

QUANTITATIVE ANALYSIS OF THE WOMEN ROLE IN RESEARCH AND DEVELOPMENT

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Today, the theme of gender equality is discussed around the world. It is become one of the most important aspects of the prospering nation or country. However, still most of us face several questions like “what is gender equality?” and “Is it necessary?” So, to begin with gender equality or gender egalitarianism – concept implying the achievement of equality in rights between men and women, also other legal relationships. According to some researchers, gender equality is the next step socio-sexual relations after the patriarchal system. The main idea of the concept is to destroy all social barriers, which prevent people from manifest as a person.

The implementation of the concept started from 19th century, as women get the legal rights to vote. As an example: in 1893 – New Zealand and Australia were first to recognize women as a citizen, moreover, gave the rights to vote. As a result, in 1998 - women around the world were entitled to vote, beside 5 countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia). Also, to note, Norway has the Nordic Gender Equality institute founded in 1970 with the support of the Nordic Council of Ministers, which funds equal opportunity projects.

The implementation of gender policy in Kazakhstan. In 2003, the Government Resolution approved the Gender Policy concept in the Republic of Kazakhstan. In the years of realization of the concept, Kazakhstan made a noticeable progress. Number of non-governmental organization such as: “Association of Business Women”, “the Union of Women – Entrepreneurs”, “the Republican Council of Women” etc.

However, still issues of gender equality are not solved. Women of our country face difficulties and generally are not perceived along with men. According to survey, which was conducted from May to October 2016, in 5 regions (including rural districts of the country) 1500 of respondents aged from 18 to 60 took part in the survey. As an outcome of the studies shown, most of the respondents in our country admitted that inequalities still exist. In turn, it is women, who observed a veiled inequality, when men felt that the problem was mostly contrived by latter.

The ones who believe that gender inequality still exists in Kazakhstan’s society, the majority indicated such areas as domestic work, child care and care for elderly relatives. This confirms the prevailing opinion of Kazakhstan men in domestic work and performing the function of care. In addition, finding out the reasons why respondents think that gender inequalities do not exist, majority answered “this is my personal opinion”. This confirms the citizens unawareness of the official sources of information. 42,2% consider the source as media, 20,2% the internet and 9.1% - consider the source as the educational system.

In addition, men still keep stereotypical view, that there is job for men and for women, moreover, men think job prevents women from being mother and wife. 45,8% of respondents do not divide on a gender basis and 39,6% recognize the division of labor and 9% do not even have an idea that the professions are “male” and “female”. Last year, in the UN scale of gender progress Kazakhstan was ranked as 93rd, which is one of the lowest levels. The scale of gender progress, which indicates that women must be at least 30% at a critical level in different industries. Overall, there are 14 indicators: women in economy, politics, education⁶ etc.

In the economy Kazakhstan occupy 26th place, business – 30, politics – 93. This indicator pulls down the universal index. In comparison in 2016, Kazakhstan was on 65th place. Every year it keeps falling. Women in research and development are important question for Kazakhstan. On 11th of February, UN proclaimed the international Day of Women and Girls in Science. The general assembly of the organization adopted the relevant resolution on December 15, 2015 in

order to achieve equal access of women and girls to science. In a previous study conducted in 14 countries, it was found that the opportunity for women to obtain a degree in science is lower compared to men. The bachelor's degree can get 18%, master's – 8%, doctors – 2%. For men these figures are 37%, 18% and 6% respectively.

Women are underrepresented in science, making up only 28% of all researchers globally — and the disparity is even greater in the fields of natural sciences and engineering. Although, the number of women pursuing doctoral and post-doctoral studies has grown, a much higher drop-out rate means that this has not translated into greater numbers of employed women researchers. Women scientists, particularly in low and middle-income countries, face hard times in reaching their full potential as researchers and leaders in academia and industry. Those who persevere in their scientific careers encounter numerous obstacles in the workplace, such as part-time and precarious work, lower pay, higher teaching and administrative workload, and a challenging work-life balance. As a result, most of the women drop their careers.

Women in research and development do matter, the work that have been done by women through ages had a significant role in people's life. The knowledge, the technologies and medical treatments that women acquired are still relevant nowadays. In the development context, increasing the participation of women in research introduces gender awareness into the research and innovation processes, which may lead to different outcomes and better solutions. For example, according to the paper, that was prepared by Londa Schiebinger (Stanford University), research in Tanzania shows that because women are responsible for fetching water, they have an improved knowledge of water sources in their local areas. A World Bank report that analyzed 122 water projects found that involving women made water/sanitation projects six to seven times more effective.

As for solutions of this issue, International Development Research Centre (IDRC), strives to enable women to enter and excel technology, engineering, and mathematics (STEM). Today, the Centre currently supports three flagship women in STEM programs delivered through the Foundations for Innovation program. In addition, on the official site of International Development Research Centre (IDRC), have been listed the method to tackle this issue. Such as, support initiatives that increase the pipeline of women in STEM; build the leadership and business skills of women scientists; fund research programs spearheaded by women scientists; support networks and mentorship schemes; etc.

