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AN ANALYSIS OF PIAAC SURVEY ON KAZAKHSTAN - GENDER, LEADERSHIP, EDUCATION AND SKILLS

Moldir Yelibay[1]

dr. Gabor Halasz[2]

[1,2]Eötvös Lóránd University, Faculty of Education and Psychology, Budapest, Hungary

Abstract

This paper aims to analyse factors predicting who will occupy leadership positions in Kazakhstan, by exploring variables such as gender, skills, level of education, and family background. The skills that are referred to in this study are competencies assessed in the PIAAC survey of Kazakhstan from 2017. The author will estimate a model whether holding leadership occupations depend on gender, family background and skills, such as numeracy, literacy and the use of ICT at workplaces. In summary, a research perspective that focuses on skills in terms of what people do in work contexts can expand conclusions drawn about leadership. Research results indicate that strategic thinking which result in literacy, numeracy and ICT skills are important for leadership. The study supports existing Western research on gender, leadership, education and skills with an analysis of big data. This empirical research adds findings to the existing data from the Central Asian context, particularly to the sector of gender studies,
leadership and education.

Keywords: PIAAC, gender, education, skills, leadership, Central Asia, Kazakhstan.

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Contextual Information

Kazakhstan has a unique history, which perplexes in interesting and conflicting societal expectations on gender roles. These norms echo in families, education, and careers of women (Kuzhabekova & Almukhambetova, 2019). Females are expected to be highly educated and well mannered. However, because of the cultural inheritance, females are stereotyped from their childhood about their abilities to succeed in different fields. Even though Kazakhstan is a secular country with gender parity at all educational levels, there are existing conventions about women who can not succeed in the STEM field or leadership. Females are mostly discouraged by their family members to pursue careers in these fields, and are advised to choose professions that are "more feminine" (Almukhambetova & Kuzhabekova, 2020).

According to the Ministry of National Economy of the Republic of Kazakhstan Committee on Statistics, the following numbers relate to the current study:

Table 1. The share of females and males in different occupations in the cities of Kazakhstan

Occupation	Year	Share of Females (%)	Share of Males (%)
Higher education leadership	2018	22	88
Schools, technical and vocational education leadership	2018	57.9	42.1
Specialists - researchers	2018	52.8	47.2
Police	2018	12.3	87.7
Members of the board of the National Bank	2018	11.1	88.9
Leaders of trade unions and NGOs	2018	32.4	67.6
Judges	2018	41.4	58.6
Members of the Supreme Court	2017	43	57
Leadership positions in the security forces	2018	2.1	97.9
Women ambassadors	2018	5	95
Leadership positions (any field)	2018	41.2	58.8
Political civil servants	2018	22	88
Political positions holders in central government bodies	2018	13	86
Ministers	2018	6	94

Seats held in the Parliament of the Republic of Kazakhstan (Senate, Mazhilis)	2018	27.4	72.6
Elected bodies of local government (maslikhats)	2018	22.2	77.8
Agriculture	2018	43.1	56.9
Industry and construction	2018	28.8	71.2
Service	2018	55.6	44.4
Small business leadership	2018	27.9	72.1
Medium business leadership	2018	32.4	67.6
Large business leadership	2018	17.2	82.8
Part-time workers	2018		

From the above mentioned table it is clear that Kazakhstani women are underrepresented in leadership positions and technical specialties, which support the research findings of Kuzhabekova and Almukhambetova (2019, 2020). However, Kazakhstani females dominate in school and technical and vocational education leadership, in service, and as specialist-researchers. As a part of country-based gender analysis for OECD, Dubok and Turakhanova (2017) explain that education is considered as a feminine profession in Kazakhstan, due to perceiving it as having a nurturing nature, which makes Kazakhstani labor market gendered. Some existing research from Kazakhstan explains the phenomenon of female underrepresentation at leadership positions. On one hand, there are perplexing complexities of traditional, Soviet, and Westernised neo-liberal expectations (Kuzhabekova, & Almukhambetova, 2017). Whilst the Soviet regime tried to build an image of women as a mother

