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## Effects from education as a key factor in the process of labor forces formation in the Republic of Kazakhstan

The article is devoted to the problem of reforming the education systems of Kazakhstan and improvement of the quality of labor forces in a market economy. Of particular relevance is the analysis of the impact of investment in education on the country's labor forces. In the context of integration into the world economy, it is necessary to find the most appropriate scientific approaches to reforming labor forces systems by improving the analysis, planning and forecasting the trends of its development, taking into account the influence of various factors. As the analysis of the works of foreign scientists in forecasting the development of human capital in the conditions of a modern market economy shows, it is the methodology of alternative forecast scenarios that reflects the needs of strategic foresight in the context of a complex intertwining of contradictory trends in the development of the world economy and human capital. It is generally recognized that in the context of rapid and ambiguous changes, it is no longer possible to use planning methods based solely on extrapolating existing trends in economic and social development. Therefore, it is important to compare the state of labor forces to date and assess its level of competitiveness. Regarding Kazakhstan, the results of the regression model should be taken into account when carrying out reforms. The model shows correlation between education and the quality of labor forces.

*Keywords:* management, human capital, labor forces, Kazakhstan, sustainable development, program evaluation, project management, regression analysis, government, human resources, education.

The growing interest of economic science in the creative abilities of people, factors contributing to their formation, coincides with the general pattern of development of modern economic science. From the standpoint of economic theory, this meant a rethinking of approaches to measuring the life of society, their «humanizing», putting the individual at the center of the socio-economic system. This, in turn, requires other approaches to education, as well as to other spheres of reproduction of human capital.

According to the theory of human capital, investment in education, carried out by economic agents, is based on their perception of the potential costs and benefits of such a decision. Consequently, the return on education is one of the important factors determining demand for it.

Demand for higher education in Kazakhstan is constantly growing, as indicated by a simple comparison of a number of statistical facts. The number of graduates of higher education institutions in 2016 was 196,7 thousand people, compared to 55,4 thousand in 1999 [1].

The share of people with higher and secondary education in the republic as a whole was 34.9 % in 1999, in the most developed regions of the country this figure reaches 54.8 % [2]. The education index in 2015 was 0.950, which is a high indicator, which in turn provides a relatively high index of the Kazakhstan human development index [3].

But what is the reason for such a «popularity» of education? It would be logical to assume that it lies in the return from education — the growth of income from a higher level of education. Official statistics do not provide this kind of data. There are official data confirming the existence of other additional benefits from higher education. For example, the unemployment rate is significantly lower among those with a higher education diploma — 15 % for men and 20.7 % for women versus 72.4 % for men and 66 % for women with secondary education. Moreover, there are almost no unemployed among persons with postgraduate education — 0.1 % in women and 0 % in men [4].

Despite the fact that institutional reforms have been carried out in Kazakhstan for quite a long time, there is no qualitative progress in the development of innovations in the country. For example, in terms of the level of knowledge application in the economy (KEI) for 2016, Kazakhstan (72-nd place) lags behind such countries with a comparable level of per capita GDP, such as Chile, Armenia and Turkey. In other words, the level of competitiveness of the Kazakhstan economy is not high enough. According to the KEI index (the level of knowledge application in the economy), the country can be compared with such countries as Jamaica and Mongolia, where the income of the population is much lower. Moreover, according to the

Innovation System index, Kazakhstan can be compared with African countries, such as Angola and Zimbabwe, where the GDP per capita is 18 times lower than in Kazakhstan.

Innovation and technological re-equipment of economic sectors is the basis for the formation and implementation of an innovative breakthrough program, without which the existence of a civilized, competitive state is impossible at present. The pace and effectiveness of the development of the innovation sphere depend on the investment policy pursued, which should provide conditions conducive to innovative development.

Despite the increase in domestic expenditures on financing research and development in the Republic of Kazakhstan over the past 8 years, this figure in % of GDP remains extremely low.

Kazakhstan's research and development expenditures averaged 0.18 % of GDP, while UNESCO recommends that developing countries bring R & D expenditures to 1 % of GDP.

In accordance with the development strategy of the republic, investment activity will be stimulated in the development of related and related industries of the fuel and energy complex, the petrochemical industry, engineering and other priority sectors.

