Access to Education and Information and Communication Technologies as a Factor Reducing Inequality

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Abstract: In this article the authorsexamine the impact offactors suchas access to educationand information and communication technologies on theinequality in the distribution of population by income. The authors, based on a household survey data baseof the Agencyof the Republic of Kazakhstan on Statisticsprove the existence of a direct relationship between the seindicators and make recommendationsto improve public policies to reduceine qualities in income andquality of life.

Key words: Quality of life · Income inequality · Education · Information and communication technology

INTRODUCTION

In today's society before each government must promote social justice and protection of the population, creating for each citizen of decent living conditions, equal opportunities, support for vulnerable groups of the population, as well as smoothing of social inequality through different mechanisms of distribution and redistribution of income between social classes. Against the background of successfully developing Kazakh economy issues related to improving the quality of life of the population, creating a stable middle class, which forms the basis of society, reduce income inequality come to the fore. In his message to the people of Kazakhstan "Strategy" Kazakhstan-2050, [1] noted the need to create equal opportunities to all people of Kazakhstan that will certainly help to reduce inequalities in income distribution and social tension.There are many reasons for the economic inequalities that are interconnected with each other. The analysis of foreign and domestic scientific literature has shown that the main factors affecting the income inequality of the population are: the labor market and wage policy, sources of cash income, level of education and access to vocational education, gender, health and access to health care, migration (both external and internal), social policy, the tax system, as well as economic growth and the system of distribution of national income, globalization. An important factor is the differences that there are disparities in access to

vocational training. According to some Western economists, the main reason for the increase in income inequality since the 80s of the last century is the steady growth in demand for high-skilled workers in high-tech industries, which, of course, was the reason for the growth of the salaries of those who have the education.

An innovative way of development, announced by the Government of the Republic of Kazakhstan, involves the introduction of unique high-tech, knowledge-intensive industries, which will create a demand for high-end professionals. Increased competition in the world markets in almost all areas and especially in the market of resources involves increasing the value of intellectual assets, the importance of human capital and increasing global competition for this resource. It was a professional and educated population, focused on innovative work and entrepreneurship, with a sufficient level of self-identification and self-awareness can give the country a high-performance, well-educated labor force for the country to become sustainable socio-economic development.

Scientific and technological progress brings about changes in the economy. In the scientific world, there are active debates about the existence and importance of digital technologies. For example, there is a view that the development of digital technologies can lead to greater economic growth and, consequently, to reduce poverty in developing countries. On the other hand, some argue that there is no digital divide and, therefore, the policy reforms

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aimed at eliminating it is a delusion. Other authors have argued in the proof of the link between economic growth, technology and the potential for poverty reduction. However, there is a general consensus that information and computer technology may provide opportunities to generate more income and improve living standards in the region and second, even if the gap in the digital divide is a symptom, not the cause of differences in earnings then ignoring this can lead to further expansion of such differences.Thus, access to education and information and communication technology has an effect on income inequality. In this article we will try to assess how far these two criteria affect the income level of the population in the Republic of Kazakhstan and the distribution of the population by income group.

Literature Review: Education is the most important factor in human development, it enables people to the acquisition of knowledge and skills can transform the quality of life and serves as a source of economic growth. Despite the fact that international organizations such as the World Bank, the UN and other education is recognized as one of the most important elements of poverty reduction. In the scientific community is still ongoing debate about the impact of education on income inequality [2,3]. In the foreign literature was conducted to test the hypothesis that the distribution of income corresponds to the distribution of the educational level of the population. In a number of countries have conducted studies that have shown that the greatest influence on the results of schooling by social and family circumstances and it subsequently determines the level of income. In particular, these conclusions in1966came Coleman *et al.* [4]. He argued that the effectiveness of the learning process does not significantly affect the way the school is provided with material resources.

Decisive of importance was the social background of students. Coleman noted that the inequality in which children are placed by their home, their neighbor, their surroundings and accompany them in the future, in their adult life after high school.

C. Jencks *et al.* [5] confirmed the findings of that success in education and professional growth is mainly determined by family circumstances and other factors outside of school and that educational reforms themselves have only very little effect on the existence of inequality.

Cross-country comparisons conducted by A.R. Castello and Domenech [6], D. Gregorio and J. Lee [7], A. Kim and K. Tang [8] have demonstrated a positive association of differentiation of the educational level of

the population and income inequality. They found that countries with the highest and lowest inequality in the educational level of the population do not coincide with the countries with the relevant indicators of income inequality. To a large extent this can be explained by the fact that the efficiency of human capital depends on its quality and characteristics of the institutional environment.

