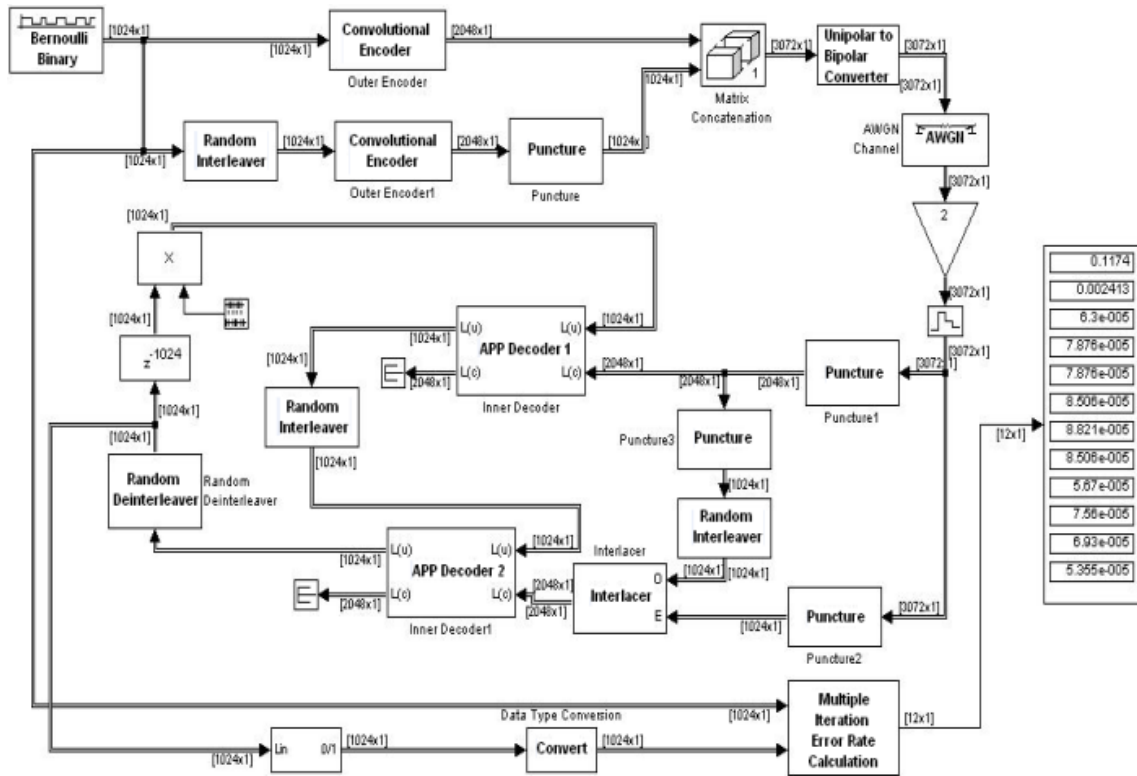


Figure 3. Simulation model of parallel-cascade high-precision coding and iterative decoding

Figure 3 shows an imitation model of parallel-cascade high-precision coding and iterative decoding. This model allows modeling of HPIC encoding and decoding processes.

The model consists of the following blocks:

- a source of digital signals (Bernoulli Binary), which generates a sequence of zeros and ones;
- convolutional encoders of recursive systematic convolutional codes (Convolutional Encoder), which encodes interleaved data, this allows reducing the number of low-weight code words that determine the efficiency of a HPIC at a high level of noise in the channel;
- high-precision iterative decoders (APP Decoder), decoding bits based on the definition of a posteriori probability (APP – a posteriori probability);
- random interleavers (Random Interleaver), mixing data before encoding;
- deinterleavers (Random Deinterleaver), carrying out the restoration of the original (before interleaving) the order of symbols;
- The interlacer (Interlacer) interleaves the binary data when it arrives at the second decoder

HPIC (APP Decoder);

- The model of the channel with the additive white Gaussian noise (AWGN Channel) changes the ratio  $E_b/N_0$ . In the settings of this block, the number of information bits per character and the duration of the symbol in seconds are indicated.

The modulation was phase shift keying with the number of positions  $M=2$  (2-PSK or 2-FM). Sequences are combined into packets of 1024 bits, after encoding, respectively, the length of the packet will be approximately 2048 bits.

### III. RESULTS AND DISCUSSION

Figure 4 shows the HPH simulation – the error probability per bit (BER) versus the signal-to-noise ratio ( $E_b/N_0$ ) using the Gray code. The input signal is an integer from 0 to  $M-1$ , where  $M$  is the modulation level or the alphabet size, produces at the output complex phase units in phase space 0 and  $2\pi(M-1)/M$ .

The efficiency of noise-immune encoding is determined by the following formula:

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$$G \text{ (дБ)} = \left( \frac{E_b}{N_0} \right)_{\text{без кодирования}} \text{ (дБ)} - \left( \frac{E_b}{N_0} \right)_{\text{с кодированием}} \text{ (дБ)} \quad (10)$$

To evaluate the efficiency of the PC, the ratio  $E_b/N_0$  of the energy per bit is compared to the noise power spectral density in the noise-immune coding

system and in the base system without noise-immune coding, and the difference in  $E_b/N_0$  values is determined for a given error probability.

This difference, measured in decibels and called EVC, can be used to compare different codes [9].

Experiments were also carried out in the case of the use of convolutional and block codes in the imitation coding model by the Gray method.

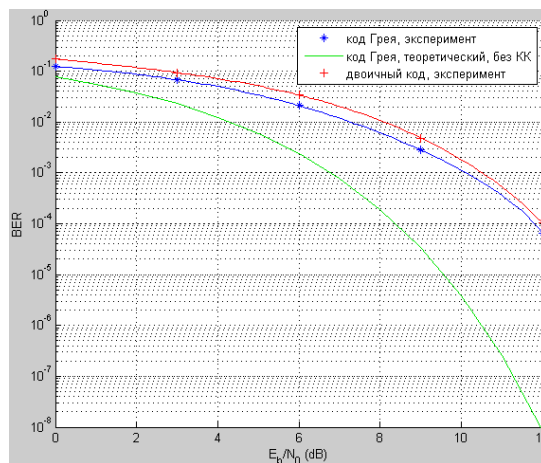


Figure 4. Dependence of the error probability on the bit on the signal-to-noise ratio of the Gray code

Figure 5 shows that the smallest  $E_b/N_0$  ratio in the entire study interval in the convolutional coding (CC) of the Gray code, decoding bits based on soft

decisions (SD) with 2-PSK, after it - convolutional code with 2-PSK, which The decoder works with a hard decision (HD).

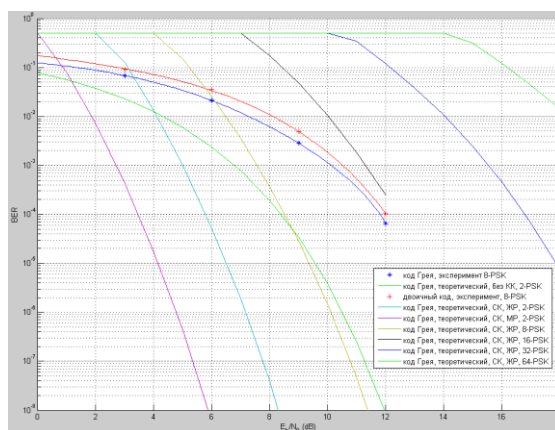


Figure 5. Characteristics of the BER for the Gray code using convolutional coding and multi-level phase shift keying, parameters of the Convolutional code (7, [171 133]).

For block coding (Fig. 6), the smallest  $E_b/N_0$  ratio in the block coding (BC) of the Gray code that the decoded bits appear on the basis of the MP with 4-PSK, thereafter the case of block coding of the Gray code from the LCR of the decoder at 2-PSK.

The results of the study. IR decoding is an iterative process, during which two ISK decoders with a soft output exchange values of estimates of external probabilities [10, 11, 12].

Usually, 8-10 iterations are enough for changes

in the estimates of decoded symbols to become insignificant, further iteration of the decoder practically does not lead to a decrease in the probability of error. One way to reduce the probability of error is to use high-precision iterative decoding (HPIDc).

For the simulation model shown in Fig. 3, the following values are selected for parallel-cascade high-precision encoding and iterative decoding codec parameters:

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1) the number of bits in the information packet is 1024; 2) type of data transmission signal and type of reception - signal with 2-PSK, coherent reception;

3) the number of iterations of the HPIC-8 decoding process;

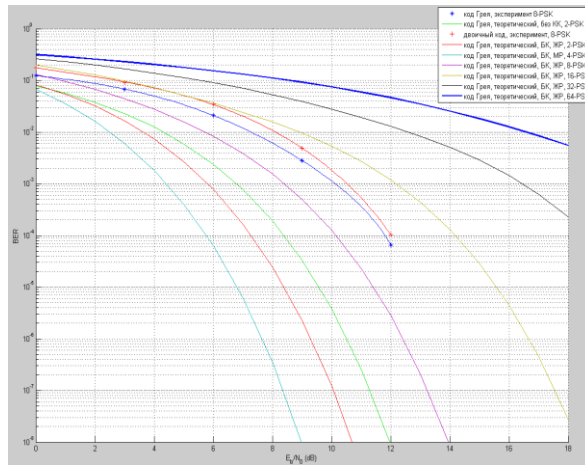


Figure 6. Characteristics of the BER for the Gray code using block coding and multilevel phase shift keying, parameters of the block code  $n = 7, k = 4, d_{min} = 5$

4) HPIC parameters: code type - parallel concatenated code with two identical compound codes; the speed of the code is 1/2;

binary perforated recursive convolutional code; code speed - 2/3; The parameters of the HPIC: (33, 31, 77777)

5) parameters of compound codes: code type -

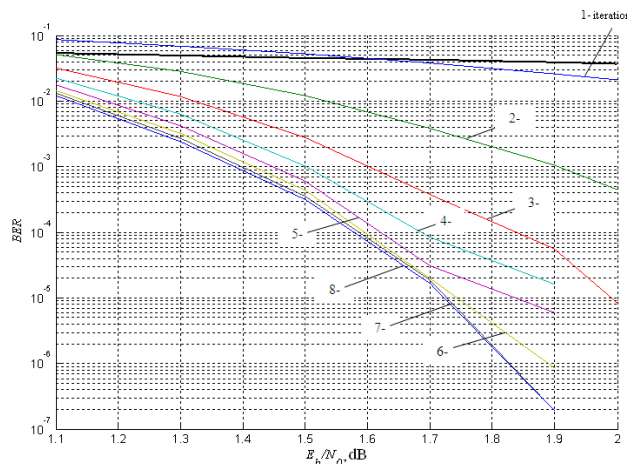


Figure 7. Characteristics of BER for HPIC using in the recursive systematic convolutional codes and 8 iterations with 2-PSK parameters  $n=7, k=4, d_{min}=5$

IC decoding is an iterative process, during which two decoders of the iterative convolutional code (ICC) with a soft output are exchanged by values of estimates of external probabilities.

Usually, 8-10 iterations are enough for changes in the estimates of decoded symbols to become insignificant, further iteration of the decoder practically does not lead to a decrease in the probability of error. One way to reduce the probability of error is to use high-precision iterative decoding (HIDc).

Figure 8a and 8b shows the simulation results, depending on the number of iterations in the bit and block transmission structures.

For the working channel used, a channel with additive white Gaussian noise and binary phase modulation is selected. Initialization of the random number generator: kst = 11100.

**Application:** in digital terrestrial and satellite TV DVB-T2/T4, DVB-S/S2 high-precision iterative decoder (HIDc).



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The length of the code block: 3008; We change the number and increase the length of the information part of the block to: 1504; Code speed: 1/2; The number of decoding iterations is increased to: 10.

S/N Ratio:  $E_s/N_0 = -1,32$  dB ( $E_b/N_0 = 1,7$  dB).

In total, 1000160 bits and 665 blocks are decoded. To decode the constituent codes, a max-log-MAP algorithm was used.

### Result:

Number of erroneously decoded bits 0.  
Probability error 0.00e-000.

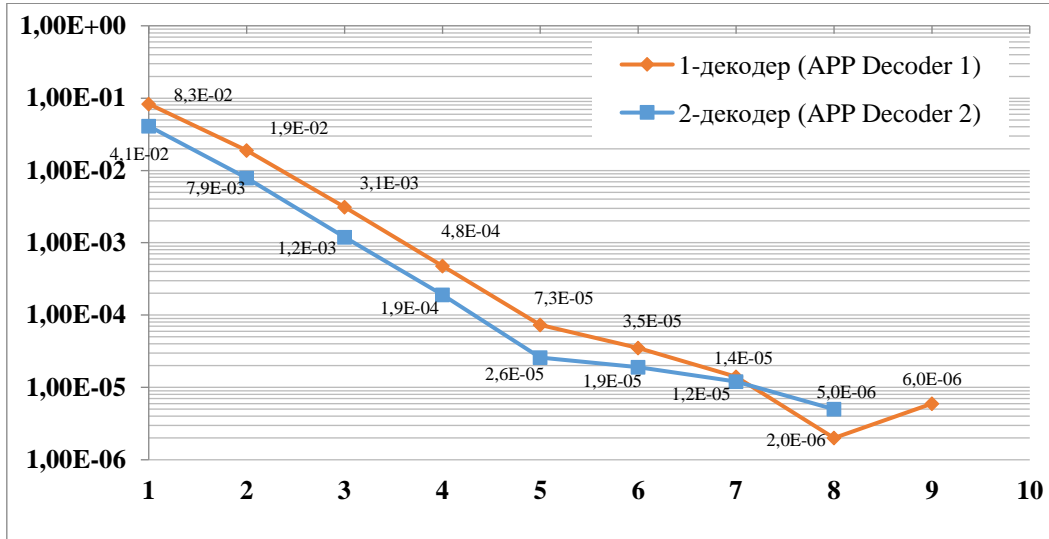


Figure 8a. The result of the error probability in bits,  $P_b$ , on the number of iterations of the high-precision iterative code with the parameter (33, 31, 11100).

Number of erroneously decoded blocks 0.  
Probability error 0.00e-000.

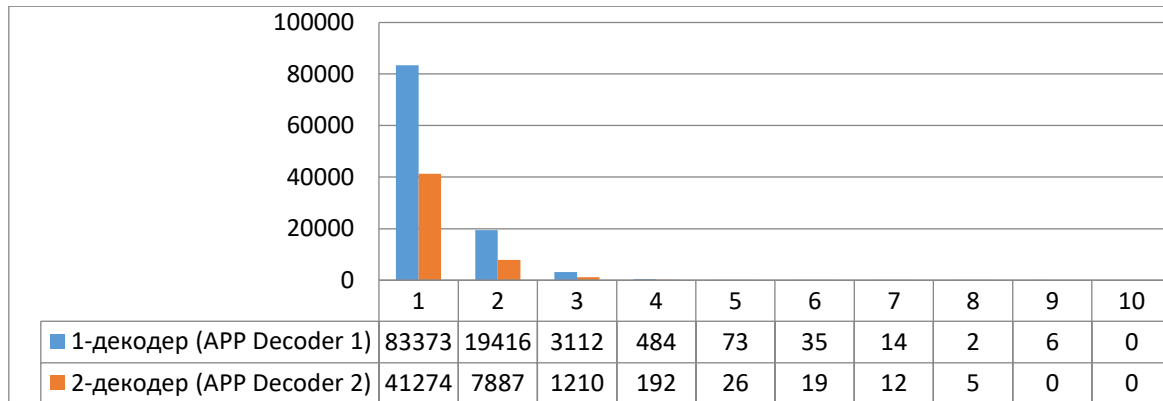


Figure 8b. The result of the dependence is the number of errors in bits  $N$ , on the number of iterations.

From the characteristic shown in Figure 4, it is seen that for a system requiring an immunity in the order of  $10^{-7}$ , approximately 13.5 dB of energy is required. In the experiment, it was found that to achieve noise immunity  $P_b=10^{-4}$  with the use of the Gray code, a signal-to-noise ratio of about 12.3 dB is required.

This value is higher than the average for the dependence of energy and noise immunity in digital

information transmission systems. In modern digital systems, to achieve this index ( $10^{-4}$ ), an average of 4.2-5.0 dB of energy is required. In this context, 12.3 dB shows an excessive consumption of useful power to obtain the error probability  $P_b=10^{-4}$ . From the simulation result of the HPIC shown in Figure 7, it is seen that to achieve noise immunity  $P_b=10^{-4}$ , for example, at the 3rd iteration, only 1,85 dB is needed, and on the 8th – 1,58 dB. Using formula (10), we

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determine the energy gain of the coding to achieve  $P_b=10^{-4}$ :

$$G (\text{дБ}) = \left( \frac{E_b}{N_0} \right)_{\text{without coding}} (\text{дБ}) - \left( \frac{E_b}{N_0} \right)_{\text{with encoding}} (\text{дБ}) = 12,3 (\text{дБ}) - 1,85 (\text{дБ}) = 10,45 (\text{дБ})!$$

## IV. CONCLUSIONS

When using iterative codes, you can achieve higher noise immunity of the system. However, their use is limited by the time delay of the decoding, due to the fact that it is impossible to decode part of the packet until it arrives completely (in other codes this is possible). As can be seen from the result, obtained at the output of the simulation model of parallel-cascade high-precision coding and iterative decoding (Figure 3), based on the developed algorithm, it is possible to obtain an energy gain in the range of 0.5-

14 dB in comparison with other of the original decoders. In this case, the algorithm of high-precision iterative decoding with smaller  $E_b/N_0$  ratios begins to coincide with the solution of the optimal decoder. Analysis of the evaluation of the efficiency of the developed algorithm showed that, in comparison with convolutional encoders, using the iterative algorithms, the bit and block error probabilities are reduced (Figure 7) to previously impossible ultra-low values of  $E_b/N_0$ , and the algorithm allows obtaining an energy gain in comparison with convolutional codes. The obtained algorithm can work with higher coding rates, different from  $r=1/2$ , which allows to reduce code redundancy and increase the information content of the output sequence, without reducing the system noise immunity.

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**SECTION 31. Economic research, finance, innovation, risk management**

## CONCEPTUAL BASES OF FORMATION OF COMPETITIVE ENVIRONMENT IN ENTREPRENEURSHIP ACTIVITY

**Abstract:** The article discusses the conceptual framework for the formation of a competitive environment in business. The author studied the issues of increasing the innovation potential and investment activity in the development of effective entrepreneurship.

**Key words:** competition, competitive environment, business, entrepreneurship, market, innovation.

**Language:** English

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### Introduction

In the course of implementing large-scale market reforms implemented in Uzbekistan, the foundations were laid for the formation of a mixed economy, the main economic subject of which is an entrepreneur who rationally and effectively connects the factors of production in economic activity.

The main goal of the holistic “national economy” system at the present stage of reforms is to create the necessary institutional conditions to stimulate a competitive environment leading to the emergence of a powerful, economically efficient private sector.

The priority areas of state regulation of business activities include the creation of a legal framework and the provision of conditions for the realization of property rights and the formation of a competitive environment on this basis. Further development of entrepreneurship involves the openness of the economy, attracting foreign investment, the release of its own, competitive to world standards products. Equally important are the tasks of adjusting the distribution of resources, redistributing part of the income in accordance with social programs, ensuring economic stability, as an integral part of state stability as a whole, which are characteristic of any state with a market economy.

It should be noted (taking into account the experience of developed countries) that ensuring sustainable competitiveness of domestic producers is largely determined not only by the conditions for the

emergence of a competitive environment, but also by the formation of a market psychology of top and middle managers.

The activity of the enterprise as a subject of market relations takes place under conditions of fierce competition between producers. It is the competitive market environment that creates the most favorable conditions for economic development, both for an individual enterprise and for society as a whole, is the driving force of social and economic progress. The coordinating and supporting influence of the state can provide the necessary result only if domestic entrepreneurship is focused on creating effective high-tech industries that provide a new level of competitiveness, investment and innovation. Therefore, investment and innovation development has become one of the priorities of economic reforms carried out in Uzbekistan.

The adoption of a number of laws, the emergence of presidential decrees and resolutions of the Cabinet of Ministers, as well as their wide coverage in the media, testifies to the most serious attention that the government pays to business issues.

Small business contributes to the solution of many important national economic problems, including the employment of demobilized soldiers, youth and the disabled, the improvement of the ecological situation, etc. It is an integral part of a market economy. This type of business has a significant impact on the development of scientific and technical areas of life..

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A feature of small business is its stability in times of crisis for large industrial production periods. The experience of developing countries shows that against the background of a protracted economic crisis, small enterprises producing mainly consumer goods suffer less than large ones and even strengthen their positions in the market, which makes them an important factor of economic and social stability.

Serious qualitative changes occur in solving the problem of employment. Along with the accelerated development of small business and private entrepreneurship, a large role is played by the development of the service sector, the widespread introduction of various forms of home-based labor, and the promotion of the development of animal husbandry in the countryside.

World experience in market economy shows that high efficiency of this model is achieved only when all major markets for goods and services, including at the regional level, grow large producers as if balanced by the necessary number of small and medium-sized producers. It is the latter that, to a decisive extent, ensure the formation and preservation of the market as a competitive environment for free enterprise, impede the tendencies of monopolization of markets, solve many social problems, above all, support employment of the population. A very remarkable aspect of the functioning of the market system is the interdependence of private and public interests. Firms and resource providers seeking to increase their own benefit and operate within a competitive market system at the same time contribute to ensuring the public interest. So, the power of competition controls or directs the motive of personal gain in such a way that it automatically and involuntarily contributes to the best satisfaction of ensuring the interests of society.

A specific feature of the current stage of reforms is the development of a theoretical basis for the formation of programs for the implementation of institutional reforms (both partial ones within individual sectors of the economy and large-scale ones covering the entire economic system of the republic).

Institutional provisions in their totality represent legitimate conditions for the choice by economic entities of production factors, types, forms and methods of their participation in the processes of a market economy, their relations with each other and other actors of society. The development of an effective economic mechanism for the formation of a competitive environment in the national economy must precede any more or less serious reforms. It should be considered primarily as a system of functional economic forms of adjusting the development of socio-economic processes, the contents of which are the real production relations of economic entities in a regulated market processes. At the same time, it is presented as a fairly reasonable methodology for further research of market problems

and their systematic solution in the course of economic and social reforms based on pluralism of ownership forms and equality of all subjects of market processes.

The process of institutional transformations involves, as a rule, the formation of institutions (rules and norms) ensuring the formation of:

- \* private property;

- \* clarity and sustainability in the allocation of responsibility (commercial law, civil code procedures, bankruptcy procedures, collateral, etc.);

- \* control over the behavior of those who have the property of others in trust management (accounting system, banking operations, stock exchange transactions, operations in the securities market, etc.);

- \* control over the behavior and expectations of economic agents (which implies the formation of a new role of the state in the economy).

Further formation of the business environment presupposes, first of all, a clearly expressed political will to control the observance of the “rules of the game” by all participants, to general strengthening of market discipline, and at the same time transition to the implementation of a long-term strategy aimed at creating a system that ensures the conditions of “self-realization” contractual obligations and centralized enforcement of private property rights.

Entrepreneurial activity involves government support, which is aimed at the conscious creation by government agencies of economic and legal conditions, incentives for the development and competitive strength of small businesses, and also the side - investing in it material and financial resources. State support should be manifested in reasonable subsidies, preferential tax treatment, lending, insurance, investment, etc. In this case, it will not be of the nature of encouraging dependency, and is considered by small enterprises as something permanent or as the main source of increased competitiveness and profitability. Under these conditions, the main principle of state support should be a gradual reduction of the administrative-directive regulation of business and the creation of primarily economic and legal conditions for the normal conduct of market economy. Government support should be expressed in the formation of economic and legal conditions, incentives for self-development and competitiveness of entrepreneurship, taking into account industry, geographical, national, historical features and traditions, as well as foreign experience. The most important tasks of state support for entrepreneurship are to ensure small businesses equal rights, minimize the gap in terms of economic opportunities between small and larger enterprises, ensure the optimal ratio of small and large businesses in the structure of the basic processes of formation of a market economic system of Uzbekistan. First of all, it is the creation of conditions for equality in competitive market competition, equal opportunities

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for doing business in conditions of free choice of its forms and methods of manifestation of independence and enterprise, granting rights and clearly defined responsibility, opportunities and risk.. [47]

State support of entrepreneurship is a means of achieving the socio-economic goals of the current and future stages of development of the republic based on market mechanisms for organizing its economic system. Therefore, the general and milestone socio-economic goals of the development of the country are at the same time the goals of state support for entrepreneurship. The real goal of economic reforms is the achievement of economic growth, the creation of an efficient economy ensuring a high standard of living of the population, the real participation of Uzbekistan in the world economic community.

In ensuring the sustainable development of the national economy, the measures taken to support small and private entrepreneurship are of no small importance. In recent years, a number of legislative acts have been adopted to improve and develop the regulatory framework for the development and support of business activities. They are mainly aimed at:

- ensuring more full employment of the population in the sphere of production, expanding the share of the private sector in the economy of the country, as well as creating the necessary conditions for the rapid development of small business;

- simplification of the process of registration and execution of documents giving the right to conduct business activities, the elimination of bureaucratic barriers;

- creation of wide opportunities for further improvement of the system of financing and lending to small businesses and private entrepreneurship, ensuring the effective use of sources of credit resources;

- introduction of market principles and mechanisms for product sales, liquidation of the centralized distribution system, provision of equal access to material and technical resources to all economic entities, regardless of the form of ownership, improvement of the mechanism of formation of market prices;

- creation of wide opportunities for the development of the private sector in the economy of the republic and a cardinal increase in its role and importance;

Improving the business environment and expanding the legal, economic and financial freedom of private enterprises;

Assistance in establishing business relations of businessmen of the republic with foreign partners, active promotion of domestic goods and services to foreign markets;

attracting foreign investments to the republic for the creation of new, technical re-equipment and modernization of existing industries ensuring the

production of competitive finished products.

