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GENDER EQUALITY IN HIGHER EDUCATION: INTERNATIONAL EXPERIENCE AND THE KAZAKHSTANI PRACTICE

Abstract: Gender equality in higher education is widely recognized as a key condition for sustainable development and social justice; however, formal parity in access does not necessarily translate into equality of opportunities and outcomes. This article examines international experience in promoting gender equality in higher education and analyzes the specific features of the Kazakhstani context. The study employs a mixed-methods review design combining policy analysis and secondary analysis of quantitative data from international and national open sources for the period 2020–2025. Comparative analysis of selected European countries participating in the Bologna Process and Kazakhstan reveals common patterns of horizontal and vertical gender segregation, particularly the underrepresentation of women in STEM fields and senior academic positions. While Kazakhstan demonstrates high female participation in higher education and comparatively strong representation of women in academic leadership, structural barriers persist at advanced career stages. The findings highlight the importance of institutionalized gender policies, systematic monitoring, and targeted support measures. The article concludes that strengthening gender-responsive governance in higher education is essential for transforming quantitative achievements into sustainable qualitative progress.

Keywords: gender equality, higher education, academic career, Bologna Process, Kazakhstan, international experience, educational policy, glass ceiling, women in science, inclusion, STEM gender gap, Gender Equality Plans

Introduction

Gender equality in higher education is recognized as one of the key factors of sustainable development and social justice. Ensuring equal opportunities for women and men in education is aligned with the objectives of the 2030 Agenda for Sustainable Development, including Goal 5 (gender equality) and Goal 4 (quality education) (United Nations, 2015). International organizations such as UNESCO identify gender equality in education as a priority area; in particular, UNESCO emphasizes that gender equality should be integrated across all levels of education and curricula (UNESCO, 2020).

Over recent decades, significant global progress has been achieved in expanding women's access to education. Between 1995 and 2018, female participation in higher education tripled, and in most countries worldwide gender parity or even female predominance in higher education enrollment is now observed (UNESCO Institute for Statistics, 2021). In other words, in approximately 74% of countries the proportion of female students exceeds that of male students, indicating a reduction of the historical gap in access to higher education in favor of women (OECD, 2022).

However, achieving formal equality in access does not imply the complete elimination of gender imbalances. In many countries, so-called horizontal and vertical segregation in academia persists (Blackmore, 2014). Horizontal segregation manifests itself in the concentration of women and men in different fields of study and academic disciplines; for example, in most countries fewer than 25% of female students choose engineering, technical, and ICT-related fields (European Commission, 2021).

Within the European Higher Education Area (countries participating in the Bologna Process), gender equality has been declared one of the objectives of policies aimed at widening participation in higher education. The European Union and other international actors have introduced a wide range of initiatives to support gender balance in science and education, ranging from gender mainstreaming requirements in EU-funded research projects (Horizon Europe) to the exchange of best practices through the European Institute for Gender Equality (EIGE, 2021).

Kazakhstan, having been a member of the Bologna Process since 2010, has been actively striving to align its higher education system with international standards of inclusiveness (Ministry of Education and Science of the Republic of Kazakhstan, 2020). In recent years, Kazakhstan has achieved notable progress in ensuring gender parity in access to higher education. According to statistics from the Committee on Statistics of the Ministry of National Economy of the Republic of Kazakhstan, the proportion of women among students exceeds that of men: as of the early 2020s, approximately 55-57% of students enrolled in higher education institutions are women (Bureau of National Statistics, 2024). Moreover, Kazakhstan stands out even in the regional context of Central Asia with regard to women's participation in university leadership: more than a quarter of rectors of Kazakhstani universities are women, which is significantly higher than in neighboring countries and exceeds the global average of 20% (Harden-Wolfson & Shakirova, 2025).