Been many studies showing that human capital and education are an important driving force in determining the long-term economic growth [9, 10, 11,12, 13]. The relationship between income distribution and economic growth was analyzed Gelor and Zayra [14], Bertola [15], Alesina and Rodrik [16], Pearson and Tabelini [17], Azhion, Caroli, Harz-Pepelopa [18]. Consensus of this theoretical and empirical research was the fact that in the countries studied inequality negatively associated with economic growth and thus the formation of a positive effect on reducing inequality. This position has been challenged by Deininger and Squire [19] in 1996, Lee and Zoe [20]. Forbes [21], Barro [22], which suggested that income inequality might be a stimulus for growth, especially in rich countries.

Heckman and Krueger [23] in his book "Inequality in America: What role for human capital policies?" examined the effect of education on income inequality in the U.S. example. In their study, they concluded that education is a key determinant of income. Reduce economic disparities can be achieved through an effective policy of investment in human capital (education and training). A. Kruger proposes to allocate more resources to the education and training of members of low-income families, which is from his point of view, the most effective way to reduce inequality. He emphasizes that credit constraints are the biggest obstacle to the achievement of equal educational opportunities for students from low-income families, because they are usually forced to use a higher discount rate when making decisions about getting an education. Examining the pre-school, primary, secondary education and the following steps of training, A. Kruger proved that enhance their education and skill level is much more difficult for those whose incomes are below. That is why it is recommended to focus on investing in the education and training of people in disadvantaged position, which will be an effective way to reduce inequality. In response Hackman, argues that in order to reduce the polarization and the transition to the higher socio-economic groups are not enormous importance to the entire system of education and especially pre-school education, which forms the basic skills in early childhood, so he has to allocate more resources to education in early childhood.

At the same time Glomma and Ravikumar [24] in 2003, considering the evolution of inequality in the overlapping generations model, where investment in human capital of each person depends on the quality of schools, came to the conclusion that the gap the income gap between rich and poor could increase even when the quality of public education is the same for all individuals. Thus, in the short term, public education cannot solve the problem of inequality.

Rene [25] studied a model in which the government provides education and finance it by raising taxes on the resources (wealth) of all persons. He showed that there is an inverted U-shaped relationship between growth and education. Initially, the increase of education leads to economic growth and then decrease. And also it affects income inequality, the Gini coefficient to measure if. However, according to scientists, there is no clear functional relationship between growth and income inequality, but it is definitely possible to speak of a nonlinear relationship between growth and education.

In Russia, according to the deputy of Director of the Center for Labor Research HSE [26], ending secondary institutions provides significant advantages in comparison with secondary education, increasing the earnings of employees by almost 20% and the graduation of 60-70%. In most developed countries of the "premium" for higher education are expected to vary from 50 to 100%.The digital divide is defined as the gap between those who have computers and Internet access and those who do not have this [27, 28]. The digital divide is a form of digital divide. Kenny [29] cites the following: of the 110,498-protected servers around the world that use encryption technology in Internet transactions, only 224 (0.2%) in low-income countries. Vershinskaya [30] suggests that the problem of enhancing the digital divide, until recently, almost did not bother the citizens of Russia, as it is not perceived as social inequality, but "essentially egalitarian system of information services is a new division of society by the degree of access to them," that gives rise to a new kind of social inequality - information.

However, many argue that the existence of inequalities due to the gap in access to digital technologies is a myth [31]. Computers have never been a source of poverty. Increased attention should be paid to ensuring the essentials, not the government's actions to remedy the "digital divide." The digital divide does not make sense for those who do not have adequate food, no access to primary health care, basic education, water and sanitation life.

Thus, the basis of our study is based on the hypothesis of a positive relationship between: 1) education (especially professional) and higher levels of income, 2) access to information and communication technologies and the level of income. Consequently, the restriction of access to education and information and communication technology is a factor in increasing inequality among the population of the Republic of Kazakhstan.

MATERIALS AND METHODS

As a study of statistical tools use dmultivariate methods of correlation, regression, factor, as well as tabular and graphical methods of visualizing the resultsof the study. Methods included abstract andlogical, comparative, structural and functional approaches. The basis for statistical evaluations served as theofficial data of the Statistics Agency, World Bank and a database of house hold surveys of the Statistics Agency for 2009 12000 45000 or more household members using the software SPSS11. Household budget survey (sample-12,000 households) includes indicatorson income, expenditure and household consumption, their socio-demographic characteristics, involvement in thelabor market andliving conditionson thebasis of the annual, quarterlyand dailysurvey. The sampling erroronthe basisof the Budget 2009 household surveyin the countrydid not exceed 1%, by region- not more than 4%.