At the same time, support for entrepreneurship is independent objectives arising from the special features of its objects. The main ones are: the widespread approval of the practice of fair competition; the formation of a wide social stratum of owners and entrepreneurs; creation of maximum self-realization of citizens in business activities; forming infrastructure business to national, regional and local level, ensuring its effective growth; stimulation of promising directions for the development of entrepreneurship and priority activities; promoting the accumulation of investment resources and their use in priority areas; to ensure the participation of small enterprises in the implementation of major economic projects and programs, as well as in the supply of products and the performance of work for state needs; modernization of production assets of small enterprises, the introduction of advanced technologies and new equipment; sustainable functioning of small business in a competitive environment by reducing the impact of higher commercial and financial risks related to entrepreneurship. It must be emphasized that all these objectives can not be considered and implemented separately in time, because they are interconnected, and therefore should be carried out together and simultaneously. The implementation of these in conjunction with regional and sectoral level interventions should improve the business value of the country's economy.

The main directions of state support of business, regardless of industry sector and activities are:

- the creation of equal conditions for business access to financial, material and technical and information resources,

- as well as to scientific and technical developments and technologies;

- assistance in organizing training, retraining and advanced training for managers, specialists and personnel of enterprises;

- the support of foreign economic activity of business entities, including the promotion of their trade, scientific, technological, industrial, information links with foreign countries, as well as attracting foreign investment to the development of entrepreneurship;

- establish a simplified procedure for registration of business entities, licensing of their activities and the provision of statistical reports;

- formation and implementation of national, sectoral and regional programs aimed at saturation of the market of environmentally friendly and safe products, competitive means of production.

It should be noted that support for entrepreneurship is a challenge not only government agencies, but also no less objective regions. It is in the regions under the conditions of an emerging market that the task of social and economic development of territories is being solved. Effective market economy

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in the region is possible only on the condition that on the monopolistic structure of the goods and services markets, supplemented and, to some extent counterbalanced by the necessary number of private enterprises, including small and entrepreneurship. Such enterprises ensure the preservation of the market as a competitive environment and contribute to solving social problems in the region. In this regard, the problem of the development of entrepreneurship, versatile support in this sphere should be counted among the most important tasks of public policy, at both the national and regional levels..

The regulatory role of the state in the sphere of entrepreneurial activity involves the conduct of antitrust policy. The basis of the state measures that form the anti-monopoly policy should be a common conceptual view, according to which the highest well-being of citizens is achieved when they have the opportunity to freely exchange goods and services produced by them in a competitive market. Moreover, it is believed that if all transactions on such exchanges are concluded on the basis of prices established as a result of competition between suppliers of goods and services, the society as a whole will receive a greater amount of material benefits than in the case when part of such transactions will be concluded at prices deviating from the competition in the direction of both overvaluation and underreporting. The competitive market, therefore, acts as a universal regulator of social production, its proportions. At the same time, the question of what to produce and in what quantity is objectively decided by the consumer himself, presenting a demand for certain types of goods and services in the market.

Solving the problem of antitrust law to support competition at the same time implies preventing the market state from which its functions cease to function - establishing a monopoly on it. Moreover, a monopolist is not necessarily understood as a very large corporation, but a company of any size, protecting itself from the action of the above-mentioned competitive functions through restrictive practice, i.e. measures that prevent rival companies from entering the market where it operates. Such measures include the seizure of sources of raw materials and distribution channels, as well as various agreements (cartels) between two or several companies, aimed at ousting the rest from the market and preventing new competitors from penetrating it, dividing it among themselves and a number of others. Prevention of restrictive practices implemented in one form or another is the immediate goal of the antimonopoly defense system of society.

Competitiveness is a key factor and important economic dimension of sustainable and consistent development of any national economy. Increasing the competitiveness of the national economy plays an important role in determining the role of the country

in the world economy and taking the place among the developed countries.

It is in this direction that there are a number of microeconomic factors that are widely used in world practice and have their own effect. The market economy requires competition, regardless of its maturity and developmental characteristics. Competition is the most important sign of the commodity and market economy, the means of its development.

### Literature review

Understanding the economic context of competition requires a different approach to it.

Competition is a competition of business entities (competitors), in which the independent actions of each of them are based on the general conditions of the commodity circulation in the commodity and financial markets, one-sided exclude or limit the ability to influence effectively "[1].

The purpose of this law is to regulate relationships in the field of competition in the commodity and financial markets, which is aimed at legitimate competition and fraudulent competition between different types of ownership, but the same product (s) of production. According to A. Smith, "Competitiveness is a fair competition between market agents to sell the product under the most favorable conditions" [12]. M. Weber states that "Competition is an attempt to control the capabilities and capabilities of others" [47].

According to A. Smith and M. Weber's discourse, the content of competition is the advantage of the opponent, and the object of competition is the ability to buy resources, resources, and consumers. "Competitiveness is a struggle between innovation and old style," says Schumpeter.

According to the competitiveness of competition, "Competitiveness - Innovation, New Opportunities and Satisfaction" (I.Kirtsner) or "Competition is the invention procedure" [16]. According to Sh. Ergashodjaeva, "Competition is a social category and represents a struggle for better living conditions among the participants of social processes" [9].

The nature of competition, the position of the market and the approach to the development process are the basis of separate approaches. It uses static and dynamic competition. Static competition is a structured approach, dynamic competition behavior, business environment, functional and evolutionary approach (Graph 1).

Thus, competition is a multifaceted economic phenomenon that represents a complex relationship between all market subjects. In our view, it is the struggle between market entities to clash with competitive economic interests or to gain high profits, to achieve image and fidelity.

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Experts say that "the most important sign of a competitive market economy and, in general, a commodity, is a way to develop."

According to Wright, "competitive firms are struggling for a limited-paying supply or a combination of uncertainties in a number of independent business units."

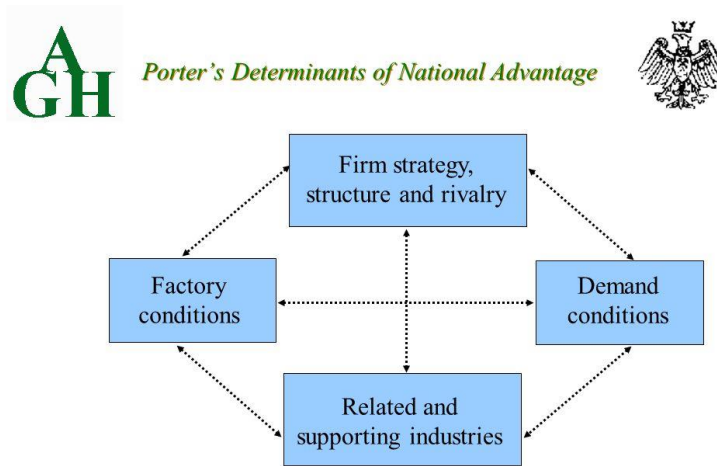
In his teachings, the function of competition depends on the choice of technology, the choice of production, and helps to understand the information about this market. The role of competition plays an important role in ensuring the harmonization of supply and demand and ensuring sustainability.

According to the evolutionary interpretation of competition, "it is a dynamic process to search for effective forms of competition behavior and to simultaneously select them."

Competition between manufacturers ultimately means struggle for attracting consumers.

**Analysis and results**

Competition also happens to consumers: they try to buy goods at affordable prices, which means that the buyer strives to gain more profit from the spent money. These relationships can be described as follows (Graph 1).



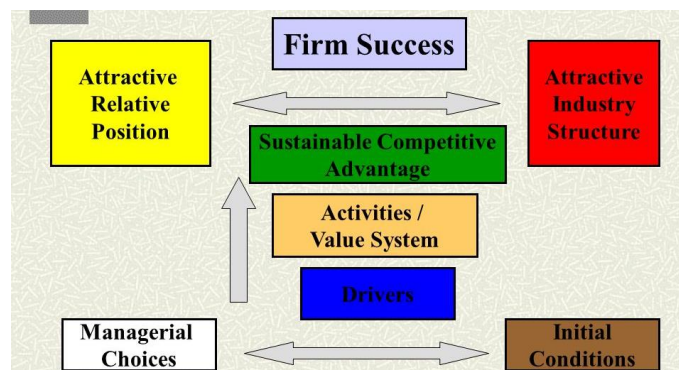
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**Fig. 1. The main objectives of competition participants.**

It is clear from the drawings that the struggle for the benefit of each of the costs incurred by the producers will be more likely. As a result of these benefits, they are fighting for the sales of commodities, ie favorable markets, cheap raw materials, energy, and cheap labor.

The concept of M. Porter. In 1982, M. Porter proposed the concept of enhanced competition (Graph 2).

According to him, the ability of the firm to use the competitive advantage of the market depends not only on the competition it faces, but also on the potential influence of potential market opponents, substitutes, customers, and suppliers.



**Fig. 2. M. Porter's Competition Concept.**

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In-competition competition means that among firms entering the same network, the favorable conditions for the production and sale of commodities is to fight for good profit.

Because of the varying levels of technical level and productivity of the enterprises in each industry, the individual value of the goods they produce is also varied. The Commodity Value Act applies, so different individual values are brought to the social market value.

In economic literature, four forms of competition within a network are highlighted separately. These are free competition, monopolistic competition, pure monopoly and oligopoly [6].

In the conditions of free competition, there are many enterprises producing the same product in the network. Under free competition conditions, new businesses are free to enter the network or existing enterprises in the network can leave it freely. There are no legal, technological, financial, or other serious economic barriers to the emerging new businesses to sell their competitive products on the market.

Monopolistic competition involves both monopoly and competition. Dozens of manufacturers of one type of product in the network compete with each other for a reasonable price and production capacity. At the same time, each producer will become a monopoly producer by differentiating its product, ie by distinguishing between any other product (quality, shape, packing, selling conditions, etc.) of such products.

Because pure monopoly is a single company or a manufacturer, it is the sole producer and the sole proprietor of existing products.

The most important sign of oligopoly is the presence and domination of so many businesses in the industry.

In the conditions of oligopoly, competition between enterprises will be interrelated. No firm in the oligopolistic sphere can focus on changing its pricing policy.

These four forms of competition within the network we are looking at are not purely in the national economy.

Interdisciplinary competition is a struggle for the highest possible profitability among firms and manufacturers in different industries.

Interdisciplinary competition is for capital to be invested in good sectors. Where there are more benefits, resources are flowing here. Therefore, the demand for the goods here will be high and will bring good benefits.

Another type of competition is informal, that is, an outrageous competition, condemned by the society. Firms and manufacturers in microcircuits sometimes use unlawful methods to compete in the competition. At the same time they act against the rules applied by the state in the regulation of competition. According

to this, the following can be included in the illicit methods of unfair competition (Graph 4).

The urgency and effectiveness of increasing the competitiveness of industrial enterprises in the context of ever-changing demand of the consumer market depends on:

- Ensuring the production of high-quality products meeting the requirements of international and national standards and satisfaction of needs of consumers (buyers);
- expansion of commodity markets and increasing export volumes;
- Creating safe working conditions by ensuring the safety and reliability of technological processes.

In other words, the development of competition, which is one of the most important elements of the market economy, is an important guarantee of increasing the efficiency of economic activity of the non-economic entities.[48,49]

Competition in the economy is a process of making good profits, filling the abilities and opportunities for self-employment. Indeed, the main goal of increasing the national competitiveness is to be able to achieve effective industrial efficiency and to increase export potential, rationally using existing natural and human resources in the country.

It is possible to increase the competitiveness of the national economy in the country not only in the domestic market, but also in the foreign markets, to create a competitive environment and to achieve a competitive edge in the international competitive environment. In our opinion, the achievement of the strategic goals of increasing the competitiveness of domestic industrial products in the process of integration of Uzbekistan into the global economy system - in turn, requires the need to improve the organizational, economic and scientific-methodological foundations of ensuring that the industry meets the requirements of the international quality standard.

Experts point out that systematic marketing research and introduction of a quality management system and consistent development enable the following positive outcomes:

- Ensures timely compliance of production to market and consumer needs;
- improves the consumer properties and quality of the products produced.

According to N. Khalilov, [8] it is desirable to introduce the international standard requirements in general, including the number of employees and the type of product, in any industry, enterprise or organization.

M.Cauchik underlined that the introduction of quality management system and international standards included the following steps [13]:

Stage 1. Carry out a diagnostic audit of the company's compliance with ISO 9001: 2008. This determines the compliance of the business



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management system with the requirements of ISO 9001: 2008.

Stage 2. Staff training to ISO 9001: 2008. The essence and requirements of ISO 9001 are taught. The working group is formed and its responsibility is determined.

Stage 3. Development of ISO 9001: 2008 SMT documentation. The main purpose of this is to document the transition stage to ISO 9001: 2008.

Stage 4. Implementation of ISO 9001: 2008 SMT. At the same time, employees of the organization or organization are trained and introduced into operation of ISO 9001: 2008.

Stage 5. ISO 9001: 2008 SMT analysis. In this case, internal auditors are trained to conduct an SMT audit and determine the degree of readiness of the SMT to certify.

Stage 6. Carry out an ISO 9001: 2008 Certification audit. At this stage, short-term certification audit, cost optimization, and ultimately ISO 9001: 2008 certification.

It should be noted that today the lack of interest in the implementation of international standards, lack of qualified managers and specialists in this direction creates a number of problems in the implementation of international standards in many enterprises.

At the moment, in order to further expand the production of stable demand on the domestic and foreign markets of the republic, and to organize the production of high quality and competitive products, a great attention is paid to the introduction of international standards in enterprises.

Experts point out that Uzbekistan has a mandatory and voluntary certification scheme, with a leading position in the quality management practice of ISO 9001: 2008 and its market share of 85%.

The State Program for the Development of National Quality Infrastructure for the period up to 2020 has identified current trends in the introduction of quality management systems in the real sector of the economy, which includes the following efforts:

- Promotion of introduction of information and communication technologies and software in the agency "Uzstandart";

- Accreditation of 12 laboratories at the international level in food, chemical, electrical, machine building, construction and light industry;

- Also, development and introduction of 174 international standards.

As a result, so far, the following standards have been issued for certification [2]. Including:

- ISO 9001: 2008 - 2096 SMT certificates;
- ISO 47001: 2004 on environmental management standard - 47 SMT certificates;
- OHSAS 18001: 2007 with the International Standard on Occupational Safety and Health Management - 60 SMT Certificates;

- ISO 22000: 2005 with the International Standard on Food Safety Management - 47 SMT certificates.

As a result, the range of products with added value, which is demanded in domestic and foreign markets, has been increasing [17]. This can only be attributed to the examples of achievements in the field of fruit and vegetable processing.

In our opinion, the relevance and relevance of quality management in the food industry enterprises related to the storage, processing of fruits and vegetables in our country is explained as follows:

1. The need to improve the product quality and constantly improve it. As you know, the existing quality assurance system identifies and improves the reasons for the decline in product quality.

2. The need to regularly reduce production costs and increase competitiveness. As a result of improved quality and productivity increase, the likelihood of the products being consumed to use is diminished, thereby reducing the cost of raw materials and materials and the amount of potential losses;

3. The need to improve the management system in enterprises. Experts believe that 80 percent of products fail to meet the quality requirements of the product, and 20 percent depend on the executive branch.

At the same time, it is obvious that the role of domestic enterprises in their compliance with international quality standards and standards - their role in the international marketplace is undoubtedly a must.

In other words, the introduction of quality management system (SMT) at enterprises is an important guarantee for the quality of produced products and services, development of competing competition among the most important elements of the market economy and increasing the efficiency of economic activity of businesses.

It is important to know the ways in which entrepreneurs operating under the conditions of market relations are to be identified and analyzed as a result of free competition and to ensure their safe operation.

Each entrepreneur plans to earn a certain amount of income during his / her career. It does not spontaneously spell, it requires spending some money. The goal of the entrepreneurial income is to cover its expenses and make a profit. If the earnings just cover the expense ( $D = X$ ), it indicates that the entrepreneur has been hurt. If ( $D > X$ ) the entrepreneur is working on this, if ( $d \leq p$ )

In order to improve, evaluate and analyze the organizational, economic and social relationships required, it is necessary to identify the level of harm to the entrepreneur.

At the same time, it is necessary to develop an automated information system (AAT) program for the correct solution of problems of analysis and

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management with the use of modern information systems.

Determining the level of enterprise's vulnerability in the development of the program will be organized as a separate module. In this case, the composition of entrepreneurial income is determined first of all.

Entrepreneur income can be divided into the following elements:

- reimbursement of business expenses (X);
- payments to the state budget (C);
- arranging profits (F).

In this case the following equation is formed:

$$D = X + C + F \quad (1)$$

As can be seen from this formula, the entrepreneur's income is proportional to its costs, taxable income, and its profits. Which of these can be (if it is low), the size of the income may also increase. Using this simple equation, the first module and base for determining the level of business vulnerability will be developed. Developed base can be used to determine the degree of utilization of any business activity.

Information base software will be created in econometric modeling of costs and taxes. As we know, some of the costs and taxes are variable and some are unchanged.

The following figure shows the actual size of the result and factors that are expressed in the following formula.

$$D = (X_{uz} + X_{um}) + (C_{uz} + C_{um}) + F \quad (2)$$

As you can see, this formula differs greatly from the formula above.

Here are some of the following:

- Crude - constant costs;
- The Variable Surplus of Currencies;
- An integral part of taxes.

If you want to create a base module together by adding the variable ( $X_{uz} + C_{uz}$ ) and ( $X_{um} + C_{um}$ ) in this formula, the following formula.

$$D = (H_{uz} + H_{um}) + F \quad (3)$$

$H_{uz} = X_{uz} + C_{uz}$ ,  $H_{um} = X_{um} + C_{um}$ . The relation of these factors to the income level is as follows: the increase in income increases the variable costs. Increasing the cost of variable costs will result in the final outcome. It can be used to calculate the correct coefficient ( $K_m$ ). Then the 3 formulas will have the following formulas:

$$D = K_m * H_{uz} + H_{um} + F \quad (4)$$

To determine the coefficient of variability, variable product costs are added together with a variable tax part ( $H_{uz}$ ) divided by its value:

$$K_m = \frac{H_{uz}}{P} \quad (5)$$

According to this formula, it is possible to calculate how much income a businessman should cover to cover all his expenses, such as his or her disadvantages. For this purpose, the first "gain point" of income ( $D_{tn}$ ) is defined, that is, the amount of revenue should be sufficient to cover all expenses. There is no benefit in this. Then the 4 formulas are represented as follows:

$$D = K_m * H_{uz} + H_{um} \quad (6)$$

The formula 6 can be written as follows to accurately represent the coefficient of correlation between the result and the factor:

$$D^{tn} = \frac{H_{um}}{1 - K_m} \quad (7)$$

According to this formula, it is possible to determine how much the entrepreneur should earn for covering all costs and tax collection.

In order to clarify the issue, the businessman analyzes the status of one product. In practice, entrepreneurs can also engage in the production and sale of several goods at the same time. In this case the harmful performance of the enterprise will be determined by the results of activities related to the production and sale of all goods. In this case we will use the following formula:

$$D^{tn} = \sum_{k=0}^n (D_k^n - H_{uzi}) - H_{umi} \quad (8)$$

In this case, the goods generated by the goods;

Variable expense for the production and sale of express goods;

Humidity - the actual amount of all permanent immovable costs;

$i$  - number of order groups ( $i = 1, n$ );

$n$  - the total number of manufactured and sold brands.

In practice, it is difficult to calculate revenue and expenses for each product. This is because of the total amount of revenue and expenses.

Then, the calculation of the financial result ( $F$ ) will be simplified and the following formula should be used:

$$F = D^t = \left( \frac{H_{um} * Y_z}{100} + H_{umi} \right) \quad (9)$$

Where  $D$  is the actual amount of the quarterly income;

$H_{UM}$  - Amount annual interest rate;

$Y_z$  - share of unimpaired expenses in the fourth quarter;

$H_{ui}$  - actual amount of variable costs per quarter;

It is possible to carry out modeling of the given stages. It is necessary to indicate that the coefficients and values of the given sequence are related to the values of common factors. For this purpose, it is envisaged to identify the factors affecting production processes.

Once the econometric models have been identified, reports of the selected objects will be

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obtained to reflect the relevance of the models to entrepreneurs and to reflect the economic processes. So, next task is to develop a set of econometric models.

This requires:

- Data obtained for modeling should be in the same range as the results obtained. Also, it should be noted that the more information received (by years), the greater the chance of achieving accuracy in the results;

- a set of econometric models that selects statistical information, reports and other official documents that combine socio-economic indicators with specific periods of production of the selected production facility, with the main sources of information, the quantitative indicators required for continuous and simultaneous modeling, and comparative to be in the nature of the character.

In addition, the database software for econometric modeling is used as a ready-made package of data analysis and application software (EXCEL, PHP) of modern computer techniques. Thus, it is expedient to solve the quantitative parameters of business efficiency using a comprehensive and systematic approach to econometric modeling and its formation in determination of future indicators.

### **Increasing innovation potential and investment activity in the development of effective entrepreneurship**

The economic development, economic independence of each country, the living standards of the country's population and the employment rate of the population depend on the development of small business and private entrepreneurship. This situation is characterized by the development of the level of stimulation of economic freedom of the entrepreneurs.

Extensive activities are also being undertaken in our country to create a business environment, support and further stimulate entrepreneurship. As a result of the measures taken in 2017, more than 38.2 thousand subjects of small business were established or increased by 122.0% compared to 2016. The largest share of these small business entities was in the industrial sector (27 percent), trade (21 percent), agriculture, forestry and fisheries (13 percent) and construction (10 percent).

The active use of the opportunities created by active entrepreneurs in the Republic to ensure the growth of finished goods production is achieved. According to the analysis, the share of small businesses and private entrepreneurship in the country's GDP in the year 2017 amounted to 53.3%, while this figure rose to 56.2% in 2016. The share of small business and private entrepreneurship in the sectors of economy in 2017 will reach 27.0% (in 2016

- 26.0%) and in industry - 39.6% (45.3%), services - 58.4% (61.4%), construction - 65.1% (66.9%) and employment - 78.3% (78.2%).

There are problems with entrepreneurship in conjunction with achievements in the field. The role of innovation potential and increase of investment activity in the accelerated and sustainable development of business entities in our country is significant. Expected results in the long term are largely due to the rapid development of small businesses and private entrepreneurship. This ensures the growth dynamics of their products.

**In order to ensure the growth of production by active entrepreneurs, the following activities should be undertaken:**

- **Creation of favorable innovative potential and investment climate on the basis of financial support of active entrepreneurship and enhancement of existing mechanisms and activation of new financing sources;**

- **Improvement of financial support of production organization in the active entrepreneurship;**

- **Improvement of mechanisms of foreign economic activity of active entrepreneurship;**

- **training of qualified competitive personnel for the active business, etc.**

The President of the Republic of Uzbekistan Sh.M.Mirziyoev addressed the Oliy Majlis in the Address to the Oliy Majlis of the Republic of Uzbekistan as a new stage in our progress in 2017 and the address of the President of the Republic of Uzbekistan addressing the most important directions of socio-economic development in 2018: "Innovative innovative activities, and the economic direction, which is based on management methods. When it comes to businessmen, we are capable of producing competitive products, most importantly, create new jobs and understand business people who feed themselves and their families, but benefit the entire society." [1] Indeed, the issue of expanding the ranks of entrepreneurs engaged in active entrepreneurship, including the introduction and introduction of high technology, techniques and equipment based on the latest achievements of science, is one of the most urgent tasks today. For this reason, it is necessary to ensure the continuity of the development of innovative activity.

Innovative capacities are related to the development of small enterprises. The world experience shows that small businesses produce more than 4 times more innovations than large enterprises or create smaller innovative enterprises for 2.5 times more than large enterprises for every dollar spent on research.

In the conditions of modernization of the economy, active entrepreneurs - the expansion of their ability to effectively use loans, raw materials,

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as well as public preferential systems - are an important factor in raising their innovative capacities.