People who are working in the field of R & D. characterize human capital as the basis of the innovation economy in Kazakhstan. Thus, in Kazakhstan, the number of people working in the field of R & D per million inhabitants in 2013 amounted to 1,382 people and increased compared to 2001 by 390 people. Such dynamics characterize the presence of significant intellectual potential in the country. However, there is an outflow of human resources in the country, with the best conditions for the development of science and research. The human capital of the country in accordance with its quality level requires adequate conditions for the realization of its potential. The lack of appropriate conditions leads to its migration. According to the Statistics Agency of the Republic of Kazakhstan for the period from 2008 to 2013, the largest positive balance of external migration of the population over 15 years old falls on the South Kazakhstan and Mangistau regions, and the negative balance on the East Kazakhstan, North Kazakhstan and Karaganda regions. This is due to the fact that Russian-speaking citizens migrate from the northern and central regions, and ethnic Kazakhs come to the southern regions.

Kazakhstan's policy of accelerated industrial-innovative development also imposes new high demands on the social development model. The main priorities of the state policy of our republic, in accordance with the guidelines of the President of the country, were and remain the development of human capital and an increase in the standard of living of the population.

More and more economists are turning their attention not only to the quantitative indicators of the standard of living of the population, but also to the combination of quality indicators with cash incomes. According to the Kazakh author, «the standard of living of the population should be defined as a socio-economic category characterizing the general welfare of the people, the consumption by each person of material, cultural, social benefits and services, combined with the conditions that ensure the possibility of satisfying his real needs. At the same time, quality of life means satisfaction of the population with its life and living conditions, based on its real various needs and interests». Quality of life should be considered as a prerequisite for achieving «harmony in society».

An important role in determining the level and quality of life and quality of labor resources have such indicators as accessibility of education, health care, housing purchases, pensions, employment and working conditions, length of vacation, size and compensation mechanisms as a result of temporary loss of work or temporary disability, crime activity and more. What matters is that you can buy on the income, quality and range of consumer goods and services.

Considerable attention is paid to the problems of accessibility of education in the Republic of Kazakhstan, since education is one of the main indicators of the country's development. Until 1999, technical, vocational, and higher education was provided to citizens of the Republic of Kazakhstan free of charge from the state budget. Since 1999, education in higher educational institutions and organizations of technical and vocational education of the republic has been paid. In order to ensure accessibility of higher education, today in Kazakhstan there are two forms of state support for students: the provision of state educational grants on a competitive basis and the provision of state guarantees for educational loans issued by commercial banks.

In the 2016–2017 school year, 527,2 thousand students were enrolled, which is 65 % more than in the previous academic year. That is, reforms in the field of higher education did not make it less accessible and the demand for higher education not only did not decrease, but also increased significantly.

In this study, we set out to determine whether there is an additional benefit from education in terms of income growth. We will also attempt to assess the impact on incomes (by which, in the narrow sense, the wages of hired workers are understood) of such factors as sex and age.

The study was conducted in one of the regions of Kazakhstan - Karaganda region. As you know, the income level in the regions of Kazakhstan is significantly differentiated, Karaganda region belongs to regions with income corresponding to the average republican level. It should also be emphasized that in Kazakhstan there is a strong differentiation of income depending on the type of economic activity - financial activities, extractive industry, real estate operations, communications and communications are among the most profitable, agriculture, education and medicine are the least profitable.

To study the dependence of income on the age, gender and qualification characteristics of the employee (level of education and degree), the author conducted a questionnaire survey of 500 respondents among employees of state institutions, scientific and educational institutions, and non-governmental financial organizations.

For each of the three groups of organizations, it is proposed to construct the following econometric model of the income dependence of the employee

$$income = c_0 + c_1gender + c_2age + c_3edu + c_4degree \quad (1)$$

various factors, where: income is the monthly income, gender is gender (the gender variable is 0 if the male employee is 1 if the female employee), age is the age, edu is the level of education (edu is 1 if the employee has a higher education and is equal to 0 if the employee does not have a higher education), degree - a degree (variable degree is 1 if the employee has a scientific degree of a candidate or a doctor of science, and is equal to 0 if the employee does not have a degree).