RESULTS AND DISCUSSIONS

In Kazakhstan, the secondary school is compulsory and free for all citizens. Despite this, according to the UN, Kazakhstan, in 2005, almost all the schools, there were various fees that must be paid by parents, which is often a heavy financial burden for poor families, particularly in rural areas. In addition, parents must be purchased for children school uniforms, textbooks and other teaching materials, which are very burdensome for many low-income families and limit the availability of education. Thus, the financial resources of the family determine access to education. Roudoi, Zislin and Bolnik [32] concluded that the level of education in schools in rural areas is significantly lower than in the cities. Another issue that needs to be noted is the fact that teachers' salaries are still significantly lower than the average salary in the Republic of Kazakhstan. This leads to a shortage of qualified teachers. Many schools in the cities and towns to work 2-3 shifts. In Mangistau, South Kazakhstan,'s. Astana and Almaty in 2003-2004 there were schools, working in four shifts.

Table 1: Correlation relationship between education and quintile and docileconsumption

		Consumptionper capitaper month, the Tenge	Quintile of consumption	Decilegroups of consumption
Levelof education (no education,	Person Correlation	0.232173	0.23889	0.246808
novocational education,	Sig. (2-tailed)	***	***	***
vocational education has)	N	11834	31367	31367

*** Correlation is significant at the 0.01 level (2-tailed).

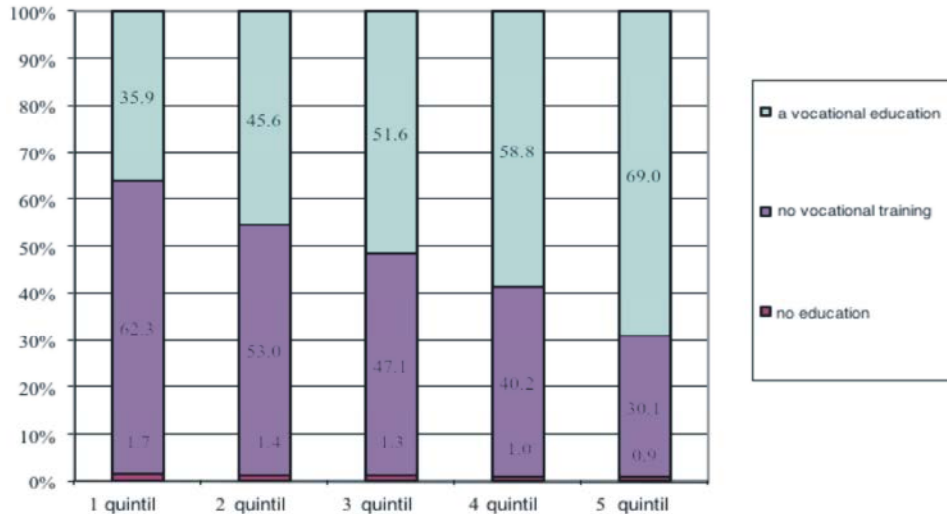Note - The author's own calculations using the statistical package SPSS version 12 for BDOD2009

Fig. 1: The level ofeducation of the population (excludingchildrenunder 15 years) to 20% quintileof consumptionin 2009, N = 31367, in%

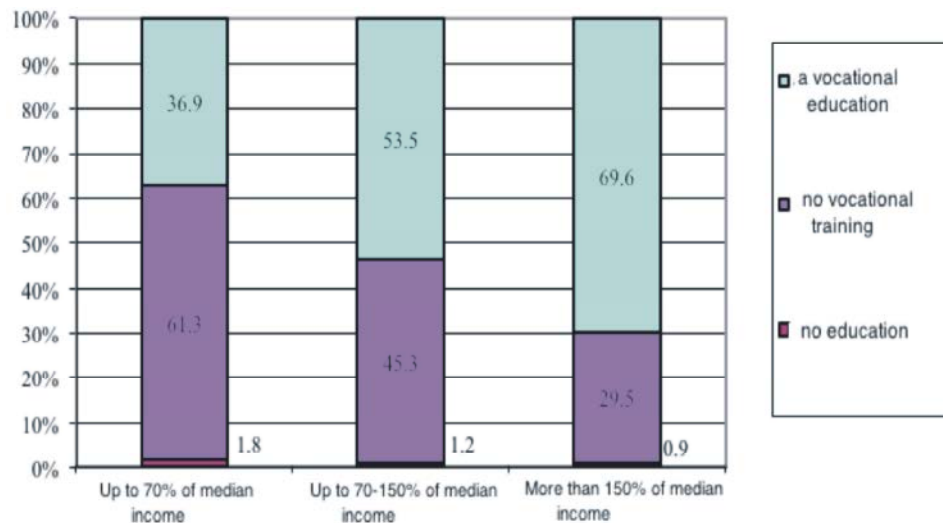Note-Constructed by the authorsbased on their owncalculations usingthe SPSS version 11 for BDOD 2009