The following aspects must be taken into account in the development of innovative entrepreneurship:

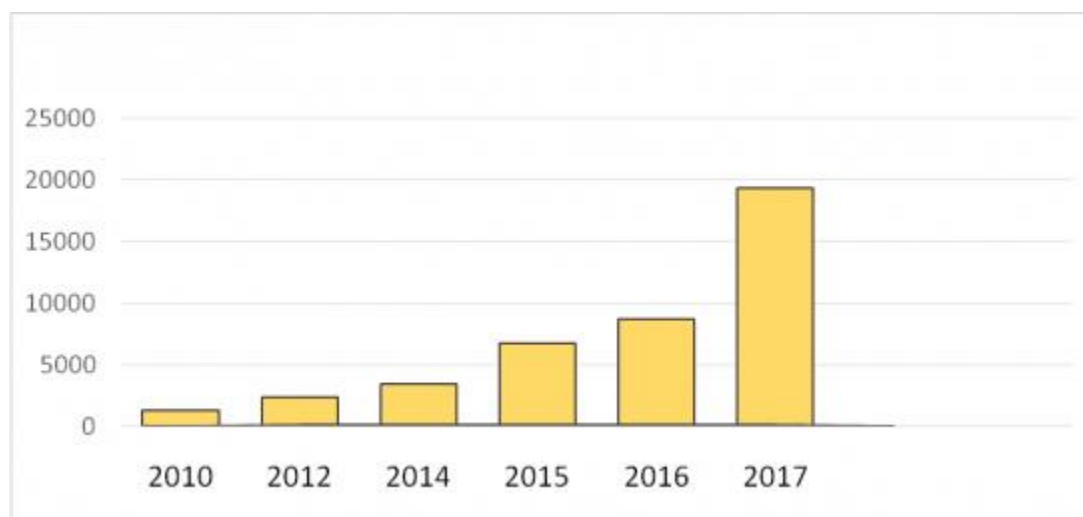
- Material and technical resources;
- tangible and intangible assets;
- financial resources;
- organizational resources;
- Personnel resources;
- Socio-psychological factors.

In view of the above, in order to establish innovative business processes of active entrepreneurship, at its discretion should have:

- Funds sufficient for financing the ideas and developments;
- Material and technical base for creation and mass production of new products;

- Capable of making and implementing innovations;
- Ability to develop original (formal) ideas based on any innovative process.

Increasing the innovative capacities of entrepreneurship is crucial to the growth of the country's industry and economy. Innovative and investment development is one of the key priorities for the implementation of technologies for the creation of innovation technologies, as well as the development of innovations. The economy is a part of investment projects implemented by the state-owned enterprises in the sector. expanded It is desirable to establish a fund for the preparation of project documentation on investment projects, which will allow businesses to reduce the costs of preparing business plans, improve their quality and reduce credit terms.



Graph 1: Characteristics of Small Business Investments.

Source: The author is based on the data from the State Statistics Committee of the Republic of Uzbekistan.

If we analyze trends characterizing small business investment in 2010-2017 (Graph 1), the current prices of fixed capital investments by them have a high rate of growth (15.0 times).

Also, the volume of products worth 1 billion soums increased by 6.6 times during this period. While this is a significant growth rate, this figure is significantly lower than in 2010-2017. This decline was due to the fact that during this period, the growth rate of investments in fixed capital by small businesses exceeded the rate of growth of their production.

Along with positive achievements in the field of small business investment, there are some problems in the development of active entrepreneurship. Including:

- lack of adequate technical and economic feasibility studies in some areas of active business;
- low level of use of long-term investment loans as a result of shortage of highly liquid mortgage facilities;
- the lack of the practice and the practice of state-funded loans to small businesses that produce and export goods in the priority sectors.

For this purpose, in our opinion, a comprehensive expertise of the proposed investment projects, the introduction of a mechanism of lending on the basis of guaranteed third-party guarantees, at least 50% of the interest rates of banks' loans, based on the refinancing rate of the Central Bank as a basic rate it is advisable to introduce the mechanism of bonus at the expense of funds.

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The role of small business and private entrepreneurship in economic sustainability

The announcement of the year 2018 as the Year of Support of Active Entrepreneurship, Innovative Ideas and Technologies in our country has created enormous opportunities for the development of small business and private entrepreneurship. Nowadays, it requires the development of entrepreneurship in the country in the conditions of global integration and globalization, innovation and modern approaches to small business, advanced technology and management methods.

In his address to the Oliy Majlis of the Republic of Uzbekistan, Shavkat Mirziyoev said: "When we say an active entrepreneur, we understand entrepreneurs who are able to produce competitive products and, most importantly, create new jobs and not only feed themselves and their families but also benefit the entire society. It is our first priority to expand the ranks of such entrepreneurs, to create the conditions for bringing them to our country and introducing advanced technology and science-based equipment and equipment. "

At the same time, the main directions of elimination of barriers that adversely affect the accelerated and sustainable development of small business and private entrepreneurship are being elaborated.

In our country, such rapid development of small business and private entrepreneurship, first of all, tax incentives for the sector are encouraging. In particular, in 2016, the single tax payment for small-scale industrial enterprises was reduced from 8 to 7 per cent, while for individual entrepreneurs this figure was reduced by an average of 1.3 times. Also, between 1996 and 2016 the tax rates for small business and private entrepreneurship declined from 38% to 5%, ie 7.4 times.

The single tax payment is the only type of tax that is simplified in exchange for various taxes and duties to support small businesses.

As President Islam Karimov put it, "In our country the Ombudsman for the protection of the rights of entrepreneurs has been introduced. Business taxes have been dramatically reduced, expanded access to credit.

New free economic zones have been created, where investors have been given a wide range of benefits. "

Creation of favorable conditions for attraction of foreign and local investments in organization of modern production of mineral raw materials and processing of agricultural resources, providing production of competitive products with high added value in foreign markets, as well as in Samarkand, Bukhara, Ferghana and Khorezm with a view of complex and effective use of production and resource potential of the regions of the Republic of Uzbekistan, on this basis, to create new jobs and increase the

incomes of the population, d Urgut district "Urgut" Gijduvan district of Bukhara region, "Gijduvan in Kokand, Ferghana region," "Cocaine", Khorezm region "Hazorasp" free economic zones in the district.

In accordance with the Decree of the President of the Republic of Uzbekistan of January 17, 2017 "On measures to accelerate the sale of state-owned facilities for business use and further simplify its procedures", the generalized taxes will be paid from the moment of signing the purchase and sale agreement of buyers of state-owned property objects Exemption from property tax and land tax on newly acquired state property for a period of 12 months, Steiermark objects of modernization, technical and technological re-equipment and development have been outlined are targeted.

In 2016, efforts were also made to reduce the costs associated with organizing business. For example:

- the cost of obtaining the architectural and planning task packages - 4 times;
- cost of expertise of design estimates - 2.5 times;
- the cost of registration of cadastral documents - 2 times.

Measures on financial support of small business and entrepreneurship have been intensified. In particular, in 2016, small businesses and private entrepreneurship will receive about 1 trillion soums. 850 bn. Over UZS worth of loans were issued.

In the practice of the developed countries, the funds of credit institutions are a major source of financing for the development of small businesses. The share of commercial banks in foreign countries is financed by small businesses and private entrepreneurship. For example, small business loans in South Korea as of January 1, 2013, are 38.9 percent of GDP, 33.7 percent in Thailand, and 20.1 percent in Malaysia. The share of small businesses in the total volume of loans issued by banks is 30-40% in countries such as China, South Korea, Thailand and Indonesia, Malaysia and Kazakhstan, almost 20%. Experience of developed countries shows that active state policy on forming and developing an effective financial infrastructure to provide small businesses with investment funds is required. According to foreign experience, effective support for small businesses can be accomplished through a broader mandate, financial means, and a specialized agency with branches throughout the country. Nowadays, economically developed countries are more often used indirectly to support small businesses directly with financial support. We'll look into the credit guarantee system in the following chart agency.

Small business enterprise Small and Medium Enterprise (Small Business Enterprise, Small Business Enterprise, SBA), Small and Medium Enterprise (Small and Medium Enterprise), Small and Medium Enterprise State Agency for Financing Small Business in South Korea and the Czech Republic, a

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Private Equity Credit Institution in Germany, the Agency for Entrepreneurship Development in Poland (PARP), Trade and Industry in Singapore at the Ministry of Entrepreneurship Development Agency (Spring), "Entrepreneurship Development Fund" JSC in Kazakhstan, Belarus (Damu), referred to as the "Entrepreneurship Fund for financial support".

The prospects for the development of small business and entrepreneurship have a great potential in the country, which is a sign of the year 2018 as the Year of Support for Active Entrepreneurship, Innovative Ideas and Technologies and, as a consequence, the adoption of the State Program.

Over the next two or three years a number of normative-legal documents on support and further development of small business and entrepreneurship have been adopted and put into practice. In accordance with the Decree of the President of the Republic of Uzbekistan of October 5, 2016 "On additional measures to ensure accelerated development of entrepreneurship, comprehensive protection of private property and qualitative improvement of the business environment", legal regulation of entrepreneurship, reduction of inspections of business entities, prevention of unreasonable interference, further

liberalization of business entities' liability, financial and taxation changes and privileges in the field of improvement of customs and customs, enhancement of judicial protection of entrepreneurs, improvement of business environment, investment attractiveness and international rating of the republic. Thus, from January 1, 2017, all types of non-scheduled inspections of entrepreneurs (except for short-term inspections, conducted in accordance with the Decree of the Republican Council on coordination of controlling bodies on the basis of appeals of physical and legal entities on cases of violation of legal entities) are invalidated. were removed. For the first time, persons who have committed offenses related to the illicit entrepreneurship activity have been released from administrative and criminal penalties for voluntarily covering the damages within one month from the date of detection of the offense, as well as issuing the necessary documents, registered and authorized by the business entity. Failure to complete the barriers to effective functioning of the bank, as well as to ensure the full realization of the right of clients to freely dispose of their money, was adopted on January 3, 2017, the Law of the Republic of Uzbekistan "On Combating Corruption"..

**Table 1. Infrastructure facilities, which provide services to entrepreneurs in Uzbekistan (as of January 1, 2017, unity)**

<b>The name of the infrastructure object</b>	<b>The number</b>
Affiliates of commercial banks	1042
Minibanks	2318
Information and consulting centers	262
Consulting centers	327
Audit firms	113
Training Centers	917
Evaluation companies	138
Trading platforms of the Commodity Exchange	204
Microcredit organizations	32
Credit unions	103
Business incubators	34
Insurance companies	32
Brokerage offices	1424

As it can be seen from the information, the amount of loans directed to small business and private entrepreneurship has grown by almost 11 times in 2010-2016.

Also, the rapid development of small business and private entrepreneurship has a significant impact

on the establishment and maintenance of infrastructure facilities serving it.

Today, about 8,000 infrastructure companies and more than a dozen types of services are provided to the country's small business, creating the necessary conditions.

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As a result, the results of small businesses and private entrepreneurship are becoming increasingly important in the country as the most important factor of creating new jobs, raising incomes and wellbeing of the population. In particular, 391.8 thousand (41.7%) of the total number of new jobs created in 2016 are created in the sphere of small business and private entrepreneurship. This is 4.7% more than in the previous year. Almost 21 percent of the total number of new jobs was created through the introduction of home-based work in various forms, 7.5 percent in commissioning of new facilities, reconstruction and expansion of existing ones and implementation of additional measures to increase the number of vacancies. As a result, the share of employed persons in SEE in total employment in 2015 was 73.1 percent versus 74.2 percent in 2016.

It is seen that in the context of the global financial and economic crisis, our country is becoming an important factor in accelerated development of small business and private entrepreneurship, ensuring economic growth, creating new jobs, raising the incomes and well-being of the population.

According to the Decree of the President of the Republic of Uzbekistan of February 1, 2017 "On Additional Measures to Improve the Mechanisms for Public Services to Business Entities", the implementation of the registration of 16 types of permits for business activity without departure from other agencies for the entrepreneurial activity by "Single Window" Centers, which helps save time and material costs of business entities. In order to expand this positive experience it is planned to gradually introduce the mechanism of registration of additional 86 types of licenses and permits through "Single window" centers.

In addition, since January 1, 2018, the registration of licenses and permits issued through the "Single window" centers on the special form of paper was canceled. At the same time, the information about the issued, suspended, revoked, reissued, canceled, as well as the validity of permits and licenses were obtained through a complex of information systems "License".

A complex of information systems, starting from the first quarter of 2017:

- to receive public services on a "single window" principle without visiting the relevant government agency;

- to remotely access information about the order and terms of obtaining permits and licenses, as well as in the Register of Permits and Licenses;

- The process and results of the review of public services and licensing applications through "One-Stop-Shops" centers, regardless of where and how they are addressed, provide opportunities for monitoring.

In 2016, nearly 2,000 vacancies revealed as a result of inventory were leased to small businesses. In the last few years, the state-owned assets were sold at the zero redemption price.

In conclusion, the socioeconomic status of subjects of small business and private entrepreneurship has considerably improved in the years of independence in connection with the creation of economic and legal basis for the development of small business and private entrepreneurship. However, despite the results of the work done, there are still problems in this area. Development of small business and private entrepreneurship in all regions of the country is the basis of economic stability. Improving the process of attracting innovative capacities, investments and modern technologies in the small business and private entrepreneurship entities, upgrading the qualification of specialists is urgent.

### **New forms of entrepreneurial activity and changes in them**

The food industry plays an important role in ensuring the economic development of the country. Today, changes in this field are positive and the development of the basis of the process of denationalization and radical change of ownership. In recent years, the number of non-governmental foodstuffs has grown significantly over the public sector. This tendency will be maintained (Table 1).

The food industry is a broad branch of the national economy, which includes meat, milk, oil, fat, fish products, flour, macaroni, canned fruits and vegetables, juices, various beverages, sugar, confectionery products, and other enterprises that produce. But what forms of food entrepreneurship will take the lead in the long term? This question can be considered in the light of the current level of development of the food industry.

In economic literature, the forms of entrepreneurship and private entrepreneurship are highlighted. It also differs depending on the type of entrepreneurial activity that is divided into individual, family, joint-stock companies, small business and private entrepreneurship.

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**Table 2. Distribution of food enterprises by forms of ownership (in%)**

Businesses	2003 y.	2007 y.	2011 y.	2014 y.	2016 y.	2017 y.
Total	100	100	100	100	100	100
Public sector food businesses	10,4	10,0	8,0	7,0	5,4	4,9
Non-governmental food businesses	89,6	90,0	92,0	93,0	94,6	95,1
<b>Including</b>						
Private property of citizens	42,3	32,5	28,1	20,8	20,1	20,5
Business associations	0,4	0,4	0,5	0,4	0,3	0,3
Joint ventures, foreign citizens and organizations	1,7	1,2	1,0	0,9	0,7	0,6
Other types of non-governmental property	45,2	55,9	62,4	70,9	73,5	73,7

Source: *Statistical Review of the Republic of Uzbekistan. - Tashkent, 2018. -S. 27.*

It is divided into entrepreneurship in trade, manufacturing, public catering and service sectors.

Local entrepreneurs in Uzbekistan have expressed their views on business forms. In particular, S. Gulyamov pointed out the following forms of entrepreneurial activity: Private entrepreneurship is organized by physical or legal persons (enterprises) on the basis of their own (private) property; collective entrepreneurship - is organized on the basis of collective property of the group of citizens; mixed business - is organized on the basis of consolidation of property of one (or more) legal entity (enterprise) and several physical entities; joint venture is created by consolidation of property of two or more legal entities (including foreign enterprises); contractual entrepreneurship - is carried out on a contractual basis by the head of the enterprise without the owner (or other responsible person - manager); the head of the enterprise (or the manager) shall be registered in the proper manner to the businessman and shall have the same responsibilities [3, 12].

Q. Muftaydinov points out the following forms of entrepreneurship: Private entrepreneurship, based on individual labor activity; Private entrepreneurship, implemented by some citizens on the basis of hired labor; collective entrepreneurship carried out by a group of citizens; joint entrepreneurship, which is carried out on the basis of consolidation of legal entities and citizens' property and property rights [9, 22].

R. Gaybullaev describes the existing forms of entrepreneurship and the subjects of the entrepreneurship in Uzbekistan as follows: Private entrepreneurship and individual entrepreneurship; joint-stock companies entrepreneurship; entrepreneurship of leasehold farms and shirkats; farming business; entrepreneurship of production cooperatives; entrepreneurship of state-owned enterprises; entrepreneurship of non profit-nongovernmental organizations; Entrepreneurship with joint ventures with foreign capital [2, 55-56].

V. Shepelev described the following in the classification of the main forms of entrepreneurship and business: [14, 7]: according to the source of entrepreneurship; according to administrative and legal forms; in terms of legal regulation; according to innovation level of goods and services.

In the conditions of modernization and diversification of the economy, the food industry needs to improve the internal system of entrepreneurship. Therefore, when looking at an entrepreneurial activity as an internal system, it does not mean that it is a purely economic relationship, and other elements are also part of it (Graph 1).

Entrepreneurship in the food industry develops through joint-stock companies, small businesses, micro-firms and individual entrepreneurs. Therefore, some economists think that they are the cornerstone of the present-day economy, while others believe that state-owned and large-scale food producing companies are creating conditions for small businesses. Each of these views has a specific foundation.

This is determined by the historical development of food business, its emergence as a economic and legal entity in class.

The system of state control and support for entrepreneurship in Uzbekistan has been improving and improving from year to year. The procedure for registration of business entities has been simplified, the number of transactions is reduced and reached to a minimal level.

According to the International Monetary Fund experts, the average duration of a new business registration in Uzbekistan in 2016 will be about 6 days, while the number of transactions is 5 [15, 7]. Although Uzbekistan's rating is lower than the developed countries, it is quite high among developing countries.

In summarizing the above research, the first group of scholars suggests that economic relations can be established through exchange relations and that



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foodstuffs will be sold and processed, while the second group of scientists will focus on the financial, economic, commercial, tax and other activities and events and provide a wide range of food products to the public.

### Conclusion

The results of our scientific researches, scientific-theoretical analyzes can be summarized in the following general conclusions based on comparative comparisons of thinkers of entrepreneurial activity, the views of mature scientists:

- further enrichment of entrepreneurship in the entrepreneurial food industry on the basis of eastern economic thought, national spirituality and Islamic values;
- fundamental research of the peculiarities, the scientific and theoretical and practical methods of entrepreneurship in the food industry;
- Scientifically-practical study of the aspects of food industry entrepreneurship in agricultural production, the advantages of the farmer's movement, the areas of livestock production;
- To examine the relationship between the human factor related to the human development of the food industry and the state support to market economy laws.

Organizational mechanisms play a key role in providing regulation as a method for implementing an anti-field strategy. The most important requirement for the latter is expressed in mutual complementarity and interconnection, the possibility of transition from one legal regime of economic activity in the industry to another.

The initiator of the introduction of regulation, which provides a legitimate basis for it, is the state. Practically in any law providing for the introduction of regulation in a particular industry, should be reflected such issues as:

- \* regulatory objectives;
- \* boundaries of the economic sector covered by regulation; the status and powers of the government body that regulates.

The competence of the latter includes the determination of competitive methods, the choice of instruments of state influence. Meanwhile, at present, the development and maintenance of competitive relations on a purely economic basis is impossible. This requires an extensive state-legal mechanism and

a developed awareness of consumer rights among the population. The formation of these institutions, the training of personnel for them, the formation of a corresponding mentality among wide sections of the public require a certain, very long time, which in the USA, for example, was about 20 years.

It seems that at the present stage, the practical efforts of the state to demonopolize should be focused on two directions. First, on the basis of the anti-monopoly legislation existing in the country, it is necessary to form a competitive supplier pricing mechanism (free competition, monopolistic competition, "weak" oligopoly) providing the market in which this is possible, based on economic efficiency. To do this, it is necessary to disassemble economic structures to the size that ensures competition in the market to which they supply their products. Moreover, such a process should affect the economic structures of all forms of ownership and be carried out regardless of how far privatization has gone in this or that industry.

Secondly, antitrust regulation should be extended to enterprises that in the conditions of a planned economy were designed and built as monopoly suppliers of goods and services produced on them and cannot be divided into independent firms without significant losses in production efficiency. Given the lack of investment, the introduction of competing firms in a number of industries is unlikely, and such enterprises will probably remain a monopoly position for a long time. In fact, this makes them natural monopolies. Their transition to a market economy system and, in particular, in the sphere of pricing, is possible only in the way of maintaining control over prices for a sufficiently long time. It should be emphasized that under price control we have in mind not a direct state pricing, but a set of measures aimed at maintaining prices at a level that ensures social stability and preservation of a single economic space in the country.

Conducting an active social policy by the state together with measures to revitalize production and enter the path of economic recovery will ensure in the long term the approach of the level and quality of life of the population to the criteria of a post-industrial society. And the main lever for strengthening the role of the state in the implementation of these goals should be an active policy of comprehensive support for business activities.

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## TRANSPARENT INVESTMENT POLICY IS INCLUSIVE ECONOMIC GROWTH IN UZBEKISTAN

**Abstract:** In transition period of Republic of Uzbekistan diversifies whole economy to attract foreign direct investment in the country. Innovation economic process moves forward overall sustainable growth of the economy. The article discusses the principles of the investment policy of Uzbekistan with various changes for the past decades. It was determined that a priority for the country is to create a favorable investment climate in order to increase the competitiveness of the country's economy under the cooperation with international economic institutions. However, investors own considerations and viewpoints about current investment policy of Uzbekistan analyzed to prove updated legislative reforms and investment climate profile developing business environment in the country.

**Key words:** transition, investment attractiveness, investors, international cooperation, lending.

**Language:** English

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### INTRODUCTION

Uzbekistan is taking active steps to create a favorable investment climate. This is based on two fundamental factors: political stability and a well-considered, balanced macroeconomic policy. Enterprises with foreign investment operate in almost all sectors of the national economy, but the maximum gross product produced by such enterprises was obtained in mechanical engineering, food industry, non-ferrous metallurgy, in trade and public catering. To date, more than 3,200 enterprises have been registered in Uzbekistan, created with the participation of investors from more than 85 countries of the world [1].

The largest number of enterprises with foreign investments was created with the participation of investors from Russia, China, South Korea, Turkey, the United States, Great Britain and Germany. The level of economic development of any state largely

depends on foreign investment. In Uzbekistan, appropriate measures are being taken in order to interest potential investors to invest in the economy of the republic. But to achieve the proper effect is not easy as accounted. Foreign investors are extremely careful and seek to eliminate any risks when investing their capital in any project. They need business guarantees that will not only remain safe and, but will also make profit.

### URGENCY

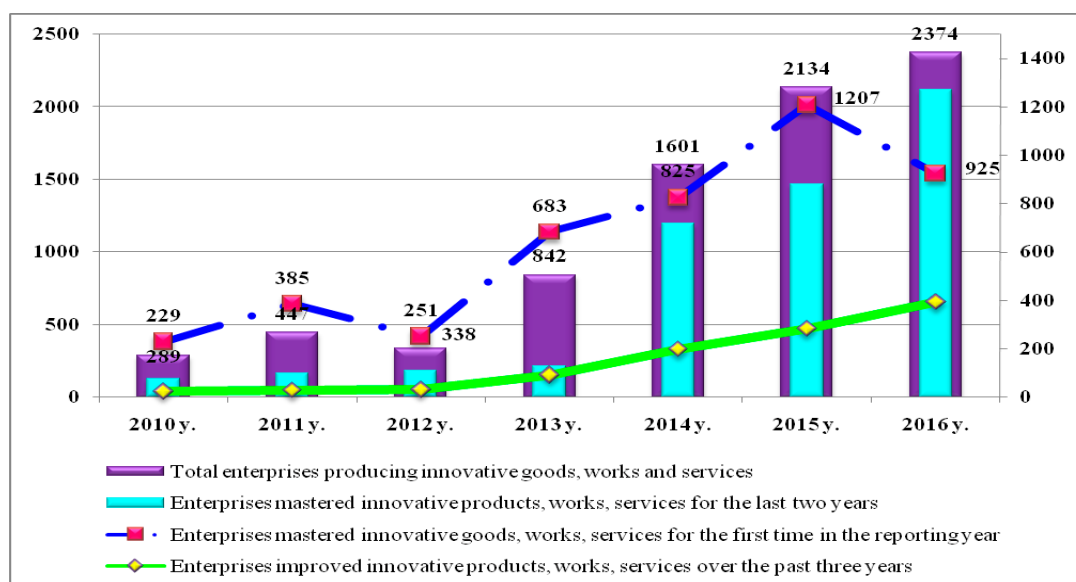
In order to improve the business environment government of Uzbekistan made a number of legislative changes in 2017, including the repeal of unplanned and seemingly arbitrary or punitive controls on companies from 1 January 2017. Annulment of the obligation to convert certain percentages of hard currency export earnings into official exchange rate; Simplification of business registration procedures; Creation of an office of the

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economic ombudsman; and the Anti-Corruption Law, which seeks to increase the transparency of the activities of the Government of Uzbekistan. Foreign investors are welcome in all areas of the Uzbek economy and the government cannot discriminate against foreign investors by nationality, place of residence or country of origin. State control of key

industries, however, has a discriminatory impact on foreign investors. For example, the Uzbek Government maintains strict control over all economic processes and retains control in key sectors such as energy, telecommunications, airlines and mining. From these point of views our research is relevant.



**Diagram 1. Number of enterprises and organizations producing innovative goods, works and services (2010-2016)**

Source: official data of stat.uz

### ANALYTICAL PART

The number of enterprises and organizations producing innovative goods, works and services grew up 8 times from 2010 to 2016 from 289 to 2374 units. Enterprises that first mastered the production of innovative products, works and services increased by 696 units [2].

Currently many Programs for the Development of the Regions of the countries are directly tied to hidden reserves, which is generally consistent with the goals and objectives of the development of the territories. In the next part we will address major factors cooperation projects.

The aims of the Development program are to:

- Raise awareness of development issues in countries.
- Promote debate on interlinked political, economic and social matters.
- Bring together political authorities, members of national, international and European development organizations, and business representatives.