and a successful worker, in the present-day Kazakhstan most of the cultural assumptions of females only as caring mothers and wives remain unchallenged (Kakabadse, Tatli, Nicolopoulou, Tankibayeva, & Mouraviev, 2018). Existing research shows that female civil servants of Kazakhstan do not aspire to leadership because of a lack of self-confidence in skills and ability to strategize. Their choices were profoundly affected by the largely shared cultural belief that women are good at details, but fail at strategizing. Hence, cultural factors resonate in Kazakhstani females' occupational choices (Mukhazhanova, 2012; Kuzhabekova, Janenova, & Almukhambetova, 2018).

On a global scale, international researchers have discovered an interesting interrelation between gender, education, skills, and leadership occupations in the labor market. In 1989, Tsui has conducted a study on the effects of gender, education, personal skills, and self-confidence on income in business management. The analysis of the results of 941 individuals has shown that being a male significantly influences the income amount. Even when the variables as skills, education, hours worked were controlled equally, the gender variable alone impacted the variance of the annual income at the level of 2.8% (Tsui, 1989). More recent research by Calero, Murillo Huertas, and Raymond (2016) has added important insights into the latter research. The authors explored how adult skills change overage, and how those skills are impacted by schooling quality. The major findings are that ageing affects negatively schooling quality, decreasing the literacy and numerical skills of the adults, which impacts the skills used at work. However, the gender dimension was not specifically addressed in this study, hence yielding a gap for further exploration.

Theoretical Framework The theoretical framework of this paper is based on Becker's (1964) Human Capital Theory. According to the Human Capital Theory (Becker, 1964), an

individual's skills can be accelerated through education and training. It is considered by far as the most important aspect of the modern economy since economies are based on people who invest in their knowledge, skills, and health. In 2002, Becker called the modern era the "Age of Human Capital" because over 70% of total capital was invested into people of the United States. Becker (2002) also noted that human capital development has become more prominent during the past two decades, emphasizing that human capital is integral to the international and sexual division of labor. Since investment in the particular activity is positively related to the time spent on a particular activity, Becker (1985) argues that married women earn significantly less than married men because they have participated less in the professional activities. After all, the burden of childcare falls on them. Interestingly, Becker (1985) notes that in the Soviet Union women and men participated in the work at the same rate, however, females' income was almost 40% less than of men. Hence, according to Becker's Human Capital Theory (1964, 1985, 2002) individuals' sets of skills and abilities are interrelated with gender and education in the labor market outcomes.

Thematic Literature Review

Gender disparities in numeracy and literacy skills

As it was stated in the contextual background information at the beginning of this paper, in Kazakhstan females occupy fewer positions in STEM and leadership careers (Ministry of National Economy of the Republic of Kazakhstan Committee on Statistics, 2018). The trend is similar to what is happening in all OECD countries. According to Borgonovi, Choi, and Paccagnella (2018), there are noticeable gender gaps in numeracy and literacy skills between childhood and adulthood periods in most OECD countries. Males' and females' numeracy and literacy skills are most prominent at the age of 10 and 27. While males have higher mean

performance in numeracy at the age of 10, females have a higher mean performance at the age of 10 to 15, and the trend evolves through a lifetime. While there is no explanation why it happens to be so, the relevance for the current research is that the authors suggest the findings are related to societal norms and gender roles, which evolve in childhood and remain in adulthood (Borgonovi, Choi & Paccagnella, 2018). These findings mirror the labor market, where men are mostly represented in the leadership and technical spheres, while women dominate in social sciences, healthcare, and services (Sassler, Glass, Levitte, & Michelmore, 2017). Researchers suggest that future studies should disentangle these issues of female underrepresentation in particular spheres concerning their skills.