Fig. 2: The level of education of the population (excluding children under 15 years of age) in the three income groups in 2009., N = 31367, in%.

Note - Constructed by the authors based on their own calculations using the SPSS version 11 for BDOD 2009

According to many researchers, Kazakhstan is facing various challenges in the field of higher education. Thus, authors [24] argues that although the demand for higher education and is met by the rapid expansion of the private sector, there is still a disparity in opportunities to pursue higher education due to the differences in the level of quality of secondary education, which significantly worse in rural areas. Another problem of higher education is no match between the content of education and labor market demand. This has led to high levels of youth

unemployment. Authors [5] notes that many of the developed countries of the world that strives for a social or socially oriented state, provide opportunities for equal access to education, from the earliest pre-school. Since at this stage lays the foundation of children's attitudes to learning, productive work and the outside world.

Kazakhstan has shown a positive correlation between the income of the individual and the level of his education, particularly the availability of vocational education. The amount of compensation for the ability, commitment, personal investments and ability to work has become more and more clearly defined by the level of education. Pearson correlation between the level of education (no education, no vocational education, has professional education) and per capita income spent on consumption, calculated on the basis of household survey data of the Statistics Agency confirmed a positive correlation (r = 0.23). The correlation coefficient is significant at the 95% significance level, sample size N = 31690 people (excluding children under 14 years). It should be noted that the indicator is considered here - consumption, not wages or income earned by a particular individual from this class. In this case, the individual's earnings are redistributed within the family in favor of dependents. Thus, we can assume that if we calculate the correlations between the wages or income of the individual and his level of education, the figure will be higher than that obtained by us.

Quintile groups on average per capita consumption can trace the influence of education on the level of income in population distribution. Thus, the shareof those who have professional trainingin the fifth quintileis 1.75 times higherthan in the first quintile with the lowest consumption. There is evidence ofthe relationship betweenlevel of educationand the profile of poverty: the higher the education level, the lower theprobability of being poor. People withlow levels of education (incomplete secondary education, secondary education) have a higher risk of poverty thant hose with vocational education.

People with complete secondary education and basic vocational most vulnerable: among people with upper secondary education over 11.8% of the population are poor and among people with primary professional more than 10.2%. This means that the risk of falling into poverty for their product is 2 times higher and the poor for subsistence by 1.4 times.

Secondary school in Kazakhstan is free and compulsory for all children. According to the Agency for Statistics, enrollment population of 6 to 24 years in

Table 2: The combined share of enrollment of the population aged 6-24 years for the academic years 2004-2009, in% of this age group

Theacademicyear	Republic of Kazakhstan	Includinginruralareas
2004/05	78.7	56.3
2005/06	78.9	53.9
2006/07	78.2	52.5
2007/08	77.3	51.3
2008/09	75.3	51.2
2009/10	749	52.6
2010/11	72.9	54.6

Note - Compiled by the authorbased onthe source.

2010/2011 academic year was 72.9%, while in the last five years the enrollment has decreased, especially in the countryside, where he is only 54, 6% of the population in this age group (Table 2). If according to the Statistics Agency coverage of children under the age of 17 years of basic education is 97.5% with almost comprehensive coverage at the age of 7 to 15 years, the young people in the age group 15-24 years there has been a different situation. Enrollment in upper secondary education in Kazakhstan is 50.9%, that is, after the end of primary school (grade 9), some students do not continue their education.

In Kazakhstan, there are problems of availability of different levels of education for socially vulnerable segments of the population in Kazakhstan. Small volume of quotas for higher education for the disabled - 0.5% and 1% for orphans and children left without parental care [15]. Even with the scholarship, students from low-income families, especially newcomers, are experiencing significant problems related to material support. It is payment for accommodation, transportation to the place of study and food.