### Uzbekistan: Country Operations Business Plan (2018–2020)

The country partnership strategy (CPS), 2012–2016 of the Asian Development Bank (ADB) for Uzbekistan supported infrastructure development and access to finance. Consultations with the government confirmed that the strategic focus of the CPS remains valid. The proposed country operations business plan (COBP), 2018–2020 for Uzbekistan extends the validity of the CPS, and is consistent with recent government initiatives. This COBP fully supports the strategy and reflects updated development priorities of Uzbekistan. To this end, this COBP includes operational support for transport, energy, municipal services, health, and access to finance. Support for the key drivers of change—private sector development, regional cooperation, knowledge management, gender equity, and climate change and the environment—is integrated into the operational assistance [3].

If we analyze current approaches we will come following feedback from foreign investors:

- Uzbekistan is situated in the center of Central Asia
- Uzbekistan is double-landlocked

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- Uzbekistan offers young and generally well-educated workforce
- Uzbekistan is a very attractive consumer market with 33mln. population

- Transport and communication systems are well developed [4].



Diagram 2. Ease of Doing Business in Uzbekistan (2008-2018)

Source: Official data of trading economics

For the development and regulations of the foreign investment activity highly relevant creation of the National Agency for Project Management under the President of Uzbekistan (NAPU) in Uzbekistan. “For example, any investor, before investing his capital in the economy of Uzbekistan, first of all, according to various sources, studies the state of the business environment in the republic. And one of such authoritative sources is the report of the World Bank and the International Finance Corporation “Doing Business”.

As for the Trading Economics Uzbekistan is ranked 74 among 190 economies in the ease of doing business, according to the latest World Bank annual ratings. The rank of Uzbekistan improved to 74 in 2017 from 87 in 2016. Ease of Doing Business in Uzbekistan averaged 127.30 from 2008 until 2017, reaching an all-time high of 166 in 2011 and a record low of 74 in 2017.

### Regulations for business authorities

Uzbekistan has a highly regulated economy with a vast number of regulatory authorities. The principal regulatory authorities are the Cabinet of Ministers (responsible for the overall regulation of the economy), the Ministry of Finance (responsible for fiscal and taxation policy), the Central Bank (responsible for regulation of banks and monetary policy), the State Tax Committee (responsible for collection of taxes), the State Customs Committee (responsible for collection of customs payments), the Ministry of Economy (responsible for development and implementation of long-term social and economic strategies of the state) and the Ministry of Foreign Economic Relations, Investment and Trade (responsible for foreign trade and attraction of foreign investment) [5].

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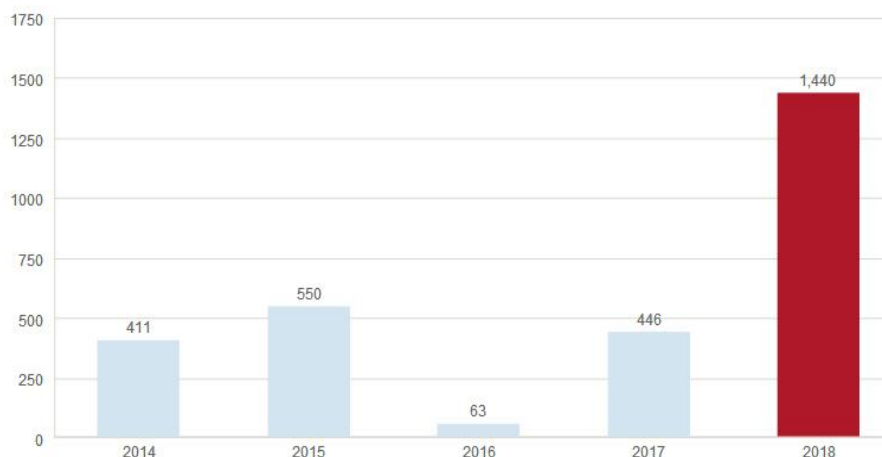


Figure 3. Uzbekistan: Commitments by Fiscal Year (in millions of dollars) [6].

Source: Official data of the World Bank

Liberalization of financial sector is a greater independence for the Central Bank of Uzbekistan (CBU), an assessment of banking sector resilience, the implementation of financial recovery plans (SOEs), and plans to reinstate the previously stalled World Trade Organization.

Loans allocated by local banks participating in the project have funded business activities across the

country, affecting a larger pool of horticultural producers and 12,000 farmers by providing improved access to services and facilities or inputs such as seedlings, fruits total of 223 loans have been issued co-invested US\$52.3 million equivalent of their own funds, bringing the total amount of investments in the agricultural sector to US\$185 million. Following table states that total lending money from World Bank for long term development projects [7].

Number of active projects	16
Lending	US\$2.7 billion
IBRD	US\$1.2 billion
IDA	US\$1.45 billion

Figure 4. World Bank Partnership Overview

Source: Official data of the World Bank

Above table indicates that total investment projects in Uzbekistan cooperation with World Bank. It is seen that obtained credit lines and amounts of two main partners by 2017.

The strategic goal of the ongoing reforms in the field of improving the investment climate has been defined, which is to create in Uzbekistan the most favorable conditions for business activities and foreign investments corresponding level of the top twenty countries of the world by 2022. It is important that in the regions they will change their attitude and turn to investors, they will begin to create all the conditions not to think about interdepartmental issues,

but to think about how to increase the country's potential with the help of these investments, accelerate development and improve the image [8].

#### Investor considerations

- Economy is highly regulated by the state
- Low level of copyright protection
- Plenty of office space available

The role of investment attractiveness in small business and private entrepreneurship in the country's GDP and economy is gradually going up. In 2017, this sector generated 56.7% of the GDP and created 77.9% of employments to the population.

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Figure 5. Uzbekistan Employed Persons (2008-2018)

Source: Official data of trading economics

The number of employed persons in Uzbekistan increased to 13520 thousand in 2017 from 13294 thousand in 2016. Employed Persons in Uzbekistan averaged 10305.11 thousand from 1991 until 2017, reaching an all-time high of 13520 thousand in 2017 and a record low of 8255 thousand in 1991 [9]. While investors hire employees in the country they need to calculate following tax burdens.

- Pension Fund – 24.8% (14.8% for small business)
- Employment Fund – 0.1%, and
- Trade Union Federation Council – 0.1%.

Government fully regulates work visa and resident permit policy for the investors.

### Restrictions on employment of foreign nationals

- The Agency on Foreign Labor Migration under the Uzbek Ministry of Labor and Social Protection sets limitations for attracting foreign personnel.

- For instance, such limitation for works under PSA is set at 20% of the total number of employees, and attracting more foreign personnel is subject to a condition that there should be no qualifying specialists in the local population.

### Regulatory authorities

The principal regulatory authorities are the Cabinet of Ministers (responsible for the overall regulation of the economy), the Ministry of Finance (responsible for fiscal and taxation policy), the Central Bank (responsible for regulation of banks and monetary policy), the State Tax Committee (responsible for collection of taxes), the State Customs Committee (responsible for collection of customs payments), the Ministry of Economy (responsible for development and implementation of long-term social and economic strategies of the state) and the Ministry of Foreign Economic Relations, Investment and Trade (responsible for foreign trade and attraction of foreign investment).



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**Figure 6. Uzbekistan Exports (2008-2018)**

Source: Official data of trading economics

The next statistical analysis by Trading Economics exports in Uzbekistan increased to 13953 USD Million in 2017 from 12178.70 USD Million in 2016. Exports in Uzbekistan averaged 4200.85 USD Million from 2006 until 2017, reaching an all-time high of 14084 USD Million in 2014 and a record low of 1386.80 USD Million in 2006.

**Incentives for carrying out export activities**

Enterprises exporting goods (services) of their own production for freely convertible currency may apply reduced rates of corporate income tax as follows:

- If export total sales 15% to 30%, the effective rate shall be reduced by 30%.
  - If export total sales is 30% or more, the effective tax rate reduced by 50%.
- This incentive is applied likewise in regards to property tax. Thus:
- If export ranges from 15% to 30%, the property tax rate is reduced by 30%.
  - If export ranges from 30% and higher, the property tax is reduced by 50%.



**Figure 7. Uzbekistan Industrial Production (2008-2018)**

Source: Official data of trading economics

Foreign direct investment to the industrial section is going very fast as above diagram shows Industrial Production in Uzbekistan increased 10.70 percent in the second quarter of 2018 over the same quarter in the previous year. Industrial Production in

Uzbekistan averaged 18.77 percent from 2004 until 2018, reaching an all-time high of 41.12 percent in the second quarter of 2006 and a record low of 4.70 percent in the second quarter of 2016.

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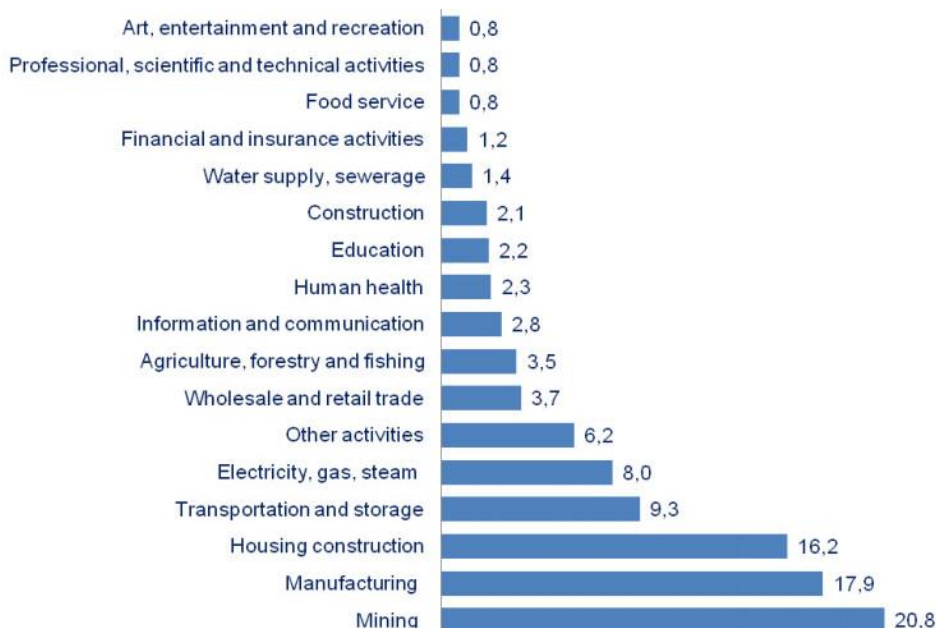


Figure 8. Investments in fixed capital by economic activity in 2017 (as% of total)

Source: Official data of stat.uz

Compared to 2016, the share of investments in the fixed capital of the mining industry increased by 5.9 percentage points of the total volume of investments. Of which: extraction of crude oil and natural gas by 4.3 percentage points, extraction of metal ores by 0.6 percentage points.

Enterprises attracting private foreign investments are exempt from corporate income tax, property tax, infrastructure development tax, unified tax payment (for micro-firms and small enterprises), as well as contributions to the Republican Road Fund. Exemption is applicable to main business activity only.

The above taxes incentives are granted if the following, without limitation, conditions are met as reports PWC 2017:

- the enterprises are located in any city or rural area settlement of Uzbekistan except Tashkent region and Tashkent city
- share of foreign capital of enterprises should not be less than 33%
- investment should be made in hard currency or new/modern technological equipment, and not less than 50% of the respective tax savings should be reinvested for further development of enterprises.

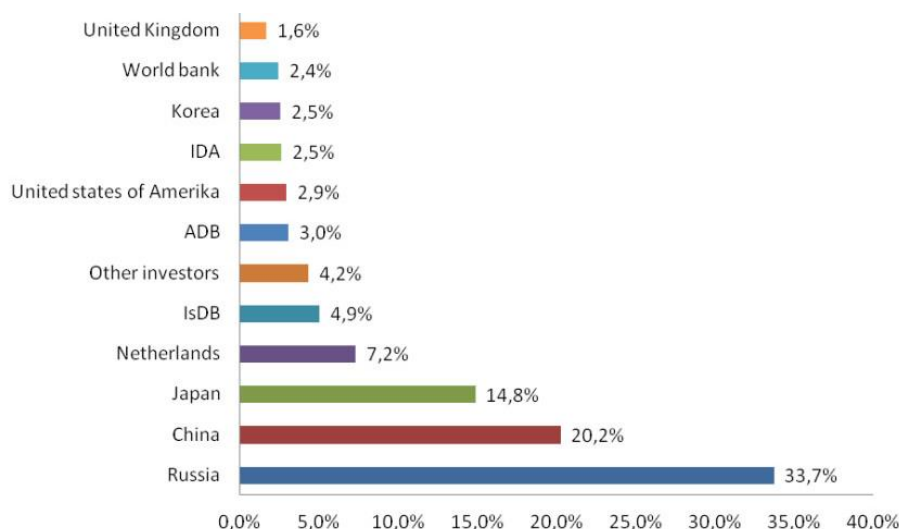


Figure 9. Share of foreign investors in total volume of foreign investments and credits in 2017

Source: Official data of stat.uz

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In conclusion, Uzbekistan is the considerable as emerging markets in continent. Reforms by the government are directed professional and transparency cooperation with many international institutions, such as societies and organizations. We hope in shortly investment attractiveness will give its enormous effects by productivity and efficiency in regions, sectors and companies. The government is closely scrutinizing all foreign investment, focusing

on the sectors that it considers strategic, such as mining, cotton processing, oil and gas refining and transportation. There is no single and transparent screening mechanism, and some elements of the legal framework are intended to protect the domestic industry and restrict competition from abroad. The government also uses licenses as a tool to control companies in various important sectors such as energy, telecommunications, wholesale and tourism.

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UDC 81-139

## USING MEDIA TECHNOLOGY IN THE TEACHING FOREIGN LANGUAGE IN TECHNICAL HIGHER EDUCATION

**Abstract:** The article highlights on the investigation of the main peculiarities of using modern communication media, namely multimedia, while teaching English in technical university.

**Key words:** information technology, multimedia, multimedia tutorial, teaching foreign languages.

**Language:** English

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### Introduction

The leading country in the world community will undoubtedly be the one that creates the most effective educational system capable of developing scientific intellectual, spiritual, technological potential and educating young people in the spirit of boundless devotion and patriotism to their homeland, its ideals and traditions, love for humanity, the environment.

At present, the state educational system is in anticipation of transition to a new stage of development and requires a radical restructuring of the existing teaching methodology. It is necessary to introduce new methods of teaching and verified information transmission technology using educational films for any complex information transmission unit becomes easily digestible and available to the public. To this end, it is necessary to widely use in the field of education and culture new technologies that are successfully used in the advertising and television industry, in the creation of commercial films.

### Materials and Methods

Multimedia are interactive (interactive) systems that provide simultaneous work with sound, animated computer graphics, video frames, static images and texts. This term refers to the simultaneous impact on the user through several information channels. In this case, the user is usually assigned an active role. In other words, multimedia is a collection of technologies that allow a computer to enter, process, store, transmit, and display (output) data types such as

text, graphics, animation, digitized still images, video, sound, and speech. The word "multimedia" appeared in connection with computer technology. It was first used by English singer and performer Bob Goldstein in 1966, when he organized his newfangled show. Later this term meant any entertainment product with various sound and video effects, but only in the 1990 — ies it was finally the definition of this word: "multimedia (multimedia) is a modern computer-based information technology that allows to combine in a computer system text, sound, video, illustration and animation (animation) - multimedia includes combination of text, audio, still images, animation, video or forms of interaction content."

The use of new communication media in the educational process provides an increase in the informative capacity of the content of the training session, because contributes to the implementation of educational, educational and developmental functions of training; reduces time, allows you to absorb more knowledge; focuses on the assimilation of the most complex topics and concepts; allows you to improve the selection of tasks and exercises, making them more visual and interesting); forms skills and abilities due to individualization of training and development of skills of independent work

The use of media in the vocational training of students is associated with the following significant functions:

- modeling of the studied processes;
- showing the considered events, phenomena and processes in the dynamics of their retrospective and perspective interpretation;

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- computer visualization and reflection on the big screen of inaccessible to the direct perception of processes and phenomena;

- interactive control of the considered processes modeled on the screen (virtual participation of students in the analyzed process or phenomenon);

- individualization and differentiation of the learning process (regulation of the information richness of the classes conducted, taking into account the individual characteristics of students);

- implementation of current and final control over the cognitive activity of students with the establishment of feedback;

- providing free access to global and local information networks;

- the emotionality and expressiveness of the transmitted educational information;

- demonstration of the studied processes and phenomena of a sufficiently large educational audience;

- increased learning motivation.

Modern information technologies require higher educational institutions to introduce new approaches to learning, ensuring the development of communicative, creative and professional knowledge, needs for self-education. The introduction of information technology in the educational process of the university moves to a new stage - the introduction of new multimedia educational materials

Multimedia tutorials have many advantages over traditional teaching methods. They allow you to train different types of speech activity and combine them in different combinations, help to realize language phenomena, form linguistic abilities, create communicative situations, automate language and speech actions, and also provide the ability to account for the leading representative system, the implementation of an individual approach and the intensification of student independent work.

It should be noted that with the help of modern multimedia technologies it is possible to expand the range of presentation of educational material in comparison with traditional. For example, the presence of a network computer terminal allows you to: search for reference material in the local and global network; find relevant information from various fields of knowledge; organize interactive communication with native speakers; visualize the training material in various ways; create your own presentations in a foreign language using various means.

It should also be noted that the use of the latest technologies provides both the teacher and the student a number of advantages:

1) the possibility of combining imaginative and logical ways of mastering information;

2) activation of the educational process by increasing visibility;

3) interactive interaction, allowing, within certain limits, to control the presentation of information, individually change the settings;

4) the ability to create a virtual environment as close to natural conditions;

5) visualization of complex schemes, internal processes and phenomena using three-dimensional computer animation; attraction of video fragments and extensive illustrative material; it turns learning into a fascinating process and helps to increase the motivation of students;

6) flexibility and integration of different types of multimedia educational information;

7) becoming an active participant in the educational process, which uses multimedia technologies (network technologies, electronic, etc.), the student from the object becomes the subject of communicative communication with the teacher, which develops independence and creativity in his educational activities.

Digital animation programs allow you to create visual processes that can be effectively used in creating educational films. The use of digital technologies (sound-image) is necessary not only to improve the level of education of students and youth, but also to involve the bulk in the educational process, which is the main condition for the development of society's potential. The importance and importance of this problem multiplied and continuously grow with the transition from individual (one teacher to one student) to mass (group) learning, when the audience is a whole class or classroom.

In order to solve this problem in the modern conditions of science and technology development, information and telecommunication technology, taking into account the accelerated and continuous growth of the demand for knowledge (education), it is necessary to introduce the latest methods of medical technology in the teaching process in educational institutions of all systems.

At present, the educational institutions in the educational process (primarily in the higher and secondary special educational institutions) to enhance learning, better and better digestibility of the material used different equipment and technical training (TCO), such as projectors, slide projectors, slydoscopy, television systems, Computers, moderators, lingaphones and many types of active teaching methods: business games, organizational and activity games, distance learning, traditional lectures, seminars, workshops Collegiums, debates, round tables, conferences, etc.

The essence of the content of medical technology and its application in the teaching and learning process lies in the fact that with this method, subject to its normal organization and skillful application, all students-listeners, regardless of their ability and education, have a personal interest in the subject and the problem in question, and Also the

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desire to actively participate in the process of discussing the issue. Almost there will be no possibility to distract.

Currently, there is a diagram "pupil - classroom - the teacher" in the educational process, in which, first, the teacher-media information plays an authoritarian role, and the result of learning - assessment, and secondly, the knowledge is distributed in disciplines that do not intersect. The school methodology does not provide for free analysis in the learning process, it is a deviation from discipline. Thirdly, increasing the communicative capacity of the audience is not seen as a factor that reveals the individual abilities inherent in each individual student of the school, which has an "impersonal character."

In contrast to this, when introduced into the scheme of "teacher - reflecting" educational films with a specialized procedure accompaniment barrier created by the circuit "pupil - audience - teacher" markedly fade and between teacher and pupil is set free, democratic, vowel working environment, forcing Liberate the listener, freely reflect and openly express their opinions (even if this is not entirely true).

### Teaching Tel meditating

The position of the teacher is democratic. Assimilation of the object is achieved by increasing the natural interest in learning. In addition to films on the curriculum, intellectual films that develop thinking and judgment are used. The result of the training is understanding and mastering the discipline.

### Consistent universal content

The disciplines in which the training takes place intersect each other. Free analysis is allowed. The focus of the educational process is aimed at understanding the internal relationships of the subjects studied.

### Social character

One of the main tasks of the teacher is the purposeful alignment of the communicative capacity of the audience and each pupil of the school to disclose the individual abilities inherent in it.

The proposed concept of the methodology of secondary education only complements, without eliminating the introduction of the norm of teaching. This addition is focused on improving the quality of information transfer and on increasing the role of education and upbringing of youth in a purposeful stage-by-stage reform of society. Digital technology allows:

To model audio and visual processes of any complexity, simplifying them for perception and memorization.

Specialized films created by the curriculum will significantly increase the interest in learning. The time of transfer and assimilation of information will be markedly reduced, which will optimize the educational process.

Educational film - a way of structuring the information using the plot, the method by which consistently sets out a large block of information of the curriculum. The barriers that arise between the student and the teacher are disappearing, since the goal of communication between the teacher and the students is not the presentation of information, but the discussion and consolidation. The film defines the content of communication. In this case, the teacher becomes a participant in the discussion. Thus, the existing educational practice, which is a role communication, expands, and in the proposed methodology the teacher and pupils are asked questions (interpersonal communication), where the dialogue participants (teacher-student) are individuals who express themselves in the course of communication.

In projects for the restructuring of secondary education, little mention is made of the training of teachers (higher education), which is the starting point in the development of secondary education. This relationship requires informers of the educational system to create new institutions aimed at the development of modern intellectual society. It is necessary to start with the most effective solution, namely with the introduction of educational films and the methods of their accompaniment in the learning process.

The project provides for the development of a methodology for accompanying educational films in the uniting direction: science, psychology, sociology, art and new technology.

## Conclusion

As a result, gradual restructuring of the state of the education system involves consideration of the effect of education in the need for a global vision of the future of the country.

In addition, it is important to note the shift in the emphasis of learning from group to individual, which is characterized by a differentiated personality-oriented approach that allows to remove the psychological difficulties of learning. Thus, in the educational process there is a redistribution of functions of the student and the teacher. Thus, in the traditional approach, the teacher plays a leading role, which is to inform and control, the student passively assimilates the knowledge taught, followed by their reproduction. In the process of reorientation to interactive learning both participants of the educational process are almost equal. The teacher becomes an assistant consultant, and the student has the opportunity to take responsibility for the acquisition of knowledge and, therefore, takes an active cognitive position.

The inclusion of modern information technologies in the educational process undoubtedly contributes to the quality of education. Nevertheless, it should be recognized that the level of

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informatization of educational and scientific activities of universities is still quite low. Currently, the introduction of information technology and the Internet in the educational process of secondary schools and universities is limited and does not always adequately correspond to the plans and programs of work. Undoubtedly, it is the University that should

play a major role in the development of information educational technologies. The most important tasks are: the development of various forms of distance learning and the creation of electronic libraries and educational databases, Modernization and development of the existing network infrastructure, increasing the capacity of the channels used.

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## THE ROLE OF THE CONCEPTS OF GLOBALIZATION IN THE ENGLISH LANGUAGE

**Abstract:** The article discusses today's major sociolinguistic theories that have emerged due to the English language globalization, as well as language and culture contacts.

**Key words:** language, culture, foreign language, norm, globalization, language community.

**Language:** English

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### Introduction.

English, one of the most powerful languages of our time, having become involved in the process of globalization, is undergoing rapid dynamic processes, observed most vividly since the last third of the 20th century. This dynamic is due to the expansion of contacting English with other languages and cultures (however, this process began from the end of the 15th century) and the development of its functions in serving the society, which was caused by political, economic, cultural and informational reasons, first of all [1].

There is no doubt that the complexity and speed of these dynamic processes, correlated with the status, change and functioning of modern English, could not but cause controversial discussion points of view, the scientific reception of which gave rise to a number of concepts, the main of which are the following: the concept of English variability, known abroad as the World English paradigm, and its related concept of English as an international language (English as an International Language, EIL); the concept of an intermediary language, or lingua franca (English as a Lingua Franca, ELF); concept of international English (International English, IE); The concept of simplified English, such as Globish, is essentially a commercialized business idea. All of these concepts, relevant to understanding the essence of modern

English, lead to reflections on its future, represented by futuristic theories, and on the social significance of these processes, illuminated by ideological theories.

The concept of English variability. One of the first theories brought about by the global spread of English was the theory of world English (world English), which was founded by American linguists Braj and Yamuna Kachru from the University of Urbana-Champaign, Illinois, and Larry Smith from the East-West Center, Created at the initiative of the University of Hawaii. The starting point in the development of this theory can be considered 1961.

Differentiation of the English language is expressed in the existence of variants of three types (the theory of three concentric circles) [2]:

a) national variants of the English language of the Inner Circle - they are the mother tongues of people and function in all possible language functions (for example, British, American, Canadian, Australian, New Zealand English);

b) regional and local variants in the states freed from the colonial yoke, where English is the second official language and performs administrative, instrumental, interpersonal and creative functions (for example, Indian, Singaporean, South African, Nigerian and other variants of the Outer Circle);

c) regional and local variants of the Expanding Circle, performing limited functions, mainly used for



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intercultural communication and mastered through the educational system (for example, European variants, Russian, Chinese, Japanese English).