According to the questionnaire among the employees of state institutions, the following results were obtained:

Correlation					
	INCOME	GENDER	AGE	EDU	DEGREE
INCOME	1.000000	-0.485792	0.475052	0.029361	-0.025306
GENDER	-0.485792	1.000000	0.033978	-0.005483	-0.285450
AGE	0.475052	0.033978	1.000000	-0.044505	-0.125718
EDU	0.029361	-0.005483	-0.044505	1.000000	0.098601
DEGREE	-0.025306	-0.285450	-0.125718	0.098601	1.000000

Judging by the correlation matrix, we can say that the medium tightness of the relationship exists between the income indicator and the two factor attributes - gender and age. Qualification signs do not have a significant impact on the income level of the employee.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	25333.44	15833.21	1.600019	0.1217
GENDER	-33118.21	8974.965	-3.690066	0.0010
AGE	1082.726	317.0930	3.414538	0.0021
EDU	4018.046	9388.692	0.427967	0.6722
DEGREE	-19667.82	23330.85	-0.842996	0.4069
R-squared	0.494089	Mean dependent var	43878.39	
Adjusted R-squared	0.416256	S.D. dependent var	28444.24	
S.E. of regression	21732.29	Akaike info criterion	22.95768	
Sum squared resid	1.23E+10	Schwarz criterion	23.18896	
Log likelihood	-350.8440	Hannan-Quinn criter.	23.03307	
F-statistic	6.348099	Durbin-Watson stat	2.225018	
Prob(F-statistic)	0.001056			

The multifactorial model of regression has the form:

$$income = 25333 - 33118gender + 1083age + 4018edu - 19668degree.$$

Coefficient of determination  $R^2=0,49$ , i.e. 49 % variation of the dependent variable *income* is determined by regression. The regression equation is significant by the F-criterion, since  $F = 6,34 > F_{0,05,4,26} = 2,74$ . The actual values of the Student's test for factors *gender* ( $t_{c_1} = -3,69$ ) and *age* ( $t_{c_2} = 3,41$ ) exceed the tabulated value at 1 % significance level with the number of degrees of freedom 26:  $t_{0,01;26} = 2,78$ , which indicates the statistical significance of the coefficients under these variables. However, the regression coefficients for dummy variables *edu* and *degree* are statistically insignificant, since  $t_{c_3} = 0,43$ ,  $t_{c_4} = -0,84$ .

Thus, only two factors explain the income level: gender and age of the employee: the income of the male employee in the surveyed state institutions is 33118 tenge higher than female employees; with an increase in the age of the employee for 1 year, his income on average increases by KZT1083 with other things being equal.

According to official statistics, there is indeed a gender pay gap in Kazakhstan: the ratio of the average salary of women to the average salary of men was 63.5 % in 2008 [5]. In our case, the average income of women (35184.09 tenge) is 54 % of men's income (65131.11 tenge).

The increase in income with the age of workers, apparently, is associated with an increase in the length of service. The Labor Code of the Republic of Kazakhstan does not specify an increase in wages for the length of service, but government agencies use Government Resolution No. 1400 of 29.11.2007 «On the system of remuneration of civil servants, employees of organizations held at the expense of the state budget, employees of state enterprises» [6], according to which a surcharge to wages for work experience is assumed.

The results of the research conducted in the scientific and educational institutions are presented in the following tables:

Correlation					
	INCOME	GENDER	AGE	EDU	DEGREE
INCOME	1.000000	-0.379991	0.349845	0.453165	0.623152
GENDER	-0.379991	1.000000	-0.270645	-0.026114	-0.211529
AGE	0.349845	-0.270645	1.000000	0.118823	0.278658
EDU	0.453165	-0.026114	0.118823	1.000000	0.258799
DEGREE	0.623152	-0.211529	0.278658	0.258799	1.000000

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	24500.02	5236.892	4.678351	0.0000
GENDER	-12770.54	2596.190	-4.918955	0.0000
AGE	211.6315	89.09704	2.375293	0.0185
EDU	22547.87	3494.375	6.452619	0.0000
DEGREE	27034.74	3010.788	8.979290	0.0000

R-squared	0.561351	Mean dependent var	52877.45
Adjusted R-squared	0.552534	S.D. dependent var	26152.30
S.E. of regression	17494.03	Akaike info criterion	22.40131
Sum squared resid	6.09E+10	Schwarz criterion	22.48264
Log likelihood	-2279.934	Hannan-Quinn criter.	22.43421
F-statistic	63.86650	Durbin-Watson stat	1.335619
Prob(F-statistic)	0.000000		

The sample was 205 respondents. According to observations, the multiple regression equation has the form:

$$income = 24500 - 12771gender + 212age + 22548edu + 27035degree.$$

The regression equation is statistically significant, because the empirical meaning of the Fisher test  $F=63,7$ , which is more critical at a significance level of 0.05 and degrees of freedom  $k_1=4$  и  $k_2=199$ :  $F_{0,05,4,199} = 2,42$ . With probability of 95 % by the Student's criterion, all the parameters of the regression equation do not accidentally differ from zero.