Western Research on Trends of Gender, Skills, Education in the Labor Market Outcomes

Thematic literature review on the theme of gender, education and skills in labor market outcomes presents interesting trends across different countries. In the United States, the project "MUSE" explores interrelations of human capital, gender pay gap, and noncognitive skills among Graduate Management Admission Test (GMAT) participants from 1990 to 1998 (Groove, Hussey & Jetter, 2011). The dataset consisted of 5,885 respondents to the first survey, 4,327 to the next survey, and 3,771 to the last survey in 1998. Although traditional human capital variables include employment experiences, family variables, and education experiences, in this analysis those variables did not matter with the female coefficients. On the other hand, the existence of the gender wage gap was correlated with occupations and ranks. This study on non-cognitive skills and the wage gap has shown that women have a higher preference for jobs that are beneficial to society and has higher ethical standards, such as education and healthcare, and less likely to aspire to leadership (Groove, Hussey & Jetter, 2011). Canadian empirical study on literacy, numeracy, and labor market outcomes found the relationship between human capital,

education, and earnings (Green and Riddell, 2011). The Canadian component of the International Adult Literacy Survey from 1994 with the sample size of 5660 individuals revealed the importance of literacy skills on occupations. The current study claim that literacy has a tremendous impact on earnings and stands for approximately 1/3 of the returns to education. Education has proven to have more influence on earnings than work experience. Although parental education and earnings are positively correlated, there is little evidence to state that parental education and literacy are related. The main conclusion of the study is that labor outcomes are dependent on individual skills (Green & Riddell, 2011). In the Netherlands, there is available empirical research on the labor market and language skills of immigrants, where the gender dimension is reflected in the skills (Yao & van Ours, 2015). The dataset consists of 435 individuals aged from 15 to 64 years old, from the Longitudinal Internet Studies for the Social Sciences from 2008 to 2014. For immigrant females, the language literacy problem affects negatively hourly wages, but not on the employment probability, whereas for immigrant males language literacy skills do not affect any aspect of the available labor opportunities. Yao and van Ours (2015) findings are relevant to the current study since they explain that females' labor is more sensitive to human capital investment - females occupy non-manual work positions where language literacy skills are more necessary. In Australia, the data from 1996, researchers have explored the link between schooling, literacy, numeracy in the labor market success (Chiswick, Lee & Miller, 2003). The main goal was to test the human capital model to identify whether skills obtained at school produce more educated and skillfull professionals and if better education has advantages in terms of employment opportunities. Using the Australian component of the Adult Literacy Survey, the researchers have proven that higher numeracy and literacy levels are associated with better labor market successes. Better education produces better skills,

which in turn have positive rewards from the labor market, such as opportunities to reach senior ranks or earn higher salaries. From the gender perspective, females are affected more with the investment in education, have greater labor market outcomes, if skilled, and are educated (Chiswick, Lee & Miller, 2003). Hence, education affects the labor market outcome through human capital investment, as was predicted by Becker's Human Capital Theory (1985).

Eastern Research on Trends of Gender, Skills, Education in the Labor Market Outcomes

Similar studies have been completed in the Asian contexts. In Japan and Korea, Lee and Wie (2017) using the PIAAC database from 2013, examined how skills affect earnings. The major findings of the analysis differed for two countries. Japanese people's skills, in comparison to Koreans', do not depend on variables such as gender, age, parental education, or experience. However, the higher return of skills depends on secondary and upper education attainment. In China, up-to-date research examined how language literacy skills affect labor market outcomes in Hong Kong. Using data from Hong Kong Population Censuses 1991, 1996, 2001, 2006, and 2011 for the analysis, Zhou, Zhu, and Zheng (2020) have discovered that language literacy skills have positive effects on individuals' income and employment. However, English language skills have proven to have more benefits to professionals in the labor market. The main point of the empirical studies presented above is that numerous researchers have explored how education, skills, gender reflect the labor market outcomes and are interrelated with the human capital theory. However, the gender variable received the least attention in all analyses. Hence, there is a clear gap in that dimension. Also, to the author's knowledge, no PIAAC database analyses are completed to understand the gender dynamics in the labor market of Kazakhstan, which makes the field fruitful for exploration.