Differences of variants are based on differences of cultures on which they are based, mentality, as well as transfer characteristics of native languages for users. Differential signs of variants are observed at all levels of language and speech - in accent, vocabulary (especially in the transmission of cultural realities), syntax, and morphology, both word-wise and word-formation, in pragmatics of discourse.

The most dynamic processes occur in variants of the Outer Circle, where they form their own endonorms (first, oral, and then writing), departing from the prototypical British or American exonorm

1 - for example, in many cases, there is an endowment of nouns with a sign of discreteness and the formation of plural forms from uncountable, from the position of the British / American norm, nouns (equipments, furnitures, advices). In fairness, it should also be noted that in the Outer Circle, exonorms are often continued to be used.

All options are equal in terms of linguocultural terms - there are no options for the worst or best. It is impossible to reduce a variant (which often occurs with variants of the Expanding and Outer Circles) to the idea of an incomplete, pidginized language in which errors are identified as features of the variant. The variant of the Outer and Expanding Circles is a much more complex formation, which is a continuum, characteristic of the speech of bilinguals and consisting of at least three parts: acrolection, typical of well-educated users mainly in a formal context; the electoral characteristic of the speech of educated people in an informal context or loss of control over their speech, and the characteristic of the speech of poorly educated users.

Language variants are objects of sociolinguistics. They are an averaged phenomenon, characteristic, in general, of a certain society, but in real speech of an individual not all of his features may appear.

As can be seen from our review, the concept of options is based on linguistic, cultural and functional parameters, considering both the common features inherent in all options and their differences. However, many European linguists criticize this concept for its focus on the description of options, calling this approach to the English language "feature linguistics", but in reality, as we see, this concept is quite multifaceted, not purely descriptive [3].

Another weak point of contact variant studies is the lack of elaboration of the issue of borders and types of options: national, regional and local.

The concept of the intermediate language. At the turn of XX-XXI centuries in European linguistics has become a popular concept of English as a lingua Franca, a spin-off from the theory of options. The main difference of this concept, in strengthening of

which the Journal of English as a Lingua Franca (ELF) plays a significant role, is in switching the focus of attention: the new concept focuses not on the variants, but on the description of the transnational intermediary function of the English language, its "naturally adaptive language development" [4].

From this it follows that in the theory of options more attention is paid to the relationship of language and culture, while in the concept of English as a lingua Franca, emphasizing the dynamics and instability of communication situations, variability and flexibility of the language means used, the object of the study are mainly the strategies and tactics of communication using the English language represented by different options (for example, code mixing, borrowing, regularization, the use of language redundancy, designation of understanding / misunderstanding, strengthening the value, search for clarification and explanation, paraphrasing, attention to nonverbal elements of communication, etc.

### International language concepts.

English has become the language of international communication, and one of the first to develop this thesis was Larry Smith: "My working definition of an international language is the language used by people of different Nations to communicate with each other. English - the most used international language" ("My operational definition of an international language is one which is used by people of different nations to communicate with one another. English is the most frequently used international language" [5].

However, the sociolinguistic reality, as B. Kachru repeatedly pointed out, proves that the pluricentricity of the English language, i.e. the number of variants whose standard is marked as a linguistic norm, increases, which is primarily due to the awareness of the linguistic and cultural identity of the peoples using the language. The Americans were the first who realized this in the late XVIII - early XIX century.

In modern English there is no uniform standard, because in each case the Inner circle of their indoor- we are, in embodiments, the Outer circle is the emergence of private standards and the Expanding range of have a wide range of econorm, not necessarily on the British model. Thus, speaking about the international character of the English language, we must be careful, because it involves two polar opposite concepts.

The concept of simplified language. The idea of creating an artificial language for international communication has long occupied the minds of those who thought about facilitating communication between Nations. One of the first such projects involving the English language was basic English, invented in 1925 by the British linguist Charles Ogden and tested in China by Ivar Armstrong Richards. BASIC - English is often associated with the adjective

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basic "basic, basic", which corresponds to the concept of this planned language: use only basic vocabulary (850 words + 200 international words +1000 words from special fields of activity, if necessary) and basic grammatical categories. In fact, BASIC is an abbreviation of British American Scientific International Commercial "British-American scientific international commercial", and the name itself contains the purpose of this project, its commercial nature. Despite criticism, associated primarily with artificial restrictions, the idea of a basic English (not the language) have been implemented in the creation of radio program for students (for example, Voice of America's Special English), in the preparation of technical manuals and dictionaries.

At the end of the XX century was invented and in 2004 began to implement another project - Globish (Globish, contamination global + English), the idea of which belonged to the former Vice President of global marketing for IBM's Jean-Paul Nerrière (Jean-PaulNerrière). This language uses standard but simplified English grammar and limited to 1,500 words of vocabulary. The selected words, as stated by its creators, constitute a common base of vocabulary used by non-native English speakers. This vocabulary consists of neutral vocabulary, metaphorical and phraseological material is absent in it. The commercial essence of the idea is already manifested in the fact that globish is registered as a trademark and is used in courses that prepare businessmen for whom time is money to communicate in English. Globish has many offices in different countries, including Russia. In 2011 Australia established a "Fund, globish", which is a non-profit organization engaged in the publication of standards, online testing and dissemination globish.

Another school project was proposed by German linguist Joachim Grzega (JoachimGrzega) - "Basic global English (Basic Global English, BGE)" [6]. The amount included in his vocabulary - 750 basic words + Styl-lismi + 250 individually selected words. Grammar consists of 20 elementary rules. Much attention is paid to the study of communication strategies. The main difference between BGE and globish and other concepts of simplification of the English language is that BGE focuses not on standard English, but on the "core lingua Franca", described by John. Jenkins [7], and admits variability. However, unlike the ELF concept, BGE does not pretend to theorize, but is an attempt to apply the idea of language simplification (which is actually a violence against language) to the practice of language teaching, which causes the commercialization of the concept itself.

### Futuristic concepts.

Differentiation of the English language makes us think about its future. One of the most striking concepts of this direction predicts the death of the English language, which, as once Latin, will break up

into independent languages, significantly divergent from each other. The beginning of this process is the formation of options. It is interesting that in a number of countries attempts have already been made to call the variants languages, which usually accompanies the process of a sharp rise of national consciousness, including linguocultural. So, in 1919. in the United States published a book by Henry Louis Mencken (HenryLouisMencken) "American language"; in 1945 in Australia was published the work of Sidney J.Baker "Australian language". In 1996, Canada issued a document for the assessment and training of immigrants, which is called "Milestones of the canadian language" ("Canadian Language Benchmarks"), and, despite the official bilingualism of the state, it was about English (mention of French appeared only in 2002).

According to the dynamic theory development of options Edgar Schneider [8], the options are quite long evolutionary way of development consisting of five phases: Foundation, economical stabilization of nativization, indoor stabilization and differentiation. At the last stage, which characterizes the developed national variants, there is a stylistic, dialect, sociolect stratification of the variant, bringing it closer to the status of the language.

### Ideological concept.

Consideration of the processes associated with globalization, in which the English language is directly involved, would be incomplete if we omitted the theory due to ideological attitudes and attitude to this sociolinguistic reality. In fact, as R.Phillipson correctly notes [9], there is a confrontation between two paradigms in this issue - the ecology of languages and the spread of the English language.

The first paradigm is represented by the theory of linguistic imperialism, according to which the English language is accused of "linguistics" of other languages, imposing the values of Western Anglophone culture on other peoples. The result of this approach, English is endowed with a hard-hitting metaphorical definitions: it is called many-headed "Hydra" (hydra), "bully" (the bully), "the terrible and inexorable force" (Juggernaut), "Nemesis", "Siren song" (Sirensong), "invader" (intruder), etc.

### Conclusion.

Modern reality poses new challenges for researchers and users of the language. Globalization of language is necessarily accompanied by its localization, complicated relations between language and society, language and culture, and this gives rise to new linguistic theories and paradigms. Their distinction is not only in conceptual and metalinguistic aspects. It is also important for sociolinguistic, evolutionary and ideological approaches that have both fundamental theoretical and applied significance. Each of the concepts analyzed in

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this article has its own ideological principles, the implementation of which determines the language policy.

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## METHODS OF LEARNING ENGLISH IN THE TECHNICAL UNIVERSITY

**Abstract:** An important role in the modern technical University is the study of English. This article provides a brief overview of the methods used in vocational training and their analysis.

**Key words:** English, methodology, multilevel training; continuous training; complex method; perception of information; thematic communication.

**Language:** English

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### Introduction.

Today, the reform of the education system is one of the most pressing issues. On the whole, first period of independence to the present day reform education system and prepared high ability specialist as one of the most important priorities of the state policy attention. Currently, much actualize area the problem of linguistic knowledge. The amount of professional information in foreign languages is huge and continues to grow. The most dynamic in terms of international integration and exchange of information are the sectors of the economy, law, industry, supply and trade and market relations and aviation, the rapid development of which leads to the need for foreign language proficiency of each industry specialist [1].

Classical approaches of teaching a foreign language, previously used as independent methods, are somewhat losing their effectiveness in modern times. Due to the increasing information load, it is difficult for students to assimilate the material, the culture of education is also changing, methods of presenting language knowledge and monitoring individual progress are being improved. Very popular methods of studying ESP - methods of learning a professionally-oriented language or language for special purposes, as evidenced by the published

monographs [2], the development of methods of teaching ESP, conducted research.

Development of programs and curricula for training students to teach technical English at the University

According to the program recommended by the scientific and methodological Council for foreign languages can be noted the main provisions fixed in the documents prescribing the modernization of higher education:

- Foreign language proficiency is an integral part of the professional training of all specialists at the University.
- The English language course is multi-level and is developed in the context of continuing education.
- English language learning is based on an interdisciplinary, integrated framework.
- English language training is aimed at the comprehensive development of communicative, cognitive, informational, socio-cultural, professional and General cultural competences of students.

But, even with a single program, you must always take into account the specifics of the institution or its departments, the needs of customers and students themselves. One of the main factors in language learning is the teachers themselves. The development of curricula should take into account the

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variety of methods and approaches used, depending on the purpose of the course and available resources.

The diagram shows the main methods used and applied in the study of the English language:

- Grammar translation method;
- Direct study;
- Audio-lingualism;
- Suggestopedia method;
- "Silent" method (silence method);
- Community (group) learning method);
- Communicative method;
- Fundamental Eclecticism.

Information and communication technologies (ICT) are also the most widely used methods at present.

Based on this, we can distinguish four groups of methods: problem learning, Autonomous education, learning abstraction, learning using ICT.

Traditionally, methods of direct language learning are used together with the method of grammatical translation. Listening and image visualization are widely used. [3]

Suggestopedia method based on the study of language under stress in a calm and relaxing atmosphere difficult to apply in Universities due to the nature of the learning process. In a certain number of educational institutions that have entered into close integration with foreign teachers, a "quiet" method is used, i.e. a method of non-verbal education, consisting

in the fact that the desire to know the language is initially inherent in the person who wants to learn it, and most importantly - do not interfere with students and do not impose the Following this method, the teacher initially does not say anything, using graphic illustrations, tables and other didactic materials. The method shows its effectiveness, but its use in a technical school is difficult.

The next most popular method is community learning (group), which consists in motivating the internal work of a group of students studying English through the collective resolution of a number of tasks. The method demonstrates pedagogical efficiency and its application in teaching technical English.

Communicative method is widely used in high-quality training of professional staff, based on dialogue and conversational communication with native speakers.

The principal Eclecticism, the method of selective combination of the most effective modern methods, deducing the goals and objectives of training, based on the needs and interests of the student, unfortunately, is still exotic, because of the complexity of its implementation. Nevertheless, this method allows you to fully learn the language, using a variety of approaches to the submission of information and realizing the potential of the student. Briefly, the difference in these methods can be presented in the form of the following table:

**Table 1. Summary table of methods**

Method	Direction	Characteristic
Grammatical translation method	Printed / written literary texts	Translation from English into native language
Direct study	Daily language practice, speaking the target language, using it as a "second native language»	Learning by linking meanings and images directly in the target language
Audio-lingualism	Speech and sound models	Listening and speaking exercises, coupled with the basic practice of writing only in the target language
Cognitive techniques	The rules of grammar	Acquisition and reproduction of grammatical rules of the studied language in the context of understanding and perception
"Silent" method (silence method)	Student faster action of the teacher	The teacher is silent to students inquired about how "works" English
Suggestopedic method	The ambiguity of the texts and the extensive thesaurus	Pleasant atmosphere, with music, encourages subconscious learning of English
Community (group) learning method)	The interaction of the students	Understanding of English through active interaction of students
Communicative method	Interaction, strengthening of interpersonal relations and conducting semantic negotiations	Understanding of the English language through active interaction of the student; role-playing games, games, information gaps

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Natural method	Audition	English speech does not reach students until they are prepared; meaning is clarified through actions and visual effects
Content-based, task-based, and participatory methods	Anything that is not a communicative way of information transmission, not the structure of the English language	content is based on students ' attitude to life: topics, tasks, problem solving
Prepared learning strategy, co-learning and multiple thinking	How to learn	the Strategy of learning, mutual cooperation. Activities vary according to different levels

The seemingly simple procedure for determining the content of training and organization of training should include theoretical provisions. The curriculum should therefore be adjusted to the overall methodology of the course.

The use of innovative methods and synthesis of the optimal approach to language learning in a technical University

In modern times, a variety of interactive, automated methods are widely used:

- Multimedia;
- Online communication with the teacher;
- Thematic communication in the target language in various social networks, forums;
- Video tutorials, listening;
- Electronic communication: e-mail, conference, etc.

The use of interactive/media/electronic AIDS in language learning can be characterized as a combination of natural, cognitive and content-oriented methods using audio-lingualism. This combination significantly increases the efficiency of language learning, using a set of advantages of the methods used, but nevertheless, the use of information technology in the study of English in technical Universities is not widespread so widely because of the unreasonableness of the over complication of the course. The most optimal statistical processing of data on students' progress shows itself the integration of the method of grammatical translation, coupled with the use of thematic content in group study and active communication of students in the classroom. [4]

Today, the ability to use the means of computing and telecommunications in their subject area should be considered as a criterion of general literacy, comparable to today with the traditional interpretation of this concept - as the ability to read, write and count.

So, What are the most frequently used elements of the use of information and computer technologies in educational process:

- electronic textbooks and manuals, displayed via a computer,
- Multimedia projector,
- Interactive whiteboards,
- Electronic encyclopedias and reference books,

- Simulators and testing programs,
- Educational resources of the Internet,
- DVD and CD discs with pictures and illustrations,
- Video and audio equipment,
- Interactive maps and atlases,
- Interactive conferences and competitions,
- Materials for distance learning,
- Research projects and projects.
- distance learning.

Learn English using and Using Information and computer technology gives children the opportunity to participate in the test, quizzes, competitions, contests, conducted over the Internet, chat with peers from other countries, participate in chat rooms, video conferencing, etc. Students can receive any information on the problem they are working on, namely: linguistic and regional material, news from the life of famous people, articles from newspapers and magazines, necessary Reference, etc. Classical and integrated lessons, accompanied by multimedia presentations, on-line tests and software products, allow my students to deepen the knowledge they received earlier, as the English proverb says: "I heard and forgot, I saw and remembered.[5]"

### Conclusion.

The approaches to the organization of the educational process in the study of English in a technical University have shown their applicability and effectiveness, which is confirmed by an increase in students ' interest in language learning and improvement of academic performance on the basis of surveys and statistical analysis. The modification of ESP - methods should take into account the industry focus and relevant didactic materials[6]. The Resource-didactic base of the Department should be regularly modernized, due to the rapid development of technical and material resources and the expansion of the semantic structure of the language base. When preparing students it is very important to assess the initial level of language understanding of the student and his individual characteristics. This approach is applicable in the study of any foreign language in any industry, but it shows the greatest efficiency when used in technical specialties. The main methods used

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in the implementation of this approach are considered, psychological and psychophysiological features of perception and memorization of information are

briefly described. The technique of presentation of material and interaction with students is deduced.

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**SECTION 31. Economic research, finance,  
innovation, risk management**

## IMPROVING THE MECHANISMS OF USING INTERNAL INVESTMENTS IN THE NATIONAL ECONOMY

**Abstract:** *The article considers the mechanism of using the investment potential in the national economy. In addition, the author also considers the determination of the boundaries of the inter-sectoral distribution of investments, the improvement of the inter-sectoral distribution of investments, as well as the analysis of the optimal boundaries of the distributed inter-sectoral investments in the Republic of Uzbekistan.*

**Key words:** investment, domestic potential, GDP, inter-industry investment, investment attractiveness.

**Language:** English

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### Introduction

World experience shows that many countries have different approaches to the regional deployment and socioeconomic development of the regions, but they are almost no different from each other. It is particularly noteworthy that the search for the optimal mechanism for attracting foreign direct investment is one of the most rapidly developing and transition economies in a relatively short period of time. Unlike the developed countries, the experience of these countries shows that they have achieved remarkable results as a result of their investment policy, which is closer to Uzbekistan than ever before.

### THE EXPERIENCE OF FOREIGN COUNTRIES FOR INVESTMENTS IN THE REGIONS OF ECONOMY AND USING EFFECTIVE USE

The goals of implementing regional economic policies in a number of countries are aimed at addressing the following objectives:

- Ensuring economic growth in developing countries;
- Install the majority of the functions of the central authorities in the local government system;
- limiting the accumulation of industrial production in major cities;
- Encouraging labor productivity and production development in newly acquired areas. One of the most

popular ways to implement a rational investment policy is to set up regional development funds. For example, in 1975 the European Union established a regional coordination body. In other countries, special funds for the solution of socio-economic problems of some regions (Southern Treasury, which operates under the state subsidy in Italy and aimed at the development of southern regions infrastructure, in the implementation of the State Program for Accelerated Development of Certain Territories in Bulgaria the Fund for the Development of Regional Targeted Funds in Central Asia, and others). [1]

An important feature of many foreign countries' regional policies is that they are large administrative-territorial units, not governors, states, provinces, and regional coordination bodies of cities and municipalities. These include nine agglomerations in France, less developed in France, 17 cities, 10 'development centers' in Spain and 2' industrial incentive centers', 10 'industrial areas in Japan' and 6 ' New Industrial Cities ', 12" Industrial Development Areas "in Italy and 26" Indus-Tria Leasing Nuclei "in Germany, 300 Population Cities in Germany, etc. The experience of the Netherlands and Belgium is particularly striking. It should be noted that the law on territorial development of cities and villages was first adopted in 1915 in Belgium. In many countries of the world, the investment policy can be applied differently depending on the domestic capacities and conditions of each region. The model of economic



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development of the People's Republic of China and the experience of attraction of foreign investments are of special importance for Uzbekistan. This feature of China's socioeconomic development is characterized by the specificity of the democratic situation in it, its high economic importance in the economy, the lack of processing industry, its specific social conditions, such as the agrarian-industrial country. This country's foreign investment The success of the project is largely dependent on the creation of a favorable investment environment in its regions. The low cost of labor in the XI, the wide use of land, the wide range of privileges for the cotton industry, the development of social infrastructure, and many other things have led to the fact that this country has become an investment destination for foreign investors in recent years. , advanced foreign economic relations and foreign exchange legislation have created favorable conditions for foreign investment. Attracting voluntary investments into the regional economies of China policy has been improving over the years. The development of this policy can be divided into three stages on the contingent.<sup>2</sup> The first stage involves the years 1979-1982. At this stage, the "open door" policy has emerged in China. In the early 1980s, local governments were granted the right to make decisions on the attraction of foreign investments. During this period, foreign investors were given great benefits. The second phase included 1983-1991. During this period, the policy of attracting foreign investment was improved. In the country's laws and regulations, the companies with foreign investments were given substantial benefits. Their income tax rate was reduced to 33%. Meanwhile, income tax for local businesses was 55 percent. If enterprises with venture capital are operating in special economic zones, this rate has been set at less than 15%. The third stage has continued since 1992. [3]

The attraction of foreign investments to the economy, which was closed to them - financial, insurance and other sectors - began in 1992. As a result of such effective reforms, China has become one of the most attractive countries for foreign investment at the beginning of the 21st century. The Japanese experience in this field has particular advantages. As a result of the consistent implementation of the socio-economic development programs of the long-term targeted regions, Japan has historically been short-sighted <sup>2</sup> Rustamova D.D. The rationale and priorities of attracting foreign investments in the context of economic liberalization are one of the most developed countries in the world. Japan's regional investment policy is based on the need for land and natural resources restriction, the need to adapt human activities to natural conditions, and the need to reduce the living standards of people in different parts of the country. Developing regional investment programs at every stage of socio-economic development of the country is determined based on the

goals and objectives facing the society and the state, and their capacity and capabilities. In Japan, flexible and convenient methods of attracting investments and production capacities to less developed regions are used. The dynamic investment policy, first of all, must meet the internal and external requirements of the modern world. In the 80-90's of the XX century, the largest scale of these products was globalization. In the 80-90's of the XX century, goods and stock markets, labor markets, development institutions, production and logistics systems, intellectual property rights (intellectual property rights , TRIPS, 1995). Globalization is an important consequence of global "tectonic" shifts. The essence of these movements is that China and India are increasingly exposed to their influence on these processes. Such factors as the long-term growth of high rates of economic growth, the enlargement of military capabilities, the rapid deployment of high technologies, and the rapid growth of the population make it possible to increase the economic and political power of these countries. In China, investment policy reforms and market mechanisms are being implemented at various stages of economic development, while the management methods have been used more frequently in the "hot" phase of the economy. China's "economic growth" is based on several key factors: reforming agriculture, reducing taxes, reducing public spending, and creating free economic zones (liberalizing exports). [2]

The Chinese administration has yet to abolish unpaired tax policy in the world economic practice - from 30.4 percent in 1979 to GDP in 1979, to 10.3 percent in 1996. This did not lead to adverse macroeconomic consequences, as at the same time, all government spending decreased from 36.4% to 13.1%. One of the instruments of Chinese investment policy is taxation. With this tool, the government struggled against the growth of capital construction. However, if businesses purchase equipment from the domestic market for technological modernization, they will be able to enjoy the privilege of up to 40% of the gross premiums. In the late 90s of the 20th century, when the GNP growth rates declined, the government required the Treasury has started to stimulate investment activity through issuing emissions. During the period of 1998-2002, the volume of this vehicle was 80.5 billion. These funds were used for the construction of irrigation facilities, highways, airports, storage facilities, forestry and partial modernization of state-owned enterprises. The Indian investment policy efficiency was the highest index of global competitiveness of 4.1 (Egypt, Khorva the Czech Republic and the Czech Republic), and also indicates a significant improvement in the export structure, which accounts for 3/4 of finished products over the past few years. Some indicators of economic and investment activity India occupies one of the leading positions among the world's developing countries. The average growth rate of GDP for the

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years 2000-2004 (compared to 4.5 per cent of the world's average developed economies) was 5.7 per cent, while the gross investment (by 5.2 per cent) was 7.7 per cent. one of them is a carefully thought out investment policy focused primarily on activating internal sources of economic development. This is illustrated by gross domestic savings (21.6% of GDP over the last 5 years), gross investment (22.5%). These indicators make up 18.6% and 20.9% respectively for the developing world countries.

The following sectors are prioritized in the investment of sectors and sectors of the economy: non-resource sectors of industry; nobank financial services; foodstuffs production; Infrastructure - construction of highways, harbors, power plants, mass-speed transport systems; civil aviation, medicine and pharmacy; hotel business and tourism; electronic equipment and software; private oil refineries; exploration and production of mineral raw materials; consulting services, etc. The size of foreign investments on joint stock companies for small businesses is subject to special restrictions. The share of these enterprises in the authorized capital is 24% of foreign participation. When foreign participation exceeds this level, the venture must obtain a production license for compulsory export of 50% of the product. India has established international and bilateral agreements with many countries on investment promotion and protection. [11] These transactions allow for free movement and return of investments; nationalization, if they do not contradict the national interests of the country. Chile is a platform for investments in the region and beyond. The platform was proposed by the Committee for Foreign Investments of Chile in 2002 and has been implemented since then. Chile is a country that has achieved success in improving national economic competitiveness. In the Global Competitiveness Index (4.9), the country ranks the world's most advanced developing countries in 2006 (higher than Malaysia and slightly less than Israel) and overtook all Latin American countries. Positive international ratings, high ratings of investment climate, politics and the choice of government's liberalization of economic life have a positive impact on foreign investors. It has been in use since 1947 to regulate the activities of foreign investors in the country passing Decree-law will serve as a basis for foreign investors. It is one of the most advanced documents in the world on guarantees of foreign capital protection. According to the Decree Law, investors have the right to repatriate the benefits provided to the national regime and, since 2000, there are no fixed capital restrictions. Most foreign investors prefer to work on the principles of this document: from 1974 to 2004, over 80% of investments were made in Chile. According to the Decree-Law, any foreigner legal entities and individuals, as well as Chileans living abroad, have the right to invest in the country. Unlike most Latin

American countries, all areas for foreign and private investment are provided in Chile. Except for air transport and the media, Thailand is in the process of liberalizing the economy (focusing on the banking sector and foreign trade), strengthening macroeconomic stability, investment priorities, transparency in privatization, and granting privileges and preferences.