From the equation it follows:

- Women's income in NOI is on average lower than the income of men at 12771 tenge, with constant values of other model parameters;
- If the age of the employee of the NOI is increased by 1 year, then his income grows on average by 212 KZT, provided the other factors of the model remain unchanged;
- an employee with a higher education has a monthly income of 22548 tenge higher than an employee without a higher education;
- the presence of a degree increases the employee's income on average by 27035 tenge, all other things being equal.

The coefficient of multiple determination characterizes that 56 % of the variation of the dependent variable (employee income) is due to the variability of the explanatory variables. Judging by the pair correlation coefficients, the closest relationship can be traced between the income of the employee and the level of his education, as well as the presence of an academic degree. Insignificant influence on the level of income is the sex of the employee and his age.

To study the influence of a magisterial degree of an employee of a scientific and educational institution on the level of his salary, dispersion analysis was used.

As a result of the processing of statistical data obtained through a questionnaire survey of respondents, the following results were obtained:

Sources of variation	Degree of freedom $df$	Sum of squares of deviations $SS$	Dispersion $MS$	Actual $F$	Table $F$ if $\alpha=0,05$
Explained	1	254172247,8	254172247,8	2,128246074	4,08
Rest	43	5135405530	119428035,6		
Common	44	5389577778			

Since the actual value of the Fisher test  $F = 2.13$  is less than the tabulated  $F = 4.08$ , the null hypothesis that there is no connection of the signs is accepted. Thus, our assumption that the master's degree does not have a significant effect on the income level of workers in scientific and educational institutions is supported by empirical calculations.

A different picture is observed in financial institutions: the income of their employees does not depend on any of the indicators considered. Such a conclusion allows us to make the obtained regression and correlation parameters.

Correlation					
	INCOME	GENDER	AGE	EDU	DEGREE
INCOME	1.000000	-0.116984	0.181480	0.107734	0.146267
GENDER	-0.116984	1.000000	0.117152	-0.145644	-0.249675
AGE	0.181480	0.117152	1.000000	0.063984	-0.063984
EDU	0.107734	-0.145644	0.063984	1.000000	0.036364
DEGREE	0.146267	-0.249675	-0.063984	0.036364	1.000000

All paired correlation coefficients are close to zero, which indicates the absence of a connection between the dependent variable (employee income) and explanatory factor attributes (gender, age, education level and academic degree of the employee).

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	30316.54	40183.53	0.754452	0.4540
GENDER	-8205.970	11993.54	-0.684199	0.4969
AGE	1377.797	946.8955	1.455068	0.1517
EDU	17147.01	30366.25	0.564673	0.5747
DEGREE	29647.02	30939.48	0.958226	0.3424
R-squared	0.074390	Mean dependent var		83328.19
Adjusted R-squared	0.003189	S.D. dependent var		41658.48
S.E. of regression	41592.00	Akaike info criterion		24.19283
Sum squared resid	9.00E+10	Schwarz criterion		24.37205
Log likelihood	-684.4958	Hannan-Quinn criter.		24.26248
F-statistic	1.044794	Durbin-Watson stat		2.163395
Prob(F-statistic)	0.393196			

Statistical analysis of the model shows that the regression equation is statistically insignificant, and the parameters of the equation randomly differ from zero. The low value of the multiple correlation coefficient  $R = 0.27$  means that significant factors are not included in the regression model; when calculating wages, employees of surveyed financial institutions take into account other criteria.

Most likely, the incomes of workers in financial institutions are mainly influenced by the positions they occupy, i.e. functions performed. The weak level of influence of factors such as the level of education and academic degree probably indicates that in these institutions there are practically no employees who have a scientific degree, as well as employees with lower education - the composition of employees is almost homogeneous.

Thus, the return on education from the surveyed takes place only in the sphere of education, which in Kazakhstan belongs to spheres with a relatively low income level. Hence it is logical to conclude that under the conditions of the Kazakhstani economy, incentives for investment in education, at least at the level of decision-making of individual economic entities, are poorly expressed. Apparently, given the steady increase in the number of people receiving higher education - the availability of a diploma of education serves only as a «pass to the workplace», while not providing a higher level of income, and further growth in the level of education is not rewarded at all in most spheres of economic activity with the exception of individual. This idea confirms the opinion of some researchers according to which the post-Soviet education system follows the so-called filter theory. In accordance with this theory, the task of the education system is not to transfer knowledge and skills, but to test the abilities of the trainees who existed before and apart from training. Therefore, the availability of higher education confirms the high level of potential productivity and actually serves as a «pass» for the best jobs. The danger of such a selection mechanism is clear - rational behavior at the individual level can lead to irrational consequences at the level of society. If higher education becomes almost universal, as a signal, it loses its informational value. As a result, this leads to «diplomomaniya» — a self-developing process leading to profound structural imbalances and devaluation of education.