Table 1. Ratio of women in research and development

Region	2013	2014	2015	2016
1	2	3	4	5
Akmola	54,3	54,5	56,4	54,8
Aktobe	52,5	53,4	57,3	54,2
Almaty	52,9	52,3	53,4	57,2
Atyrau	58,8	59,3	60,2	57,0
West Kazakhstan	49,5	44,5	40,4	43,1
Zhambyl	46,4	56,0	44,0	32,7
Karaganda	53,6	50,3	55,5	58,4
Kostanay	56,4	56,1	54,0	53,8
Kyzylorda	44,9	51,4	43,6	39,5
Mangystau	66,4	64,5	65,4	60,4
South Kazakhstan	48,7	45,9	51,0	48,2
Pavlodar	62,1	57,8	56,4	61,0
North Kazakhstan	42,3	45,9	43,4	50,4
East Kazakhstan	56,9	59,2	55,4	55,6
Astana city	44,0	45,8	45,5	46,3

Almaty city	51,2	51,9	51,8	54,5
Total	840,9	848,8	833,7	827,1

In Kazakhstan, according to the National Science Report of the Republic of Kazakhstan for 2017, 9282 women carried out research and development in 2016.

An academic degree among them are: doctors in the field – 206, PhD – 243, masters – 2345, candidates of sciences – 2579.

For the ratio of women in Research and Development is 51,8%. As for regions, the lowest indicator shown in Zhambyl region – 31,8%, while the highest is 58,7% in Pavlodar region.

We have got data on the past 4 years of ratio of women working in research and development field.

Using this information we are going to process given variables. Thus, we get this table:

Table 2. Number of women in Kazakhstan that work in RD

2013	2014	2015	2016
1	2	3	4
840,9	848,8	833,7	827,1

After we processed the information, next step is to calculate the time series.

First step enlargement by combining 2 years together (2013-2014; 2015-2016) (table 3)

Table 3

2013-2014	2015-2016
1	2
1689,7	1660,8

Next step is to calculate moving average using the same variables.

Table 4

2013-2014	2014-2015	2015-2016
1	2	3
1689,7	1682,5	1660,8

Now, we are moving to analytical alignment

For that step using the variable in table 2, we will process the data. We get this table 5.

Table 5

Years	Number of women in RD, y	T	T ²	Y ²	Y*T
1	2	3	4	5	6
2013	840,9	1	1	707112,8	840,9
2014	848,8	2	4	720461,4	1697,6
2015	833,7	3	9	695055,6	2501,1
2016	827,1	4	16	684094,4	3308,4
Total	3350,5	10	30	2806724,2	8348

Now, moving to calculations:

$$\begin{cases} n \times a_0 + a_1 \sum t = \sum y \\ a_0 \sum t + a_1 \sum t^2 = \sum y * t \end{cases}$$

$$\begin{cases} 4a_0 + a_1 10 = 3350,5 \\ 10a_0 + 30a_1 = 8248 \end{cases}$$

$$a_0 = 904,75$$

$$a_1 = -25,65$$

$$y_t = a_0 + a_1 t$$

$$y_t = 904,75 + (-25,65)t$$

Thus, by finding variables we can see that trend on average is negative, that per year there (-25,65) of negative growth. Next we are going to find out the factors that influence the number of women in RD. Women of Kazakhstan working in the field of Research and Development, usually face difficulties during the years of the career. As any women around the world, working in this field they face unconscious discrimination, difficulties in combining motherhood and professional duties, psychological prejudice, insufficient recognition of women's achievements. The burden of expectations falls on women, as her role in the community is to be happy wife and mother. However, being mother and wife, also being able to pursue career is hard.

According to deputy Jamilya Nurmanbetova, women in science often have to make more efforts than men to prove their independence, overcome psychological difficulties and social barriers. Despite this, women are making great strides because they sincerely love their work.

Gender balance will be useful in implementations of the strategies of the sustainable development of the country. It is significant to motivate women scientists in our community and to put an end to discrimination. One of the main barriers to women's leadership in Western countries is unequal access to education. However, in Kazakhstan situation is different, as 99,3% got higher and secondary education. Despite of, free access to education, we face deeper problems associated with values of traditional Kazakh society. There is a dissonance: on the one hand, women have to play role of perfect spouse, but on the other hand, women have to build a successful career. According to, the Women's League of Creative Initiative, the adoption of government programs and laws is not enough; close ties between government and public institutions and measures to change stereotypical thinking regarding the role of women are needed. As an outcome, women are obviously in minority, because they cannot fully participate in the creation of an equal society. Women are subject to discrimination in recruitment, career development and downsizing. This is largely due to the lack of knowledge of their own rights and the indifference of the majority of the population. In addition, a high level of education does not guarantee women any prospects at work.

To sum up, I would like to say As part of the implementation of gender policy in the Republic of Kazakhstan, the need for social equality of men and women in all spheres of public **life is being shaped in the public consciousness. As a result, new models of gender identity and** gender types of behavior will be formed, based on the principle of gender equality of rights and opportunities, taking into account the unique life practices of men and women.

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