The measures taken in this country in the past few years will allow to simplify the process of expanding the scope of foreign direct investment, the investment climate, the facts and methods of taxation, and various incentives and preferences. This includes simultaneous repatriation of profits, repatriation of profits of foreign investors, improvement of the legal norms creating a positive image of the country (organization of exhibitions, invitation of investors and journalists, special publications of investors), foreign offices of the National Council, such as public disclosure and publication of national priorities. For example, in 2002, the focus was on modern agro-technology, clothing, jewelry, automobiles and new tourism technology. As a result, Thailand has progressed from many emerging economies in terms of economic liberalization (Index of Economic Freedom for Developing Countries in 2000-2004 66.6 percent compared to 57.5 percent, macroeconomic stability index - GDP deflator 1.8 percent compared to 8.2 percent, modernization of the economy the index of recovery was 97.7 percent versus 48.6 percent). The Thai example highlights the importance of the banking sector to increase the efficiency of investment policy. Even in the case of developing countries, the banking sector can simultaneously involve a portion of the income of the population and entrepreneurship, thereby improving the level of macroeconomic stability and improving the investment environment by attracting economically active population and private businesses. Despite the differences and specificity of the investment policies of countries (China, India, Chile), the overall investment strategies and mechanisms of these countries y parties. [3,4]

These are:

1. The role of the state is high when organizing an effective investment policy (especially at its stages). At the same time, the functions of the state are not limited to the creation of a favorable investment climate, attracting foreign investment, developing infrastructure networks, creating and maintaining the necessary regulatory and legal framework. It is important to address such issues as development of human and social capital, strengthening the institutional capacity of the state institutions, and increasing the investment in the development of new innovative sectors of the economy. At the same time, with the deepening of liberalization processes, the scope of direct regulation of the investment processes on the part of the government has diminished, and the

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functions of stimulating investment flows indirectly are becoming increasingly important.

2. Favorable and strong investment climate that promotes direct foreign investment. This will ensure that the level of savings will not be less than 20 per cent of GDP, and that the growth rates of investment are higher than GDP growth rates (2-4 points). The final indicator is made at the expense of private investments. At the same time, large amounts of loans to the private sector (Thailand, India), the combination of free market forces and government active roles in addressing social and economic problems (low inflation, job creation, poverty reduction, etc.) The

3. Sustainable development of the banking sector and the financial market. The level of monetization in many of the world's most competitive countries is over 50 percent. Only then will there be created conditions for the use of free resources of the population and entrepreneurs, the efficiency of the use of investment resources, and the effective anti-inflation policy. Integrity and integrity of investment policy. As you know, the investment policy is one of the key components of the country's economic development strategy (eg, India's new policy, Thailand's industrial policy, Chile's export potential development policy) and nationwide benefits. In particular, the Chinese investment policy is an effective tool for regulating cycles, ensuring sustainable development, maintaining high growth rates (taking into account the cyclical development of China economy). Increasing the quality of public institutions responsible for investment policy. It involves the involvement of independent experts (prominent scientists and prestigious entrepreneurs) into the governing boards and structures that distribute public resources. These resources are provided for the formation of the starting capital of private investment and innovation funds as the state support for these or other investment projects. For this purpose, the government used private low-profit corporations, dealing with government contracts. Transparency of investment incentives and preferences in these countries plays an important role. Orientation of capital flows to the development of high technology. Many developing countries have used development strategies to help them to overcome differences in economic development with developed countries. The main mechanism is public-private partnership, risk sharing between government and business, state co-financing costs for marketing research, staff training, and new product certification. [4]

4. Giving priority to investment in human and social capital. The need to ensure the growth of competitiveness in a fast-paced economic environment creates a distinct priority for developing countries in terms of attracting large-scale investments into human and social capital. Attention to the education sector has been the most important criterion for assessing the economic growth prospects

of developing countries. The experience of foreign countries shows that not only investment incentives, but also investment promotion (investment promotion) strategies are also important. Research based on the experience of 50 industrialized and developing countries has shown that every dollar spent on investing in the capital can give a four-dollar effect to the national economy. Investments that are specifically targeted at one or another sector and designed for specific potential investors and have an active marketing strategy are most effective.

### INVESTMENT POSSIBILITIES OF INDUSTRIAL PROPERTY IN THE MODERNIZATION CASE OF THE NATIONAL ECONOMIC DEVELOPMENT OF UZBEKISTAN

At the modern stages of the development of the national economy of Uzbekistan, the competition of entrepreneurs in the manufacturing sector is gaining momentum. Under such circumstances, production entrepreneurship plays an important role in the economy. In the implementation of the Anti-Crisis Program in 2010, one of the priorities is the accelerated modernization, technical and technological renovation of the most important sectors of the economy, the development of modern transport and infrastructure communications through attracting investments, primarily by using internal resources. [5,6]

It is well-known that some of the key directions identified in the Anti-Crisis Program for 2009-2012 are fold expansion of activities and ensure the growth of investment activity. The implementation of the program, more specifically, was summarized in 2009 by commercial banks for financing projects of modernization, technical and technological renovation, totaling 2.4 trillion soums in 2008, and 1.6 times more investment loans, if compared to 2008. In particular, in 2009, 690 investment projects were implemented within the framework of investment programs and technical modernization programs, of which 303 projects were successfully completed. Total volume of investments into the economy made up US \$ 8.2 billion in 2008, by almost 24.8%. The volume of attracted investments has increased by 68% and most of them are direct investments. For the full implementation of the Investment Program for 2009-2014 it is envisaged to allocate US \$ 42.5 billion from all financial sources. The highest level of investment programs in 2010 was accounted for by 42.6% of enterprises' funds, direct investments were made at the expense of 21.3%. According to preliminary data, in 2010, commercial banks' loans and other borrowed funds and funds of the Development and Savings Fund accounted for 22.6% of all investment funds. The Decree of the President of the Republic of Uzbekistan " The adoption of the Resolution "On

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Priority Areas of Development of the Republic's Industry" can be described as one of the vectors of the country's industrial potential mobilization. vojlantirishning target indicators, and prepared to carry out, or, as at present, including a list of investment projects carried out on the priorities of industrial development of Uzbekistan for 2011-2015 "program" to confirm. Over the past five years alone, 259 industrial projects have been planned to spend over \$ 30 billion. Within the framework of new construction, US \$ 23.05 billion will be spent. The modernization of existing enterprises will require 5,242 milliard dollars of capital investments, and \$ 1,783 billion for re-equipment of enterprises of different sectors. The program also includes 99 more projects. Their initial value is \$ 6.446 billion. Industry reform also includes 158 investment projects worth \$ 10.98 billion in fuel and energy, chemical, metallurgy, light industry, construction and machinery sectors.

Consideration of strategic results of small business (development, potential outcomes). The known bar codes are based on actual or expected actual results; the use of value-sized computing results that will help you get monomers that can lead to more targeted administration. This criterion should combine factors such as economic (budget revenues) and social (growth of wages, increase of workplaces). It is important to take into account the criteria for local performance indicators. The interest of subjects and of the region's administration to the development of entrepreneurship should be as diverse as the hierarchical system, depending on the situation in the

region. In terms of strategic development of the region's economy and its manufacturing industries, the most cumulative investment projects, due to a combination of resources to support them, should be considered as the priority areas of government support. can participate in investment projects. Particular attention is paid to the assessment of the economic success and success of the so-called "people's interests". These are infrastructure projects; innovative projects with significant multiplicative effects. Here the first innovative solutions (and funds) are provided by private owners, and the state capital is a guarantee.

According to the State Statistics Committee of Uzbekistan, the volume of investment in agriculture and construction has been 10-15 times lower than in industrial and service sectors. The annual average value of investment in the economic sectors in 2000-2017 amounted to UZS 3893.5 bn. It is possible to identify a number of indicators for this situation.

In particular, a line chart on the circulation of investments in economic sectors is created. For this purpose, first of all, they are grouped according to their marginal values, using their fair values determined on the basis of annual dynamic indicators of the intersectoral distribution of investment. The goal is to calculate the set parameters for each set and set.

Table 1 below shows that the columns 2, 3 and 4 are divided by the average of the average annual investment values on the basis of the five conditions, representing a percentage of the total.

**Table 1. Periodic distribution of investments in linear scales networks**

T/p	Periodic amount of investments (UZS bn)			Number of periods		Plot size
	≥	<	"from-to"	in unity	percent	percent
very bad	1	850	1 -850	6	33,3	5,9
bad	850	1700	850 - 1700	2	11,1	7,1
middle	1700	3400	1700 -3400	2	11,1	16,7
good	3400	6800	3400 -6800	4	22,2	33,1
very good	6800	13600	6800 -13600	4	22,2	21,6
TOTAL ON TIME				18	100	84,3
XI square meter comparison of real and normal distribution of investments						85,1%

Source: Development of the authors based on the data from the State Committee on Statistics of the Republic of Uzbekistan.

According to figures in Table 1, the most important is the 7th column, which sets out the distribution of investment by sectoral status. 27.4% and 4.0% of investments were allocated on the sectoral basis, while the third and fourth position was 5.6% and 10.9% less than the norm for the first and second cases. In the fifth case, 21.6 percent, instead of

22.2 percent, were found to be 0.6 percent higher than the norm, and a total investment of more than 15.7 percent of the investment needed to be allocated to the industry was calculated in the overall 2000-2017 years.

This, meanwhile, indicates that 15.7% of investments have remained unprofitable. In general,

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the current situation in the current sector (especially 1 and 2 cases) has shown that the effectiveness of distributed investments is 155060,1 billion soums. 131491,0 billion sums, which is 14,0 percent less than the national currency. It could also be done in soum. According to the results of the calculations, the fact that the proportion of investment in 100% is actually 84.3%. [7]

Investments play an important role in supporting and enhancing the economic potential of the country, modernization and diversification of the economy, activating economic growth, increasing the competitiveness of products and services both at home and abroad. Investments lead to growth of GDP, the development of enterprises and the export potential of the country.

It is necessary to develop a regional investment policy to address the issue of attracting investments into the region's economy. Regional investment policies are the activities of the regional administration, which should be sought from sources of investment and directed to the most effective sectors.

The purpose of investment policy can be explained by:

1. Implementation of structural changes, development of priority sectors.
2. Support for small business and private entrepreneurship.
3. Creating additional jobs.
4. Attracting investment resources from all sources. At the same time, attracting foreign investment.

5. Creation of non-state investment funds, as well as venture funds.

6. Expansion of leasing activity in innovation activity.

7. Improve the system of privileges.

8. Ensuring investment climate and attractiveness.

The analysis of these areas is one of the most pressing issues of today. [8]

In the strategic context of the country, achieving a balanced regional socio-economic development is crucial to ensuring macroeconomic stability and proportional economic growth. The existence of an asymmetric distinction in the current socio-economic development requires the implementation of an active regional investment policy aimed at the efficient use of existing economic and resource potential and the revitalization of economic development in relatively less developed regions. At the same time, there is a need to deepen reforms to revitalize investment activity based on proper valuation and management of regional financial and investment capacities.

The Strategic Action Strategy for the five main priorities of the Republic of Uzbekistan for 2017-2021 is to implement the tasks in the near future "to improve the investment climate, to actively attract foreign, primarily direct foreign investment in the sectors and regions of the country's economy."

In 2019, the President's Address to the Parliament on the most important priorities of the country's development in 2019 was named the Year of Active Investments and Social Development, and identified important goals for economic reform.

**Table 2. Investments into fixed capital and their distribution in Uzbekistan, bn. soums**

Name of Regions	Years						Increasing by 2018, compared to 2013
	2013	2014	2015	2016	2017	2018	
Total in the country	28694,6	35233,3	41670,5	49770,6	60719,2	107 333,0	374,1
Republic of Karakalpakstan	2361,9	3917,8	5925,7	3718,9	2235	6046,4	256,0
Andijan region	1287,8	1423	1661	1987,3	2236	4056,0	315,0
Bukhara Region	2871,6	3408,3	3866,1	5756,7	11008,9	7846,1	273,2
Jizzakh Province	1017,9	1038,5	1101,1	1247	1436,7	3169,2	311,3
Kashkadarya Province	3498,8	4483,2	5590,5	7048,8	10181,9	15321,1	437,9
Navoi Province	1622,6	1653	1685,4	2846,8	2784,5	10059,1	619,9
The Namangan Region	1059,3	1618,7	1966,4	2566,7	3052	7131,0	673,2
Samarkand Region	1915	2247,8	2854	3321,4	3307,1	5746,9	300,1
Surkhandarya region	1246,8	1339,5	1633,4	2005,2	2949,1	6111,0	490,1
Syrdarya region	804,7	927,2	1000,2	1240,9	1349,4	2154,6	267,8
Tashkent region	2982,9	3741,9	4055,7	3959,9	4301,8	9351,4	313,5
Fergana Province	1899,7	1998,4	2133	2404,5	2473,8	4978,4	262,1
Khorezm Region	1148,5	1466,5	1343,4	1445,4	1877,1	2980,0	259,5

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City of Tashkent	4977,1	5969,5	6854,6	10221,1	11525,9	21861,5	439,2
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Source: the author's calculations based on the data from the Statistics Committee of the Republic of Uzbekistan.

In 2019, Uzbekistan plans to invest about 138 trillion soums or 16% more than in 2018. The volume of direct foreign investments in this area has increased by almost 1.5 times compared with the current year and reached 4.2 billion dollars, as a result of which it is planned to put into operation 142 modern enterprises.

Consistent implementation of regional economic policy on these tasks, in the future, constitutes the fundamental basis for determining the strategic directions of regional investment policy.

Table 1 shows that capital investments in the Republic are estimated at UZS 28694.6 bn. This figure was characterized by steady growth and amounted to 107 333.0 billion soums by 2018. Thus, the growth of nominal value of fixed capital investments in these years was 3.7 times. [9]

Investment in fixed capital in Uzbekistan in 2018 grew by 374.1% compared to 2013. High growth rates are observed in Kashkadarya (437.9%), Namangan (673.2%), Navoi (619.9%) and Surkhandarya (490.1%) provinces and Tashkent city (439.2%).

The role and significance of investment in fixed capital in the socio-economic development of the regions can be explained by:

First of all, the growth of investment in fixed capital will have a positive impact on the annual growth rate of GRP as a factor of high technological advancement and intensive economic growth; [12]

Secondly, the diversification of the economy, the implementation of structural reforms will ultimately provide for the establishment of import-substituting and export-oriented products;

Thirdly, it promotes the development of entrepreneurship in the context of rational use of existing financial and investment capacities and ultimately increases the well-being of the population through the creation of new jobs. As a result, the expansion of the aggregate demand in the economy, thanks to consistent growth of the population's income, creates conditions for the further development of production. [10]

It is possible to identify the investment activity of each region by means of the average national cumulative nominal amount of investment in fixed capital.

**Table 2. Share of Regions in Capital Investments in Uzbekistan (% of total)**

Regions	Share of regions in main capital investments, %					
	2013	2014	2015	2016	2017	2018
Total in the country	100	100	100	100	100	100
Republic of Karakalpakstan	8,23	11,12	14,22	7,47	3,68	5,6
Andijan region	4,49	4,04	3,99	3,99	3,68	3,8
Bukhara Region	10,01	9,67	9,28	11,57	18,13	7,3
Jizzakh Province	3,55	2,95	2,64	2,51	2,37	3
Kashkadarya Province	12,19	12,72	13,42	14,16	16,77	14,3
Navoi Province	5,65	4,69	4,04	5,72	4,59	9,4
The Namangan Region	3,69	4,59	4,72	5,16	5,03	6,6
Samarkand Region	6,67	6,38	6,85	6,67	5,45	5,4
Surkhandarya region	4,35	3,8	3,92	4,03	4,86	5,7
Syrdarya region	2,8	2,63	2,4	2,49	2,22	2
Tashkent region	10,4	10,62	9,73	7,96	7,08	8,7
Fergana Province	6,62	5,67	5,12	4,83	4,07	4,6
Khorezm Region	4	4,16	3,22	2,9	3,09	2,8
Tashkent city	17,35	16,94	16,45	20,54	18,98	20,4

Source: the author's calculations based on the data from the Statistics Committee of the Republic of Uzbekistan.

According to the Table 2, the highest level of capital investment in the country is in Tashkent. In

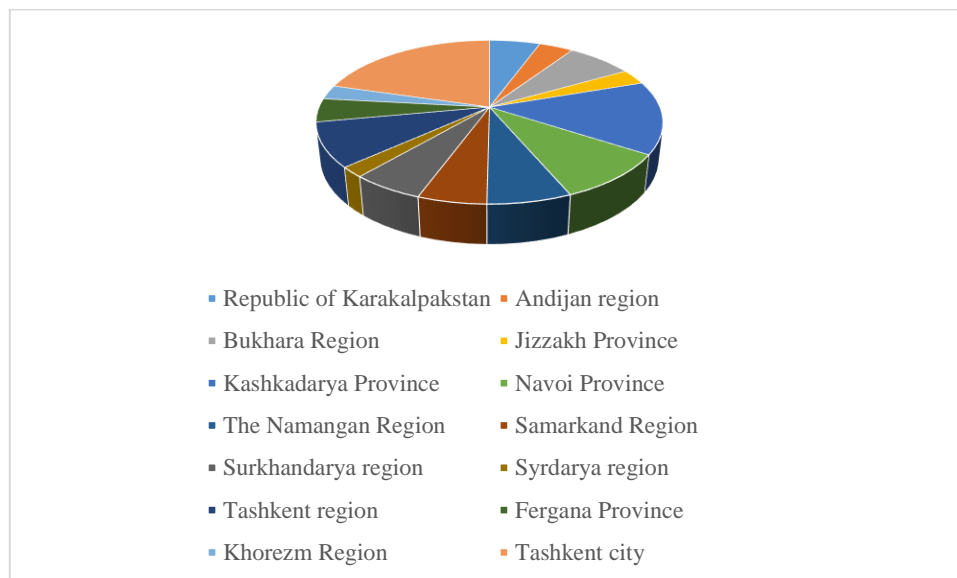
particular, the share of Tashkent city in total fixed capital in 2013 amounted to 17.35%, while the relative

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decline was observed in 2014 and 2015, but by 2017 it was 18.98%, and in 2017 it was 20.4%. In the period under review, the highest growth was observed in Kashkadarya region (14.3%), Tashkent region (8.7%),

and in 2018 it achieved the leading indicators (Table 2). However, in Syrdarya (2 percent), Khorezm (2.8 percent) and Jizzakh (3.0 percent) regions this indicator is relatively low.



**Fig. 1. Share of Regions in Capital Investments in Uzbekistan, 2018 (in % of total) [13]**

In the context of current reforms, the issue of increasing investment activity through the rational use of available financial and investment capacities in each region is becoming an urgent issue on the agenda.

Based on the above analysis, in our opinion, the opportunities for increasing investment activity in the regions of the Republic of Uzbekistan are as follows:

1. In order to carry out systematic work on territorial infrastructure and, in particular, investment infrastructure, it is necessary to modernize the road transport and communications system, carry out deep reforms in public utilities, introduce high-speed internet systems.

2. It is necessary to increase the volume of investments through the introduction of a long-term crediting system for poor regions. At the same time, the creation of potentially bank branches and mini-banks, strengthening their capitalization and development of the financial infrastructure are especially important in the areas with insufficient investment resources. Development of modern forms of financial institutions such as investment and insurance funds, credit unions, pawnshops, bank groups and holdings, mutual funds accelerates capital movement in the economy.

3. Creating a systemized regional registry with detailed and detailed information on production facilities, existing natural resources, agricultural and raw materials resources in the regions of the Republic and the Internet for the purpose of forming a positive

image of the regions and demonstrating an attractive investment climate in the world and in the Republic. it should be brought to the attention of foreign investors.

### Conclusion

A comprehensive approach to the identification and regulation of investment opportunities in enterprises and regions can be achieved by formulating the necessary resources for investment resources and enhancing investment activity on the basis of effective utilization of in-venture funds .2. In Uzbekistan under current conditions, the growth and development of investment capacities of entrepreneurial entrepreneurship is linked with the need to overcome the deficit of investment resources in manufacturing. It is primarily dependent on the creation of an optimal investment mechanism for investment, and, on the other hand, the investment goods that are capable of offering high-quality investment products and the rational actions of the owners of the investment capital that will allow them to be bartered without any barrier in the investment market. In turn, increasing the efficiency of entrepreneurship at the state, republican, regional and local levels depends on the coordination of direct government support and coordination of state investment incentive activities. The first phase of the market regulation includes the transition from direct subsidies to targeted subventions, multi-subject financing of employment projects, which are of great

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significance due to budgetary and private funds, to commercial banks government and community-based guarantees, and take measures to minimize the risks faced by investors, in particular due to the allocation of them between government, investment and insurance organizations. I. Corporations and corporations have the opportunity to invest in investment through the systematic use of investment portfolio diversification methods, transfer of savings and resources of legal and private entities to investment resources of production, as well as to the development of new techniques and technologies. can be shaped.

In sum, improving the methodology of econometric modeling of intra-sectoral investment attraction to the economy ensures the proper distribution of investments in the conditions of uncertainty, avoiding unnecessary maintenance of deficit and excessive funds. Also, improving the methodology of econometric modeling of intersectoral investment in research has identified the risks and threats to the effective use of distributed investment, the sustainable growth of the sector's operations, the achievement of global competitiveness, and the deep and comprehensive analysis of factors affecting investment efficiency, the ability to determine the.

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SECTION 8. Architecture and construction.  
UDC 624.13

## THE STUDY OF THE DEFORMATION OF SOILS AT VARIOUS FREQUENCIES OF CYCLIC LOADING

**Abstract:** The article presents the results of studies of the deformability of sandy soils under multiple cyclic effects, the analysis of the revealed in experiments at different loading frequencies of deformation patterns, presents the equations for the prediction of General and additional (volume and shear) deformations from the action of multiple cyclic effects in the studied range of loading frequencies.

**Key words:** soil, cyclic loading, deformation, frequency of application of loading, additional deformation.

**Language:** Russian

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### ИССЛЕДОВАНИЕ ДЕФОРМИРОВАНИЯ ГРУНТОВ ПРИ РАЗЛИЧНЫХ ЧАСТОТАХ ЦИКЛИЧЕСКОГО НАГРУЖЕНИЯ

**Аннотация:** В статье приведены результаты исследований деформируемости песчаных грунтов при многократных циклических воздействиях, выполнен анализ выявленных в экспериментах при различных частотах нагружения закономерностей деформирования, представлены уравнения для прогноза обших и дополнительных (объемных и сдвиговых) деформаций от действия многократных циклических воздействий в исследованном диапазоне частот нагружения.

**Ключевые слова:** грунт, циклическая нагрузка, деформация, частота приложения нагрузки, дополнительная деформация.

#### Introduction

Известно, что характер работы грунтовых оснований зданий и сооружений при действии многократно приложенной нагрузки в значительной мере отличается от работы их при постоянной (однократно приложенной) нагрузке. При таком воздействии деформирование грунтов сопровождается развитием дополнительных пластических деформаций, зависящей от частоты приложения нагрузки.

В работах [1-7] приводятся результаты экспериментальных исследований деформируемости песчаных грунтов при статических и квазистатических циклических воздействиях, приведены аналитические описания закономерностей их объемного и сдвигового деформирования.

#### Materials and Methods

В общем случае полные (объемные и сдвиговые) деформации от многократного циклического воздействия можно определить суммированием деформаций от однократного нагружения и дополнительных деформаций от повторных приложений нагрузки:

$$\varepsilon_{v(N)} = \varepsilon_v + \Delta\varepsilon_{v(N)}^p; \quad (1)$$

$$\varepsilon_{i(N)} = \varepsilon_i + \Delta\varepsilon_{i(N)}^p, \quad (2)$$

где  $\varepsilon_v$  и  $\varepsilon_i$  - объемная и сдвиговая деформации при однократном (статическом) нагружении;  $\Delta\varepsilon_{v(N)}^p$  и  $\Delta\varepsilon_{i(N)}^p$  - дополнительные объемная и

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сдвиговая деформации, накопленные за  $N$  циклов повторного воздействия.

Для прогноза дополнительных пластических (объемных и сдвиговых) деформаций от  $N$  циклов квазистатического нагружения, используя результаты исследований, можно записать:

$$\Delta \varepsilon_{v(N)}^p = \Delta \varepsilon_{v(1)}^p (1 + B_v \cdot \ln N) \quad (3)$$

$$\Delta \varepsilon_{i(N)}^p = \Delta \varepsilon_{i(1)}^p (1 + B_i \cdot \ln N) \quad (4)$$

где  $B_v$  и  $B_i$  - экспериментальные параметры.

Величины дополнительных пластических объемных и сдвиговых деформаций от первого цикла нагружения ( $\Delta \varepsilon_{v(1)}^p$  и  $\Delta \varepsilon_{i(1)}^p$ ) хорошо аппроксимируются выражениями

$$\Delta \varepsilon_{v(1)}^p = \alpha_v (\sigma_i / \sigma_i^*)^{\beta_v} \cdot \ln(n/n_o); \quad (5)$$

$$\Delta \varepsilon_{i(1)}^p = \alpha_i (\sigma_i / \sigma_i^*)^{\beta_i} \cdot \ln(n/n_o), \quad (6)$$

где  $\alpha_v, \beta_v, n_o, \alpha_i$  и  $\beta_i$  - экспериментальные параметры.

Приводимые ниже результаты исследований являются продолжением указанных работ в части оценки влияния частоты приложения циклической нагрузки на деформируемость грунтов.