The formation of human resources of a new quality, their management at the firm level, are the key to the country's future competitiveness in the global economy. Therefore, the relevance of the issues being developed for the economy of Kazakhstan is of high importance.

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## Қазақстан Республикасында еңбек ресурстарының сапасын қалыптастырудың басты факторы ретіндегі білім беруден қайтарым

Мақалада Қазақстан Республикасындағы білім беру жүйесін реформалау мен нарықтық экономика жағдайындағы еңбек ресурстарының сапасын жақсарту саласындағы негізгі мәселелер ашылды. Білім беруге инвестициялардың елдің еңбек ресурстарына әсерін талдау ерекше қызығушылық тудырады. Елдің әлемдік экономикаға кірігуі контекстінде барлық факторлардың әсерін назарға ала отырып, даму болжамдарын жасау және одан әрі даму үрдістерін айқындау кезінде талдау, жоспарлау, болжамдау (экономикалық-математикалық үлгілеуді қоса алғанда) сапасын жақсарту арқылы еңбек ресурстары тұжырымдамасын реформалауға лайықты барлық сәйкес келетін ғылыми тәсілдерді табу қажет. Қазіргі заманғы нарықтық экономика жағдайында адам капиталы мен еңбек ресурстарының дамуын болжамдаудағы шетелдік ғалымдардың жұмыстарын талдау көрсеткендей, болжамның балама сценарийлерінің әдіснамасы әлемдік экономика мен адам капиталын дамытудағы қарама-қайшы үрдістердің күрделі өрлеуі контекстінде стратегиялық болжаудың қажеттілігін көрсетеді. Тез және бірмәнді емес өзгерістер контекстінде экономикалық және әлеуметтік дамудағы қазіргі үрдістерді экстраполяциялауға ғана негізделген жоспарлау әдістерін пайдалану мүмкін еместігін көпшілік мойындаған. Сондықтан бүгінгі күні еңбек ресурстарының жай-күйін салыстыру және олардың бәсекеге қабілеттілік деңгейін бағалау маңызды. Қазақстанға келетін болсақ, регрессиялық модельдің нәтижелерін реформалар жүргізу кезінде ескеру қажет. Модель жұмыс күшінің сапасы мен білім беру арақатынасын көрсетеді.

*Кілт сөздер:* басқару, адамдық капитал, еңбек ресурстары, Қазақстан, тұрақты даму, бағдарламаларды бағалау, жобаларды басқару, регрессиялық талдау, басқару, адамдық ресурстар, білім беру.

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## Отдача от образования как главный фактор формирования качества трудовых ресурсов в Республике Казахстан

В статье раскрыты основные проблемы в области реформирования системы образования в Республике Казахстан и улучшения качества трудовых ресурсов в условиях рыночной экономики. Особый интерес представляет анализ влияния инвестиций в образование на трудовые ресурсы страны. В контексте интеграции страны в мировую экономику необходимо найти подходящие научные подходы к реформированию концепции трудовых ресурсов посредством улучшения качества анализа, планирования, прогнозирования (включая экономико-математическое моделирование) при составлении прогнозов развития и определении тенденций дальнейшего развития, принимая во внимание влияние всевозможных факторов. Как показывает анализ работ зарубежных ученых в прогнозировании развития человеческого капитала и трудовых ресурсов в условиях современной рыночной экономики, именно методология альтернативных сценариев прогноза отражает потребности стратегического прогнозирования в контексте сложного переплетения противоречивых тенденций в развитии мировой экономики и человеческого капитала. Общеизвестно, что в контексте быстрых и неоднозначных изменений уже невозможно использовать методы планирования, основанные исключительно на экстраполяции существующих тенденций в экономическом и социальном развитии. Поэтому важно сравнить состояние трудовых ресурсов на сегодняшний день и оценить уровень их конкурентоспособности. Что касается Казахстана, то результаты регрессионной модели следует учитывать при проведении реформ. Модель показывает соотношение между образованием и качеством рабочей силы.

*Ключевые слова:* управление, человеческий капитал, трудовые ресурсы, Казахстан, устойчивое развитие, оценка программ, управление проектами, регрессионный анализ, управление, человеческие ресурсы, образование.

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