Description of the Data

To explore who occupies leadership positions in Kazakhstan, the author has used the The Programme for the International Assessment of Adult Competencies (PIAAC) which is a programme of evaluation and analysis of adult skills. The data for Kazakhstan was collected from August 2017 to April 2018, and consisted of 6050 adults aged 16-65.

The Survey of Adult Skills (PIAAC) measures skills in three main areas of exploration:

(1) literacy – the ability of understand and respond appropriately to written texts;

(2) numeracy – the ability to use numerical and mathematical concepts;

(3) problem solving in technology-rich environments – the capacity to access, interpret and analyse information found, transformed and communicated in digital environments.

Hence, to understand factors that influence reaching senior positions, the author has chosen the following variables which has been mentioned in the existing literature as affecting to leadership:

(1) Activities - Last year - On the job training – Count;

(2) Education - Highest qualification – Level;

(3) Skill use work - Literacy - (all variables in the database);

(4) Skill use work - Numeracy - (all variables in the database);

(5) Skill use work - ICT - Computer - (all variables in the database);

(6) Background – Children;

(7) Background - Age of the child;

(8) Background - Number of children;

(9) Gender Also, the PIAAC database has data on participants' occupations which were categorised manually as leadership and non-leadership positions.

Problem of the Study

While previous research has explained some part of Kazakhstani females' occupational choices related to gender, education, and skills, this research is significant because it proposes big data analysis, which has not been completed before in the context of Kazakhstan. The study will contribute theoretically to interpret Western theories, namely, the Human Capital theory, in a different geographical context. According to Walker and Dimmock (2002), most of the theories are based on the Western context and somewhat inappropriate in different cultures. Empirically, the work will be completed across disciplines such as education, leadership and gender studies. The analysis of the research contributes to the understanding of the imbalances in occupational choices and the development of diversity policies to put into practice in Kazakhstan.

The Aim of the Study

To estimate what factors predict Kazakhstani females to hold leadership careers concerning an extensive set of human capital variables (education, family-related factors, skills) and gender.

Results

To understand the underrepresentation of females at the leadership position, first it is necessary to see if variable gender is correlated with leadership. The researcher wanted to see how gender and occupational choices marked as leadership, non-leadership and not sure are related to gender. Running the chi square test gave the p-value is 0.178. That means that, using the 0.05 cut-off point, correlation between gender and leadership is not statistically significant. A significant difference was found in the responses of females and males to the variable "leadership" ($\chi 2=1.817$; $df=1$; $p>0.05$). Overall, there are 3600 cases that are valid for this analysis. Interestingly, contrary to the statistical data presented in the problem statement, PIAAC

database shows that there are actually more females than males at the leadership positions in Kazakhstan. However, the database in the problem statement and the PIAAC database has slightly different occupations, and therefore the field of work may affect why the results differ. Since reaching leadership positions does not depend on someone's gender, the focus is on other factors enabling someone to occupy these positions. The literature review of this study has proposed that factors that influence leadership are education, skills and family-related factors.

To see if occupying leadership positions is dependant on the highest level of education, skills used at work (literacy, numeracy, ICT) and family-related factors the researcher run the binary logistic regression. The output of the analysis revealed that the following variables have statistically significant influence on the variable leadership:

Table 2. Binary logistic regression output on leadership variable.

Variable name	df	significance	exp (B)
Literacy - Reading financial statements	1	0.011	1.200
Numeracy - Using a calculator	1	0.025	1.170
ICT - Computer - How often - Programming language	1	0.024	0.851
ICT - Computer - How often -Word	1	0.47	1.184
How often - Planning others activities	1	<0.001	1.731

Since the variables that affect leadership positions were revealed, let's see how those variables are affected by one's gender. Running the cross tabulation in SPSS using variables gender and variables that affect leadership it is found that:

Table 3. Binary logistic regression output on gender variable.

Variable name	Males (N)	Females (N)
How often - Planning others activities	335	395
Numeracy - Using a calculator	425	883
Literacy - Reading financial statements	243	417
ICT - Computer - How often - Programming language	85	139
How often - Planning others activities	249	592

Almost equal number or females and males plan others activities everyday. The bigger number of females use calculator more than males everyday. The bigger number of females read financial statements more than males everyday. The bigger number of females use programming language more than males everyday. The bigger number of females use Word more than males everyday.