Экспериментальные исследования проводились с песчаными грунтами средней плотности сложения. Опыты выполнялись в приборах трехосного сжатия С-62 конструкции Азберген М.И. [2,5,6,8], в которых, впервые в экспериментальной практике исследования грунтов, применена широко используемая в машиностроении система "противодавление" [9]. Использование такой системы позволило устранить недостатки существующих приборов - утечку рабочей жидкости и трение по контакту «шток-втулка», и обеспечило значительное повышение достоверности получаемых результатов. Общий вид экспериментальной установки представлен на рисунке 1, а схема его приведена на рисунке 2.

Испытанию подвергались однородные песчаные грунты двух типов: песок мелкий и средней крупности. Значения продолжительности цикла нагружения ( $t_u$ ) принимались равными 60 мин., 60 сек. и 10 сек.

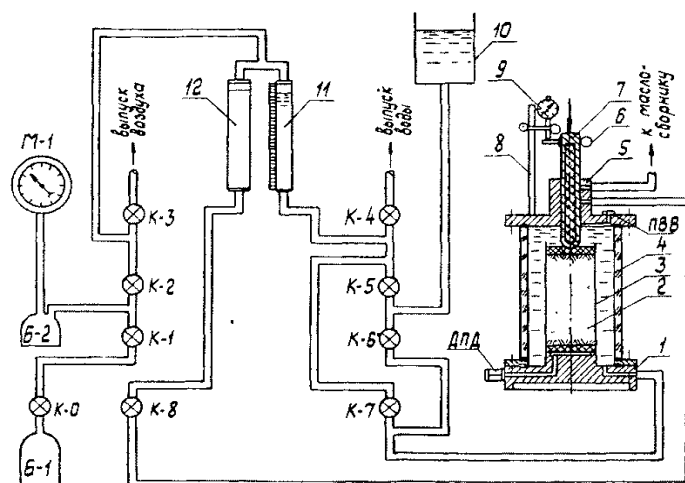
Результаты исследований показывают, что значения дополнительных пластических деформаций  $\Delta \varepsilon_{v(N)}^p$  и  $\Delta \varepsilon_{i(N)}^p$  от числа  $N$  при различной степени приближения напряженного состояния к предельному  $\sigma_i / \sigma_i^*$  и степени разгрузки  $n$  (отношения величин циклической и статической напряжений) показывает, что значения этих деформаций возрастают с увеличением числа циклов нагружения, а приращения их уменьшаются от цикла к циклу. Несмотря на то, что общий характер развития дополнительных пластических деформаций одинаков, уменьшение продолжительности цикла оказывает значительное влияние на величину накопленной за  $N$  циклов нагружения деформации. Вместе с тем, влияние продолжительности цикла на развитие дополнительных пластических деформации существенно возрастает с увеличением степени разгрузки и степени приближения напряженного состояния к предельному. Увеличение последней в значительной мере проявляется на величинах сдвиговых деформаций. Установлено, что при степени разгрузки  $n^{(0)} \leq 0,2$  (при нагружении только в пределах девиаторной части траектории) не происходит развития дополнительных пластических деформаций (как объемных, так и сдвиговых). Продолжительность цикла влияет не только на значения накопленных деформаций, но и определяет число циклов, при котором происходит стабилизация деформаций. Уменьшение продолжительности цикла нагружения для исследованных грунтов во всех случаях приводит к увеличению стабилизированных значений дополнительных пластических деформаций (как объемных, так и сдвиговых). При этом уменьшение  $t_u$  от 60 минут до 60 секунд незначительно влияет на значения дополнительных пластических деформаций песка средней крупности и это влияние практически не зависит от влажности грунта. Для песка мелкого изменение продолжительности цикла в указанном диапазоне приводит к существенному росту значений дополнительных пластических деформаций, наибольшая величина которой соответствует  $t_u=10$  сек. Учитывая последнее, исследование влияния продолжительности цикла нагружения (частоты нагружения) на развитие дополнительных пластических деформаций грунта выполнено более подробно для песка мелкого.

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Рисунок 1. Установка для испытания грунтов в условиях трехосного сжатия конструкции Азберген М.И.



1 - основание прибора; 2 - образец грунта; 3 - оболочка резиновая; 4 - корпус прибора; 5 - крышка корпуса; 6 - консоль индикатора; 7 - шток прибора; 8 - индикатор перемещений; 9 - стойка индикатора; 10 - бакоч напорный; 11 - волюмометр; 12 - емкость с маслом; Б - баллон для воздуха; К - кран; М - манометр; ПВВ - пробка выпуска воздуха; ДПД - датчик парового давления.

Рисунок 2. Схема прибора трехосного сжатия С-62 конструкции Азберген М.И.

### Conclusion

Данные обработки результатов экспериментов, проведенных с песком мелким показывают, что зависимости дополнительных пластических деформаций от логарифма числа циклов в общем случае нелинейны (рис.3), а зависимости приведенных деформаций  $K_{(N)}$  (отношения дополнительных деформаций, накопленных за  $N$  циклов и на первом цикле нагружения) от логарифма числа циклов  $N$  едины для всех значений напряжений гидростатического обжатия, степени приближения напряженного

состояния к предельному и степени разгрузки (рис.4). Это свидетельствует о том, что при уменьшении продолжительности цикла нагружения  $t_{ц}$  в исследованном диапазоне, так же как и при квазистатическом циклическом нагружении (при  $t_{ц} = 60$  мин), существует подобие процесса развития дополнительных пластических деформаций с увеличением числа циклов, характеризуемых приведенной деформацией  $K_{(N)}$ . Сказанное позволяет констатировать, что

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приведенная деформация является функцией только числа циклов нагружения.

Нелинейность зависимости  $K_{(N)}(\ln N)$  объясняется тем, что при продолжительности цикла нагружения  $t_c=10$  сек накопление дополнительных пластических деформаций на первых циклах происходит с гораздо меньшей интенсивностью, чем при квазистатическом циклическом нагружении. Это обусловлено динамическим приложением нагрузки, в результате которого инерционные силы не успевают привести к значительно плотной

упаковке частиц грунта на первых 10-12 циклов нагружения, что согласуется с результатами [10]. При дальнейшем нагружении интенсивность накопления дополнительных пластических деформаций, характеризуемая приведенной деформацией, линейно зависят от числа циклов. Из сказанного следует, что для грунтов, испытывающих большое число циклов динамического воздействия, зависимость  $K_{(N)}(\ln N)$  в определенном диапазоне (от  $N'$  до  $N$ ) можно принимать линейной.

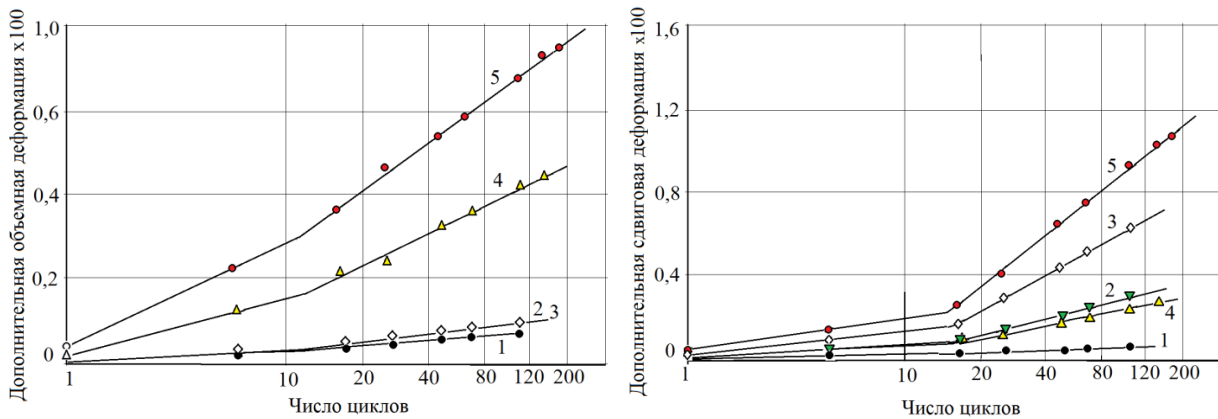


Рисунок 3. Зависимости деформаций  $\Delta\varepsilon_{v(N)}^p$  и  $\Delta\varepsilon_{i(N)}^p$  от числа циклов: 1, 4 и 2, 5, а также 3 – при различных значениях степени приближения напряженного состояния к предельному и степени разгрузки.

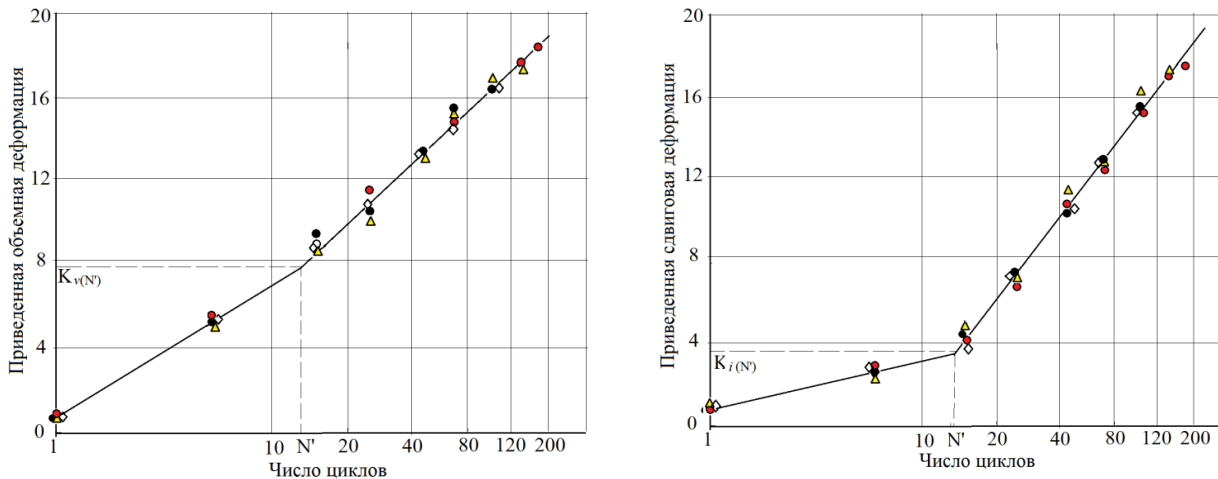


Рисунок 4. Зависимости приведенных деформаций  $K_{v(N)}$  и  $K_{i(N)}$  от числа циклов при различных значениях напряжений гидростатического обжатия, степени приближения напряженного состояния к предельному и степени разгрузки.

Тогда зависимости приведенных объемных и сдвиговых деформаций от числа циклов при

различных частотах приложения многократной нагрузки могут быть описаны функциями

$$\Delta\varepsilon_{v(N)}^p = \Delta\varepsilon_{v(N')}^p [K_{v(N')} + B_v \cdot \ln(N/N')]; \quad (7)$$

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$$\Delta \varepsilon_{i(N)}^p = \Delta \varepsilon_{i(N')}^p [K_{i(N')} + B_i \cdot \ln(N/N')], \quad (8)$$

где  $\Delta \varepsilon_{v(N)}^p$ ,  $\Delta \varepsilon_{v(N')}^p$ ,  $K_{v(N)}$ ,  $K_{i(N')}$ ,  $B_v$ ,  $B_i$  и  $N'$  - экспериментальные параметры, определяемые из опытов при трехосном сжатии.

Сравнение данных расчетного прогноза и экспериментальных величин деформаций

показывает на правильность выбранных аппроксимаций и возможность использования уравнений (1), (2) и (7), (8) для прогноза общих и дополнительных объемных и сдвиговых деформаций при многократных циклических воздействиях в исследованном диапазоне частот нагружения.

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SECTION 14. Journalism (history, innovations, practices).

## FEATURES OF WOMEN'S PUBLICATION: TYPOLOGIES AND UPDATING THE THEME SCOPE

**Abstract:** The author reviewed the typology of modern women's online magazines in Uzbekistan and abroad. In addition, the author conducts their classification of modern women's online magazines on the basis of theoretical and typological analysis, identified types of publications and identified development trends.

**Key words:** online journal, women's journalism, female journal, typology, classification, media, online magazines.

**Language:** English

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### Introduction

The development of Internet technologies is qualitatively changing the structure of the media, making significant adjustments to the activities of the media sphere. In the process of popularization of Internet resources, a gender-oriented approach has emerged to consider the specifics of a network media structure [1]. The period of the organization of women's online magazines was designated in the second half of the 90s. XX century., At the beginning of the new century, the attention of publishers to this press has increased [2]. The reasons for the revitalization of the newest media segment being investigated were reduced to the popularization of online media, the growth of the audience, the organization of media projects that were not represented in the information environment, and the expansion of media companies. The typology of women's online journals is a field that has not been practically studied in the scientific community; meanwhile, the typological analysis of these publications and the definition of types contribute to the consideration of the specifics of the system of women's online periodicals. The development of Internet technologies is qualitatively changing the structure of the media, making significant adjustments to the activities of the media sphere. In the process of popularization of Internet resources, a gender-oriented approach has emerged to consider the specifics of a network media structure [1]. The period of the

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### Foreign overview: women's internet magazines in the Russia

At the present stage in the Internet space, the following means of mass communication, focused on the female segment: the women's Internet press, women's portals, websites of women's organizations, women's blogs, women's social networks. Women's periodicals presented on the Internet, it is advisable to consider it as women's magazines. First, they unite topics that correspond to the information interests of the female audience. Secondly, information is updated on these resources daily, or weekly, or as materials are

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prepared (but at least once a year). Thirdly, although the publications contain information of a news nature (news from the life of “stars”, the fashion industry, the medical field), however, these thematic sections do not require frequent updates (unlike political, economic news blocks of Internet information newspapers). Fourth, informational genres used in publications (note, interview) are not predominant, informational and analytical (review, letter, article, commentary) and artistic and journalistic (essay, sketch) materials that allow most fully to reveal the subject-specific originality, to choose ways of describing and depicting reality (phenomena, events, heroes).

Women's online press is divided into online and electronic journals. Women's electronic journals (offline editions, modified online versions of traditional media) include online women's print journals, for example, “Liza” (<http://www.lisa.ru>), “Cosmopolitan” (<http://www.cosmo.ru>), “Vogue” (<http://www.vogue.ru>), “Glamor” (<http://www.glamor.ru>), “Samaya” (<http://www.samaya.ru>), “Women's Health” (<http://www.wh-lady.ru>), “9 months” (<http://www.9months.ru>), “Elle Girl” (<http://www.ellegirl.ru>) and etc. The electronic version differs from the print edition in a number of typological features: structure, authoring, periodicity, etc. The modified online versions are organized I'm a publisher of women's magazines, the creation and promotion under the already known name guarantees the growth of readership, it promotes the formation of the image of the publication, promotion of the brand.

Women's online magazines (online editions) include publications that operate only on the Internet, which have no printed analogues, are engaged in the preparation and distribution of information addressed to a female audience.

In the process of organizing women's online journals, determining their intended purpose, which is directly related to the interests of the classroom group, is essential. According to a study conducted by the psychological department of Moscow State University, women on the Internet are interested in the following information: humor, culture, literature and art, education, leisure and hobbies, news. Women are more than men interested in information about education (54 and 41%, respectively), culture and art (62 and 41%), travel and tourism (35 and 22%), family and children (22 and 10%), medicine and diets (36 and 13%), leisure and hobbies (48 and 33%). In contrast, there are fewer female users than men who are interested in information about programs and computing equipment (30 and 74%, respectively), Internet updates (38 and 59%), sports (13 and 20%), products and prices (27 and 44 %), policies (20 and 35%), as well as information “for adults” (18 and 41%) [3]. Subsequent studies of the behavior of the female Internet audience [4] revealed its characteristic

features: the need for communicative communication, creative implementation, and recreation. The most attention of this segment is used by the topics of the relationship between the sexes, cooking, women's health and fashion.

Information interests of the audience group are taken into account in the activities of women's Internet resources. Thematic fields (“fashion and beauty”, “interpersonal relations”, “health”, “children”, “home economics”) are prevalent in women's network projects, their development in the direction of meeting the information expectations and needs of the women's group is one of the main conditions for successful operation.

In the course of the formation and development of the women's network press, there have been two directions in its organization: the first is the creation of a media product focused on the attention of a mass audience, obtaining a high rating, attracting advertisers; the second is the opening of a resource that ensures the implementation of a creative project that promotes communicative communication, the elimination of the information vacuum in the sphere of women's interests.

Based on the fact that the women's press refers to numerous spheres of female life (fashion, health, pedagogy, etc.), one can speak of women's differentiation network logs on types. Classification according to the classroom and subject-thematic characteristics allows to identify several types of women's online publications.

The study of women's online magazines engaged M. Kolesnikova, it analyzed the mass of women's online publications. As their distinguishing feature, the author identifies the thematic originality, which, according to the researcher, is limited to the following structures of a woman's life: “cooking, beauty secrets, cosmetics, family relationships, dating, growing houseplants, handicrafts, jewelry, shopping. In a word, everything that is interesting for women” [5]. It is noteworthy that the identified thematic aspects make it possible to classify the type of mass women's web magazine considered by M. Kolesnikova as a mass universal. The Women's Network Universal Magazine is an Internet-based publication that publishes materials prepared specifically for this media, updated at regular intervals, covering the many areas of a woman's life that are related to her interests due to the functions of her wife, mother, and housewife.

Women's online universal journals are the predominant type of publications on the Internet (for example, myJane.ru, WomanJournal.ru, Devichnik, etc.). The organization of the publication, positioning itself as a women's universal, that is, covering a wide thematic spectrum, interesting to potential audiences, regardless of their professional status, political views, or confession, makes it possible to rely on mass demand. These journals represent the most popular

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projects in the category of women's resources, which is confirmed by rating statistics. Large media companies are interested in their promotion and popularization. The development of the media market is influenced by the law of the correspondence of supply and demand, "as the information needs of certain public groups increase, the demand for media products also increases. He calls the corresponding proposal" [6], which vividly confirms the development of network universal journals. [15]

In women's online universal magazines there is the same subject as on the pages of the popular print women's press, they are apolitical, distanced from economic issues, their attention is focused on fashion, home economics, women's health, children's pedagogy, gossip, interpersonal relationships. The problem-oriented orientation of the women's network universal periodicals is limited to the following targets: to help a woman look beautiful in accordance with fashionable standards, to be healthy, to normalize personal relationships, to help in raising children, to improve family life.

The specifics of online media introduces changes in the themes of publications and the process of its coverage. First, the definition of themes occurs with the participation of an audience group (in the forums, in the comments to the articles, in the publications of the readers). Secondly, the number of materials increases. Thirdly, the use of links and hyperlinks makes women's online magazines more traditional and more informative than traditional ones.

Women's online magazines of fashionable lifestyle (life style) - periodicals presented on the Internet, addressed to a female audience, informing about the development of the fashion industry, forming ideas about fashionable lifestyle (for example, FashionTame.ru, FashionWalk.ru and others). The concept of the publication includes thematic areas limited to the scope of fashion (clothing, cosmetology, perfumery, design, leisure, information about famous people). The structure of the journals in question does not include sections related to housekeeping, child-rearing, and in defining the characteristics of the classroom group, the key parameters are such criteria as material status, age. The readership of these publications is girls, young women with an average and high level of wealth, whose position allows not only to read publications about new trends in the field of fashion, but also to buy fashion products, information about which is posted in the magazines in question. Women's online publications of fashionable lifestyle repeat the thematic concept of women's elite magazines (Cosmopolitan, Glamor, etc.).

The concepts of "Internet gloss", "lifestyle-Internet media" have been established in the Internet environment. The first definition characterizes the segment of Internet publications that popularize fashionable standards and attributes, the semantic

content of the second is interpreted as the designation of a group of media represented on the Internet, focused on the formation of ideas about a comfortable, beautiful life. Women's network universal magazines aimed at attracting a mass audience can be considered as "Internet gloss", they include the "lifestyle" direction, but in addition to it they integrate into their typological model a number of other thematic areas.

Women's online medical journals - periodicals, presented on the Internet, addressed to the mass female audience, popularizing information about women's health. It should be noted that attention in the press to the topic of women's health was updated: a series of printed women's health journals are published, they have electronic versions, and, in addition, women's online health magazines are published (for example, "Womenhealthnet", "Mother and Child", etc.).

Women's online religious magazines - periodicals, operating on the Internet, are addressed to women believers. The network has been created women's Orthodox magazines ("Matrony.ru" (2006-2011), "Mironositsy.ru") and the Muslim edition ("darling"). [3]

Women's online magazines sewing, handicrafts - periodicals, presented on the Internet, addressed to the female audience, posting information about fashionable clothing styles, its production, acquainting with the technology of needlework craftsmanship. Among the designated editions, the following magazines stand out: on fashionable clothes, sewing, embroidery, etc. (for example, Osinka.ru magazine, Atelier.com, etc.).

Women's Network Literary Journal is a periodical published on the Internet that hosts literary publications focused on a female audience. For example, the publication "Outline". The presence of advertising in the magazine is minimal, thus, the implementation of a creative project in the concept of publication is predominant.

Non-commercial projects include the Katoga women's online magazine, its main goal is the organization of virtual communication, "help and support" [7]. The network publication "Katoga" is an individual author's project, created not on a commercial platform, it is positioned as a publication of one author.

The diversity of women's Internet resources is motivated by the growing interest of the audience to the network space, in which the communicative, cognitive, professional, and recreational activities of the individual are realized. The publishers of women's online magazines are mainly media companies interested in expanding media assets through women's resources. So, the owner of myJane.ru is the MediaFort group, which includes women's social networks; "WomanJournal.ru" is owned by Milanor LLC, which unites the women's Internet magazine Passion.ru, the portal leLuxe.ru, 19 women's websites



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that form the media project ("media space") "Women's passions". The increase in attendance of the studied resources indicates their demand, for example, "myJane.ru", according to 2009, occupied the 29th position in the rating of women's sites "Rambler Top 100" (April), the monthly number of visitors was more than 119 thousand people (March - April), in 2011, the monthly attendance exceeded 2 million people (May).

The model of a mass women's online magazine is designed for a reader segment with the following characteristics: age range - up to 40 years old, level of financial security - average and above average. The classroom group takes an active part in the work of network journals, which leads to a change in the nature of the role of the reader, from a passive consumer of information, he turns into an author.

So, at present, there is a development of women's online magazines, which is caused by the expansion of online media activities and their functional specificity. The tendency of organizing commercial projects of network journals and publications aimed at the implementation of creative ideas, the coverage of topics that are not popular in the mass periodicals was marked. The first group is characterized by the construction of a typological model focused on obtaining economic profit. At the base of its type-forming features are approved the criteria, which, in general, determine the parameters of the publication, allowing to rely on the effective project activity: large media companies act as a publisher, groups of wealthy women are chosen as the auditorium segment. Non-profit women's network projects are presented, in particular, religious magazines, as well as a literary publication. In the role of their publishers are individuals, as the main goals of their organization are the following: coverage of the thematic aspect, which is not considered in the mass press, the realization of creative possibilities, the initiation of communication between the audience. The democratic nature of the network environment makes it possible to publish publications in which the minimum number of employees is involved, as a result of which it becomes possible to organize a copyright journal produced by one person, combining the duties of an editor, author, web designer.

Women's journalism on the Internet is one of the fastest growing segments. It is noteworthy that so far there is not only a special study of this issue, but also a study of Internet journals in general. The article attempts to fill this gap by referring to the analysis of the Internet media of Runet, which position themselves as women's magazines.

Keywords: women's journalism, Internet magazines, analysis of Internet media Runet. [13]

In the light of the problem of the establishment and development of women's magazines in the domestic information market, let us turn to the analysis of the Internet media of Runet, which position

themselves as women's magazines. In this case, we will take into account the following signs that are essential for attributing a resource to the media: "the professional nature of information production and specialization in this type of activity; the presence in the name or logo of the site generic features that indicate belonging to the media (for example, "newspaper", "magazine", "television", "channel", "agency", etc.); positioning itself as a producer of information; the content of the site indicates that the creators identify it with activities that coincide with the activities of the media ("edition", "source", "interview", "transfer", etc.): reflected in the content of the life of the society, and not only the activities of the subject of information production; a combination of different types / types of materials or programs belonging to different genres; frequency of content update at least once a month; availability of an address where users can find the site creators, contact them"(1). It should be remembered that, speaking of online media or the electronic version of traditional media, we cannot unambiguously determine whether it is a newspaper, magazine, TV, radio or something else related to the multi-format of the network media.

There are many different classifications of Internet publications, however, theorists and media practitioners see an obvious and non-objectionable approach in which online media are considered relative to their offline parents. Such an approach is reasonably presented in the works of M. M. Lukina, which identifies "clones", "hybrids" and the network media proper (2). From this point of view, women's online magazines can be classified as follows.

1. Equivalent copies of traditional media ("clones"),

Most of the "clones" in the Internet catalogs, since their creation does not require significant efforts: a copy of the printed publication is placed on the global network. Most often this occurs somewhat later than the date of the printed number, in some cases, earlier or at the same time. This type of Internet presence in the segment

Those women's magazines usually have low-cost domestic, most often regional publications.

2. Modified online versions of traditional media ("hybrids"). [4]

The electronic version of the publication is not a copy of the printed issue, but lives an independent life, first of all it is connected with the daily update. At the same time, materials are adapted for their perception on a computer screen, taking into account the possibilities of Internet technologies associated with an increase in the amount of information (all materials on the topic available in the editorial office can be published), updating information online, publishing hyperlinks that expand the information field (3).