According to the National Human Development Report, 2009, 40.2% of 16-year-old children did not go to college and 3.9% did not receive education in 2008. A study by the EC "Sange" in 2009. Showed that although the macroeconomic stabilization of the economy and income growth in 2001 and 2008. and the availability of private educational institutions (universities and colleges) have made more accessible vocational education for the wider youth, still it remains accessible only for a limited part of young people. As the cost of education is high enough, not all groups of young people can pay for training or to get a loan from banks for education. In particular, this applies to rural youth, in which the combined share of enrollment in recent years has declined substantially. Consequently, the issues of access to vocational education - especially for rural youth and youth with low incomes - are currently extremely relevant.
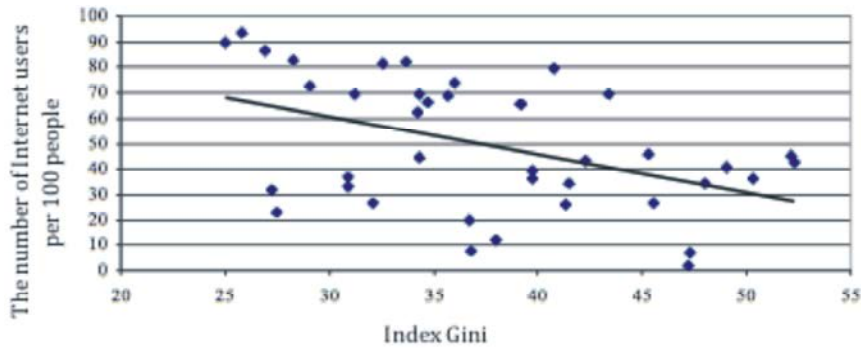
Fig. 3: Income inequalityand the numberof Internet usersin 44countries around the world, 2011
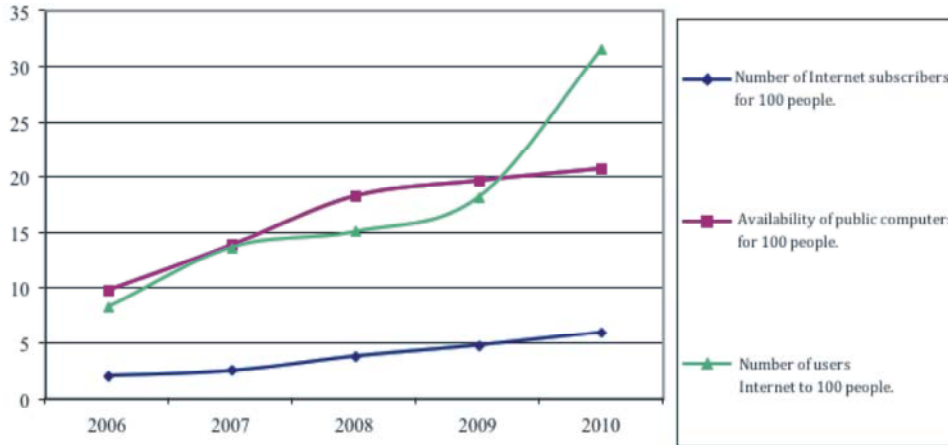Note - Compiled by the author based on the source

Fig. 4: Indicators ofaccessto information and communication technologies in the Republic of Kazakhstanin 2006-2010.
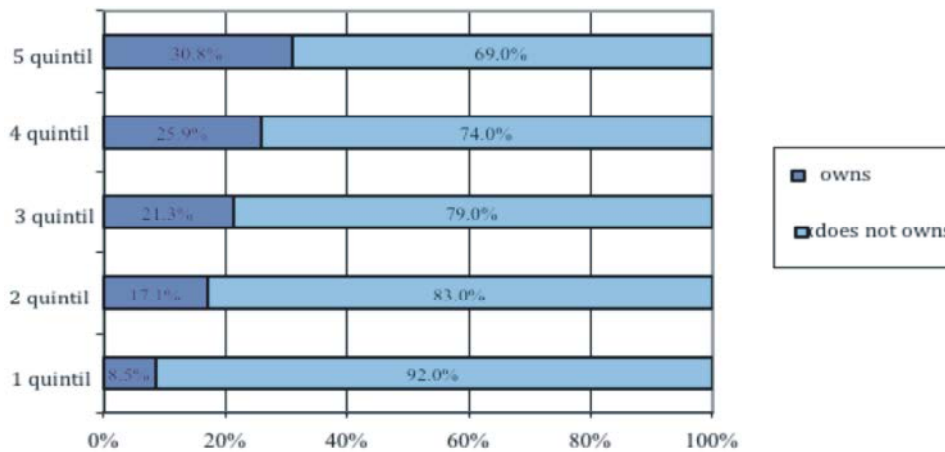Note - Compiled by the author based on the source [16]