Discussion The author started the research from an idea of using the PIAAC dataset on gender, education and skills to gain relevant information about its correlation with leadership occupations. Thereafter, the professionss were sorted manually as “leadership” and “non-leadership”, combined in a new variable in the quantitative research data. Nine single items were selected from a range of different variables in the PIAAC data (literacy, numeracy, ICT, family background, gender, education, activities and etc.). As a result, three different profiles of skill use could be described as influencing leadership positions. These were called the following:

(1) Numeracy & literacy skills;

(2) ICT skills;

(3) Other skills used in the workplace;

The findings clearly indicate gender differences for literacy, numeracy and ICT practices, which in turn influence the leadership positions. In particular, skills as reading financial statements, using a calculator, programming language or Word has influence on reaching the leadership position. Even though gender was not a factor that impacts holding high-ranked positions, twice number of females in comparison to males has shown to use the above mentioned skills more at workplaces. These results point to a socially relevant difference in literacy, numeracy and ICT skills used at workplaces. Another factor that significantly affects leadership positions is the skill of planning others' activities. Here, almost equal number of male and female workers complete the action, although a slightly more females tend to plan others activities.

As Chiswick, Lee & Miller (2003) show, higher literacy and numeracy practices differ by the quality of school education. These findings can be linked to Becker's theory of Human Capital (1985), which states that an individual's skills can be accelerated through education and training. Interestingly, Becker (1985) notes that since the burden of childcare mainly falls on women, they tend to miss out more from the development of their human capital. Nevertheless, the result of this study show that twice more women than men tend to use the literacy, numeracy and ICT skills at workplaces. In light of the results, it could be an important issue to think about the gender dimension of this research and associated critical reflexions. It has been shown that gender does not influence leadership, but particular literacy, numeracy and ICT skills do. Furthermore, the findings illustrate that females tend to use those skills ar workplaces more than males. The results of the analysis show that even though female group seems to use their skills that influence leadership at work more, it does not help them to reach leadership, as according to

the Ministry of National Economy of the Republic of Kazakhstan Committee on Statistics (2017).

Considering earlier research regarding the relationship between the labor market outcomes and individual skills and education (Lee and Wie 2017; Green and Riddell, 2011; Zhou, Zhu, and Zheng 2020), the findings are supported. Numeracy, literacy, ICT and other skills used in the workplace influence leadership positions. In particular, those skills that influence leadership are mostly associated with strategic thinking, which require having the clear vision and framework to develop steps to understand the issue. That is what is required to read financial statements or to use a programming language. The strategic thinking has been proven to influence leadership, in particular transformational leadership style, which is focused on bringing positive changes to the workplaces (Bass & Avolio, 1993).

The phenomenon here is why more women use skills at workplaces that influence leadership, but the women are underrepresented in senior ranks in Kazakhstan? Although the analysis of big data could not answer this question, the explanation is found in qualitative research by Kazakhstani scholars. Kuzhabekova and Almukhambetova (2019) explain that human capital theory does not apply to the Central Asian context, because women are more educated than men. Nevertheless they are underrepresented in leadership because of the explicit male-centric views of leadership (Kuzhabekova and Almukhambetova, 2019).

In summary, a research perspective that focuses on literacy, numeracy and ICT skills in terms of what people do in work contexts can expand conclusions drawn about leadership. Research results indicate that strategic thinking which result in literacy, numeracy and ICT skills are important for leadership. Although it was shown here that analysing quantitative skill use data with human capital approach enables valuable contributions for research, some weaknesses

of the current PIAAC measurement instruments should be mentioned. First, the analysis are not specific enough with regard to the gender differentiation on leadership. Secondly, leadership practices cannot be examined and explained in more detail than the occupation names in this database. For these reasons, it is difficult to identify specific practices related to gender in leadership. Hence, the author would suggest to complement this study with a follow up qualitative research.

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