All modern women's glossy magazines have their offices on the Internet, referring specifically to the "hybrid" type. In addition to the materials

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published in the print edition, there is an archive of publications, additional articles on the most relevant topics, which (like the site as a whole) have visitor counters (ratings), readers vote and discuss materials in the forums.

Forums - peculiar analogues of the round table - one of the most important headings of online media. Here everyone can ask a question of interest and get an answer from the same users as him, discuss the readings with them. It is noteworthy that more and more forum materials help thematic content of magazines, offering new topics, problems, situations. This also contributes to the numerous questionnaires posted in the online versions of women's magazines. Publications stimulate readers with contests, prizes, and the publication of the best ideas on the pages of the printed version. [5]

3. Actually network SAS not having offline prototypes.

The network has generated its own, specific media. One of these tools is the online magazine (the English name is "e-zines >>", abbreviated from "electronic magazines" - "electronic journals"). Currently, there are a large number of publications on the Internet that present themselves as women's magazines. They are focused mainly on a socially active, business-like, technically advanced, fairly well-to-do female audience. Here are the most characteristic of them. [6]

"Cultural life of the South of Russia"

The journal "Women's Passions" is published from June 26, 1999 on Mondays and has an infotainment character. The magazine's audience is modern women, independent and independent. Thematic content - cooking, beauty secrets, cosmetics, family relationships, dating, indoor gardening, handicrafts, jewelry, shopping, etc. In accordance with this, eleven rubrics are formed, uniting into a single whole the key concept of "passion": "Passionate cook" - a heading for home cooks, present and future; "Passionate and beautiful" - tips on caring for yourself; "Family Passions" - tips on how to find your soul mate and get married, how to save a family, etc.; "Fruits of Passion" - a section on children and their upbringing; "Intimate Passions" - articles on intimate topics; "Passionate Dating" - the opportunity to meet, start a correspondence, flirt; "Passion to spend money" - information about bargains; "Handicraft is my passion"; "Passionate florist"; "Passionate horoscope"; "Jewelry passion." Materials of the new issue are presented on the main page, with each rubric containing an archive of publications by topic. A significant amount of materials are translated articles. The magazine supports the readers' forum to discuss the problems proposed by the attendees. [8]

"Devichnik" magazine began to be published on April 15, 1998. The publisher and editor, O. Dunaeva, performs coordinating and organizing functions, and

editorial staff work independently in different cities and countries, searching for authors, selecting and arranging materials (this is one of the most common forms of organizing an Internet publication). In the very first issues of the magazine there were only four small rubrics, but gradually "Hen Party" turned into a large project and gathered a team of regular authors around itself. The main headings: "Theme", "Life", "Interview", "Style", "Hostess", "Needlework", "Kid", "Muse", "Hihanki", "Cinema", "Tourism". In general, "Hen Party" can be attributed to the same type as "Women's Passion" - a mass edition. [11]

"Woman Journal" [www.WMJ.ru] contains a traditional set of bookmarks, headings: fashion, stars, beauty and health, love and sex, psychology, home and food, family and children, leisure and hobbies, magic. At the same time on the main page there are portraits of expert consultants - professional doctors, psychologists, makeup artists. Secular news is placed in the "Starfall" section and accompanied by photos. Various games, contests are offered. [12]

The electronic magazine about beauty, health and fashion "Beauty online" [www.krasota.ru] consists of two large sections ("Everything for you" and "Professionals") and a number of general headings. The purpose of the publication - the coverage of issues related to human health and beauty. The materials of the journal are of interest both for ordinary users and specialists, published articles are stored in the archive. The authors and consultants are experienced and well-known specialists - hairdressers, cosmetologists, fashion designers, nutritionists, plastic surgeons, etc. Updating the magazine - one or two new articles a day, plus a newsletter. The publication offers a search for resources by topic (salons, online stores, training, etc.); contest of masters, review of events. The forum is supported, consultations are given. In addition, there is a kind of labor exchange that helps women in their search for work. [10]

The magazine "Jane" [www.myjane.ru] offers readers to break away from the everyday hustle and bustle, to enjoy reading the proposed information, which will help to keep abreast of all the most interesting and important events. The rubrics are traditional for most women's publications (everything about fashion, beauty, style, health; library of articles, news, horoscopes, forums; online psychological counseling service), while editor-in-chief Yevgenia Kulikova addresses readers with the proposal to become co-authors of the magazine, writing about the news, send feedback, suggestions and suggestions. [14]

There are a huge number of women's magazines in the Internet space, and they are developing practically in the same way as printed ones. It is dominated by publications of a universal nature, designed to meet the information needs of women in various areas of their lives. Specialized publications,

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primarily devoted to the beauty industry, are actively developing. The group of socio-political publications is almost undeveloped.

The share of the female audience of the Internet is constantly growing, there are more and more new online publications designed for it. Determining the place of women's magazines in the online media system is important not only from the point of view of theoretical understanding of the new phenomenon, but also from the point of view of creating successful products in the field of online media. [16]

### Women's publication in Uzbekistan: typologies, updating the theme scope

Women's publications in Uzbekistan have almost a century of history. These publications have contributed significantly to the social activeness of women in Uzbekistan, which has traditionally been regarded as a "subgroup of society", and has contributed to the resolution of "women's issues" in society. As the Russian researcher EASola Sokolova pointed out, "the role of women in the world and the gender issues that they have in their quest for equal access to men have been strongly entrenched in the humanitarian sphere and social consciousness. Therefore, academic research on the ways and conditions of media influence on the formation of gender perception has become an actual "scientific issue.

During the years of independence, "the increase in the number of women's publications in the national press can be attributed to the increased demand for such newspapers and magazines in the information market and the increase in women's social activity in society. The number of women's publications is around 30 in the country. They were created mainly in 2006-2010 ". In the national press, the politically motivated approach of women also coincides with those years. The majority of them are established by the Women's Committee of the Republic and its regional offices.

Saodat magazine, which operates in our country in the 20th century and has a direct impact on raising the socio-political activity of women in the country today, is the first of its kind in this area.

Saodat magazine is distributed nationwide by the Women's Committee of Uzbekistan. The magazine has been published since 1925 (the first issue was called "The New Way"). In 1936, it was called "Bright Wedding", and in 1938 it was called "Bright Life". Nowadays, this edition is published in 34 pages, about 8,000 copies.

The new pillars of the magazine have a special place in the "Women and Politics" pillar. The "Women and Politics" magazine publishes essays and essays on the activities of women in politics, their family life. For example, in the issue number 7 of the magazine in 2018 an article by Muhtabar Khusanova,

candidate of the Legislative Chamber of the Oliy Majlis of the Republic of Uzbekistan, "Our Family Law Center" can be found. This article focuses on the ongoing reforms in Uzbekistan to pursue a wave of dictatorships in the life of our Uzbek women, to look at it in a new way and to raise our children as mature people.

The author admits that today's policies of leading women abroad are correct and, if necessary, we have to work together to achieve our goals, that is, execution of draft resolutions, decrees and orders. Such an opinion creates a sense of self-confidence in the socio-political sphere of women in all aspects of political leadership in our country. In addition, other conversations, portraits and essays published in this column give interesting materials about prominent women of modern age, women-MPs working in various representative bodies, well-respected women who work in different fields of national economy.

Other pagans also have readable material. For example, an article titled "The Ration of Mother's Milk," published in the 5th issue of the magazine, gives an interesting piece of information. In particular, it is thought about the impact of breast milk on the health of the baby and its future health. Today, this approach to the health of the people during the growing ecological threats today is certainly attracted by the attention of the female audience. In this issue another article titled "No will be" is about the life of Mukhabbat Yuldasheva, resident of the Kurgantepa village of Andijan region, where her entering the business sector has been struggling to implement her ideas, attracting credit funds to her family members today, most of his story is about his pure labor and his example. Nowadays, such women are, in fact, the "Future of Uzbekistan", the future of Uzbekistan, is making its fascinating contribution to the future of our youth. Of course, this kind of material about women will have a positive effect on the audience. [9]

The headings on each issue of the journal vary widely depending on the different themes and styles. For each published material, it is considered to be a meaningful pillar.

Saodat is widely promoting the single state policy on women. Along with this, the activity of non-governmental publications in the information market is increasing. For example, women's publishing houses such as "Sogdiana", "Saodat", "Tadbirkor ayol", "Mo'minalar" can be mentioned. In particular, it is not a mistake to say that Sogdiana women's weekly meeting housewives can fully meet their information needs. Various articles, interviews and consultations on housewives' health, children's upbringing, family relationships, psychologist counseling, cookery, and secrets are regularly published.

However, it should be noted that, although subjects may be attractive to the subject, but the materials are of a pleasant nature, this publication is

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far from its typological approach to qualitatively analyzing "serious" issues. This dramatically limits the ability of the publication to have potential audiences.

The newspaper "Gulchehralar" publishes about 13 thousand copies in "Saodat" magazine in April 1991, once a month. The main issue of the newspaper is the samples of creative women's works. The essays, essays, and articles that tell us about the realities of our Ibratam are published. In the "Read" column samples of Uzbek and world literature are given. The final page is a minstrel of fans, and there is a post on the "Letters to Ophthalmus" in the editorial office. It contains a comprehensive and analytical response to the messages from customers. It may be said that typologically this publication has become a popular literary art publication of women.

In the Internet, there are resources that cover the lives and activities of women in the Republic, which are mainly the traditional versions of paper women's newspapers and magazines. They also seek to publish the latest news and articles quickly in their social networking sites, such as facebook, and thus respond to the information needs of girls and women who can effectively use ICT. An example is facebook.com/sugdiyona.uz. This site, along with materials about women's socio-political life, can answer all of their questions. [8]

However, today's clients apply more often to the joint web-site of the two leading magazines - republican.uz. This online publication has been operating since 2014. It provides the best materials published in leading chapters of both paper publications. The site's upgrade is on a regular basis. Of course, happiness-gaming.uz is not inferior to anything. It does not contain full-fledged multimedia genres, infographics, and other features of internet journalism. However, this resource has its own regular audience among the audience. By examining the number of years 2018, we can say that they are much better. [7]

It is certainly not possible to purchase any published magazine. But we can see all the magazines electronically through this web site. They can read the magazine to carry out psychological support and full explanatory work so that our women can find their place and change their outlook, even when they see the attitude of women around them. On the website www.host-goggum.uz you can find electronic magazine "Bekalar", "Jahonga mashhur ayollar", "Journey to the heart", "Unsigned articles", "Nasr", "Khanlarimiz sporti", " ", "Chevarxana". Nearly 193-200 customers per day will enter the data and review the information they need.

The newspaper "In the family circle" was founded by nine founders. Among them are the Women's Committee. The Week has been published since 2012. The main materials of the weekly workshops are given in such topics as "Topic",

"Today's Speech", "Source of income", "About aunt", "Mustacheam family", "Man yourself", "Healthy life", "Invisible childhood", "Family doctor" go. Typically, this publication is considered as a family, with a third of the materials in it devotedly to women. Therefore, this pomegranate can also be included in the editions.

It is also possible to mention publications for women published in the regional Women's Committees.

Iqbol newspaper is a socio-political, cultural-educational publication of Andijan women's women, starting November 1, 1997. The eight-page event will feature 3,000 copies. The newspaper covers a wide range of topics, broadens criticisms, and publishes articles on the topic of "Today's Speech", "The Tongue of Tongue", "Hidoyat nuri" and "Our Values".

Another aspect of the newspaper is that it does not raise local press, but it is up-to-date, "untouched," raises issues that are causing debate. In the article titled "The problem of corruption of the century" in the issue of September 20, 2018, the article focuses on the current issues of the current situation, the measures to prevent the bribery of our times, and the interview with representatives of the relevant sector in Uzbekistan.

On November 8, 2018, an international conference titled "Women's Role in Democratic Modernization and Modernization of the Country: Uzbekistan's Experience and International Practice" was held in Uzbekistan with support from the United Nations and other international organizations. As noted by the media, the issues of expanding the role and capacity of women in public administration and the importance of gender equality, women's employment and entrepreneurship, their social protection and their health care were discussed in detail.

It has been said that today women should be educated in a conscientious manner by bringing them to the politics of the world, and not only in Uzbekistan, but also in Afghanistan, Tajikistan, and Kazakhstan.

During the study of the activities of women's publications in the Republic, several laws were identified. Firstly, not all publications are specialized in women's issues. Secondly, the number of analytical, critically and controversial articles on the daily life and activities of women in both private and public-owned publications is less than 2017.

Over the past two years, the number of critical and analytical materials has increased, but not in terms of quality. Third, the majority of the materials are of formal nature, with almost no emphasis on the human personality of women. Fourthly, it is desirable to extend the scope of genres and topics in most publications, and to increase the content of the women's inner world.

It does not mean that these publications are fully covering gender relations. The main reasons for this

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are the lack of awareness of journalists about gender issues and the fact that they do not understand the gender issue in the context of women's issues and that men and women are equally responsible for the development of society and the welfare of the family. Therefore, the following issues are addressed to our national press on the main issues of gender mainstreaming:

- Widespread coverage and promotion of consistent processes for the improvement of women's rights legislation;
- Consistent and systematic coverage of women's political participation processes in Uzbekistan;
- Promote the broader dissemination of women in leadership skills;
- broad coverage of women entrepreneurship activities, including women entrepreneurship based on innovative technologies;
- Publish more materials from lawyer and psychologist on domestic violence; provide journalistic inquiries;
- providing live lectures to mass audience, providing handouts, such as question-answer, expert advice, to meet women's everyday needs;

- broad coverage of activities of women in non-governmental non-profit organizations.

### Conclusions

In summary, Uzbekistan is focusing on women's activism in the development of society. During the years of independence, a number of special programs and projects at the level of state policy have been implemented in this direction.

During the years of independence, a number of special programs and projects at the level of state policy have been implemented in this direction. Media and other media are gaining momentum to support women's participation in social, economic, political, and cultural life. Significance of public-private and specialized women's publications is increasing in coverage of the role of women in public life and their activities in various spheres.

Our national press coverage of the women's role today should consistently and consistently reflect on the rights of women, the processes of their entry into politics, and the activities of women entrepreneurship, including those engaged in entrepreneurship on the basis of innovative technologies.

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## THE FACTORS SERVING TO FORM PERSONAL CONSUMPTIVE CONDUCT

**Abstract:** In this article the notion of “consumptive conduct” is defined. In author’s opinion, the consumptive conduct is considered to be complex actions, adapted under the natural and social conditions in order to meet the needs of a consumer in products and services and realizing his or her desires in consumption.

The conduct of consumerism in an individual is formed under the influences of different factors. The author analyzes the impact of cultural, social, personal and psychological factors on the consumptive conduct of an individual.

**Key words:** consumption, behavior, consumptive behavior, peculiarities of consuming behavior, the factors, shaping consuming behavior, cultural factors, social factors, personal factors, spiritual factors, smart consumer behavior.

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### Introduction

In the current century, changing people’s needs and desires has radically influenced their consuming habits. The contemporary person is turning into an individual one, who dives into flow of the consumption, i.e. “consuming person”. To make a conclusion on the basis of the views of specialists, who analyzed the subject from economic [1], sociologic [2], social-psychological [3] point: of course, this tendency is included in the content of social-philosophical issues of which should be investigated deeply. However, before undertaking this task, it is important to define the concept of “consumption behavior” and the factors that can influence its formation. In order to define the category of “consumer behavior”, it is crucial to pay special attention to the two concept definitions at first. First of all, it is impossible to express the specific peculiarities of consumption behavior without revealing the essence of the definition “behavior”. Secondly, the word “consumption” denotes the field of belongingness- this respect of the issue must be on the central point of attention. Behavior is the combination of human efforts to adapt and adjust to natural and social conditions. Regularly the behavior of the human being refers to their activity. Actually, it

isn’t so. When a person’s behavior is manifested in the pursuit of adaptation to reality and his activity is based on the actions, aimed at changing this reality. Human behavior has its classification. We do not dwell on this classification as it doesn’t belong to the research object. Only the following should be stated that one of its main features includes efforts, that is connected with consumption of various products and services.

### Materials and Methods

Consumption is the main source of meeting human requirements. As long as the system of requirements exist, there’s also consumption. The requirement causes the necessity of consuming various products and services, so that a human being should adapt to existing social conditions and that one should be compatible with the norms and principles in society with objective conditions and subjective factors. Thus, the certain type of behavior in consumption - consumptive behavior become apparent.

Consumptive behavior is deduced from the meeting the requirements of the consumers for various products and services and the combination of the efforts, made by the consumer to meet the natural and

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social conditions, taking into account the likelihood of their consumption.

Like other patterns of behavior, consumptive conduct has a number of specific features, which allow you to deeply understand the essence and content laws of its formation and development of consumer behavior. In our opinion these features are the followings:

- Consumptive conduct has a concrete-historical feature; it hasn't the same unique and constant reputation for all ages; As social conditions, the factors and tools, that influence on consumers are changing, purpose and objectives of consuming behavior has changed;

- at the certain time not only one type of consumptive behavior, but also various models that are proportionate to community hierarchy, demographic state, classroom structure and cultural level dominate; the following models are composed of common and specific elements;

- Consumptive behavior has changeable, still or stable and unstable characteristics; As the need for any product appears, the efforts, which meet this requirement comes into existence, eliminating the demand leads the loss of the effort;

- Consumptive conduct consists of synthesis of rationality and perceptive elements; in most cases it is focused on satisfying the emotional needs of consumers;

- In the content of consumptive conduct, owning artifacts, which has turned into public consuming product and also admitted as a custom is of great importance;

- Consumptive behavior develops in free state of principles of inheritance, because there isn't mechanism of transferring consuming tradition from generation to generation; the system of the needs and desires which is part of its structure is indispensable and actual only at a certain period, after that new requirements and desires appear instead of it.

- Although elements of consumptive behavior satisfies consumers' daily and lively needs and desires, it doesn't affect its mental progress, that is personal belief, qualities and features, citizen and life position are not developed.

As we have already stated consumer behavior has a variable character. Naturally, these changes are not considered indirect processes. There are encouraging factors to it. In general, there is no single theoretical approach to the factors which influence on modifying and forming of the consuming behavior in scientific sources of consuming behavior. According to the object of the study, the researchers distinguish a set of the factors from each other. Among them, the classification of factors suggested by professor F.Cottler, in school of Management at Northwestern university plays indispensable role.

According to the scientists, consumer decision about the choice of this or that product, service doesn't

happen indirectly. Any shopping is carried out under the influence of many cultural, social, personal and psychological factors.

The factors, which influence of this personal consuming behavior efficiently can be shown separately on the basis of this negotiation.

1.Culture is one of the most controversial reasons for determining the specific dimensions of human needs and behavior. The person firstly acquired his /her family then the material and cultural values, dreams and desires, attempts and efforts of the society, which those belong to the requirement for the discrepant product and services is formed according to the system of the system of these traditions, hope and desire. F. Cottler presents this relationship as the example of Betty Smith. Betty adores photocamera. This willing is the result of that she has been brought up in modern society, where photocamera and phototechnics are appreciated. While there may be no value and requirement for photocamera for the members of the tribe, who are living in some place of Australia, as they are not interested in and free of scientific-technical development of the age.

As it is known, any culture is composed of various components, that is subculture. Subculture creates finding the people who are like to themselves, communicating with them, the suitable possibilities. The culture of small group, class relating to the person influences national and rational belongings, religious belief, the system of traditions and like these its requirement influence on the complex of requirement and consumers' rights seriously.

A human being selects nutritional products, outfits, the forms of having rest, even profession and life destination are chosen under the influence of this subculture. One product may be valuable for some members of the culture, but it can be invaluable for the representative of other subculture. That's why there is the certain dissimilarity between people's consuming behavior according to the groups.

2. Forming consumptive behavior is conducted under the influence of different *social factors*. The type of these factors may cover referent groups of person, social life in their family, social slogan, social roles under people's responsibility...

According to the Philip Cottler, the referent group refers to a group of capable of directly influencing the consciousness and activity of a person.

Usually family, neighbors and colleagues are considered such group. Informal groups that are based on different interests can also be regarded as referent groups. Individual's lives and activities in society is a part of the same group. This group influences the human being in three ways: first he introduces the person to the new norms of behavior; Second it promotes the idea of individual; thirdly it adapts to the consumption of products and services that are acceptable to the group. The higher the

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authority of the referent group, the greater will be its impact on the consumer behavior.

The social status of the family and family traditions, especially the steps of family life have strong impact on the change in consumptive behavior. Actually a young man or a girl, who accommodate with their parents, a newly-married couple, a husband and wife with their offspring, a father and mother who are busy with bringing up teenagers, an elderly person who continues to work, a retirement age an old woman and man- their shopping habits radically differ from each other.

The social state and social activity of human influences to consumptive conduct. As you know people are forced to play a variety of roles as members of different social groups. For instance, he or she is as the relative of a parent, i.e. husband or wife, and a livelier of his or her own business. All of these roles require the person to carry out the certain efforts. Each of these roles has a strong impact on its consumer behavior, as well as consumers.

Moreover, each role requires to have its own social status. For example, the person's status is higher than being a child. This position, the role of the company demands to use the products and services that are appropriate to the company.

According to American experts, the company's presidents spend their valuable time in Mercedes or Cadillac, and they buy expensive costumes, drink, Katti Sark whiskey. It should be noted that these symbols, which indicate the person's social status may have different appearance in different regions. For example, in New York these symbols include fishery and cosmetic operations for men, while Chicago has the tradition of purchasing only the products which are listed in catalogues, night parties and caviar refers to Houston and the outfits produced by Izod belong to San Francisco.

Individual factors are one of the most crucial factors of consumptive conduct. They include the age, profession, career, lifestyle, thoughts and so on. However as the younger generation grows, the structure services and services that consumers use during their daily lives change radically. Consumption of food also differs at different stages of life. Dressing habits, household appliances, rest types, thoughts and taste are changeable.

The branch will have certain impact on the nature of the goods and services purchased by its occupation. The worker finds appropriate not only consuming the necessary products for his or her professional activity but also the dainties, which are considered valuable in this area. But the head of the company focuses on the entire new complex of products hugely: he selects the best of services, the suits that represents his status. Marketing services of developed countries doesn't distract this feature of consuming process, thus in recent years markets, grocery stores, which are designed for certain

profession have been expanded for certain professions and social statuses.

The economical state of the person is especially crucial in the content of personal factors which influence consumption behavior. It is known to us that the economical state of the person is marked with his or her income, the amount of deposits, the ownership of property and etc. on the one hand these factors determine the shopping capability of the person. on the other hand, it shows the quality and norms of the products and services, which he or she tends to purchase. The person of whom the economical state is stable as a consumer's essentially different from that of a person in an unstable economic situation.

There is another aspect of the issue. In certain cases, two people, those are representatives of the same subculture, in the same economic position and who are responsible for similar roles may be sharply differentiated according to the efforts as consumers. For example, the people, who are carrying out in honorable positions of those the one may be hedonist and the second one may be ascetic. Consequently, a set of personal factors that can influence the formation of consumer behavior should include a lifestyle of personality. Philip Cottler also considers personal traits (determination, willingness, self-esteem, enthusiasm, cautiousness, discipline, flexibility and etc.) and self-imagination about the person, as the personal factors which can influence consuming behavior. According to his opinion, the certain trait claims to select this or that product. For instance, the people who tend to converse with people like to consume beer.

4. The Person's choice as a consumer also influences spiritual factors. Among them people's wish is of particular importance. We have emphasized that the source of humans' efforts as consumer is their needs. However, naturally any requirement cannot be hit to buy this or that product. As you know, types of personal requirement depends on physiological and spiritual necessity. Most of them do not claim the source of effort. As they don't have actual and intensive importance may turn into personal willing. The very willing forms consumptive behavior in other words encourage purchasing the products and services. However, after getting the product, the desire to achieve the things fades, its place is replaced by another dwelling.

The person's intelligence affects on consumers' manner, human beings' intelligence which is related to the consumption has its peculiarity. For instance, the one who wants to buy any kind of production came to the market. Firstly, he or she only realized the product that he wants to purchase. For example, the consumer who decided to buy a camera one may not see other technical Gadgets that are placed beside him or her.

One of the spiritual factors that highly influence on consumptive conduct is related to belief. Strong



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belief defines the circle of products and services that an individual person might consume. For example, a person who is strongly addicted to Islam, restrain himself from receiving the services and consuming the products such as pork and alcoholic drinks that Islamic religion puts prohibition. We can witness the advice and measures concerning to consuming in another religious dogmas. But this factor which influences on personal consumption behavior is not dependent on only religion. Beliefs, created on a foundation of scientific and religious knowledge, customs, traditions and imaginations and hopes could be such a source.

### Conclusion

Finally, one of the last spiritual factor that affects consumer's behavior is personal attitude. Personal attitude is based on the system of person's certain

knowledge and positive or negative attitude to the object. This marking system can serve as a logical basement for opting the types of products, intended for consumption. For instance, the person who has a positive attitude to the economy and culture of Japan and inhabitants' living condition is likely to consume the products or goods that have been produced in the very country. Contrarily, the person, who has a negative deduction doesn't find normal the consumption of the country's production appropriate.

Obviously, consumption behavior is formed under the influence of different factors. It should be noted that, as the social and historical conditions change, some of them may be of priority importance, while others lose their reputation. The scientific concepts about these factors create the possibility not only to query the rules of consumer behavior, but also to investigate it sensibly.

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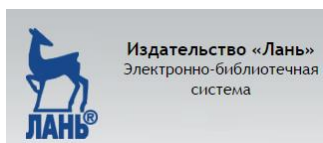
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