Fig. 5: The presence of a personal computer in the context of the income deciles, N = 11837
Note - Compiled by the authors based on household surveys in Kazakhstan, the Kazakh Statistics Agency, 2009

At the same time, it should be noted that in Kazakhstan, many workers education is excessive in relation to the kinds of work that they are engaged, which suggests either an extremely low quality of education available to them, or the irrational use it when "having a high formal training, they are forced to take unskilled types of labor". Analysis of the impact of access to information and communication space on the inequality in income distribution. Access to information and communication technology (ICT) could be another factor in enhancing

the socio-economic inequality. Information illiteracy in the world can produce "digital divide" and "information poverty", which is difficult to overcome. Despite the fact that the development of information and communication technologies, reduction in the cost of equipment and software, the level of information inequality in the world is growing. Kazakhstan is already possible to ascertain the presence of the digital divide between regions, major cities and smaller settlements. On the one hand, information technology, new opportunities, reduce social disparities, increase access to knowledge, on the other hand society is beginning to share information on the "elite" and "outsiders" and the gap between them will grow all the time.

We have attempted to identify the relationship between the level of income inequality (as measured by the Gini index) and the number of Internet users (as a measure of the level of development of information and communication technologies in the country) on the example of 44 countries in 2011.

To speak ofa strictlinear relationshiphere, we cannot, but the trend isto reducedisparities inthe growing numberof Internet usersis still present. In Kazakhstan in 2006 adopted aprogramto reduce the digital dividein the Republic of Kazakhstan for 2007-2009 [18], which was aimedat achieving theobjective indicatorssuc has increased computer literacy ofthe population of Kazakhstanto 20% and increase the number of Internet usersin Kazakhstanto 20% (reached by 2010).

The dynamicsof such indicatorsas the numberof Internet subscribers, provision of computers and thenumber of Internet usersper 100population, represented in Figure 1, shows thatover the past 5years, Kazakhstan has experienced a significant improvement inaccessto information and communicationtechnologies.

Analysis ofa personal computerin the householdin the context of the fivequintiles of incomegroups is thatin the fifth quintile (with the highest income) of households witha personal computer was 3.6-foldhigher than in thefirstquintileof households.

On the one hand, the personal computer and access to the Internet is a boon and his presence is more common for those who can pay for it, that is, it is economic inequality can lead to an information inequality. On the other hand, the lack of access to information and communication technologies do not allow the poor to acquire the necessary knowledge and skills today with the information and thus leaving their "left behind." Therefore (as in the case of education), we can talk about

the mutual influence of the economic and digital divide and from our point of view, these issues should be solved together.

CONCLUSION

The results (outputs). Kazakhstan has positioned itself as a socially oriented state, which means carrying out socio-economic policies aimed at forming a stable, developed society with high human potential. Socio-economic policies, based on available public resources, can act as a catalyst for economic growth through the promotion of employment and economic activity of the population through the creation of every able-bodied citizen's ability based on his work, entrepreneurial skills, education and provide a decent level of income and the level of life and for the disabled and low-income citizens to provide effective social protection.

In this regard, Kazakhstan needs to create conditions to ensure access to quality vocational education free for everyone and training for members of low-income families. Access to education and training is the most effective way to reduce inequality. This is one of the most effective social mobility that can make the transition from lower to higher layers. As we noted earlier, Secondary vocational education increases the earnings of workers (compared to the average schooling) by almost 20% and graduation - by 60-70%. Therefore, it is important to create an education system in which everyone will be available for obtaining high-quality vocational training free of charge. It is also important to provide access to further education for low-income families. In this training should be carried out directly on those specialties that are in demand in the region, district or village.

An innovative way of development, announced by the Government of Kazakhstan, involves the introduction of unique high-tech, knowledge-intensive industries, which will create a demand for high-end professionals. Increased competition in the world markets in almost all areas and especially in the market of resources involves increasing the value of intellectual assets, the importance of human capital and increasing global competition for this resource. It is professionally educated population, focused on innovative work and entrepreneurship, with a sufficient level of self-identification and self-awareness can give the country a high-performance, well-educated labor force for the country to become sustainable socio-economic development. All of these factors (education and economic growth) will ultimately help to reduce inequalities in income population.

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