Nevertheless, despite these achievements, the higher education system of Kazakhstan, like that of many other countries, continues to face gender imbalances. Horizontal segregation remains evident: women dominate in the humanities and social sciences, while their participation in engineering, technical, and ICT fields is lower. The share of women among graduates of STEM programs in Kazakhstan is only about 33%, despite the fact that women constitute the majority of the overall student population (Nazarbayev University Graduate School of Education, 2022). Thus, the relevance of this study is driven by the need for a comprehensive analysis of international experience in promoting gender equality in higher education and its comparison with the Kazakhstani context.

Methods of Research

The study was conducted using a multi-stage research design combining qualitative policy analysis and secondary quantitative data analysis. At the first stage, a comprehensive review of scientific literature, international policy documents, and regulatory frameworks related to gender equality in higher education was carried out. This stage included an analysis of key documents of the Bologna Process, reports and policy papers of international organizations (UNESCO, OECD, European Commission), as well as national strategies, laws, and analytical reports regulating higher education and gender policy in Kazakhstan.

Theoretical research methods applied at this stage included systematic literature review, document analysis, and comparative analysis. In addition, secondary quantitative data were analyzed using publicly available statistical sources, including international databases and national statistics. These data covered indicators of gender participation, academic career progression, leadership representation, and gender distribution across fields of study, allowing for cross-national and longitudinal comparisons.

At the second stage, the results of the literature review and data analysis were synthesized to identify key patterns, structural imbalances, and institutional mechanisms shaping gender equality in higher education. Comparative analysis was used to contrast international practices from selected European countries participating in the Bologna Process with the Kazakhstani context. This made it possible to assess both convergent trends and context-specific features of gender equality policies.

At the final stage of the study, elements of analytical modeling were applied to conceptualize the interaction between policy instruments, institutional practices, and observed outcomes. Based on the identified challenges and successful international practices, potential directions for strengthening gender-responsive governance in higher education were formulated. This stage focused on translating analytical findings into policy-relevant conclusions and recommendations aimed at improving the effectiveness of gender equality measures in the higher education system of Kazakhstan.

Literature review

Gender equality in higher education has become an established area of academic inquiry within education studies, gender studies, and public policy research. Early scholarship primarily focused on eliminating formal barriers to women's access to education and increasing female enrollment rates, which were long considered the main indicators of progress (UNESCO, 2015). As access to higher education became more equalized in many regions, research attention gradually shifted toward structural and qualitative dimensions of inequality, including field-of-study segregation, academic career trajectories, and representation in leadership positions (Blackmore, 2014).

A consistent finding across international studies is the persistence of horizontal and vertical gender segregation within higher education systems. Horizontal segregation refers to the concentration of women and men in different academic fields, with women overrepresented in the humanities, education, and social sciences and underrepresented in STEM disciplines (European Commission, 2021; UNESCO Institute for Statistics, 2023). Vertical segregation, often described through the concepts of the "leaky pipeline" and the "glass ceiling," captures the declining share of women at successive stages of academic careers, particularly at the levels of full professorship and senior management (Blickenstaff, 2005). These patterns have been documented across diverse national contexts, indicating that gender inequality in academia is not limited to specific regions or levels of economic development.

The literature identifies multiple and interrelated explanations for these persistent disparities. At the individual level, gender socialization and early educational experiences shape students' academic choices and career aspirations, often reinforcing stereotypes about "male" and "female" professions (OECD, 2019). At the institutional level, opaque recruitment and promotion procedures, reliance on informal professional networks, and evaluation criteria that disadvantage non-linear career paths contribute to the reproduction of inequality (Morley, 2013). These structural factors are further compounded by sociocultural expectations regarding leadership and the unequal distribution of care responsibilities, which disproportionately affect women's academic careers.

In response to these challenges, a substantial body of literature examines policy instruments aimed at promoting gender equality in higher education. In Europe, gender mainstreaming has become a core principle of higher education and research governance, particularly within the framework of the Bologna Process and EU research policy (European Commission, 2021). Gender Equality Plans (GEPs), quotas in decision-making bodies, cascade models for academic promotion, and targeted funding schemes for women researchers are frequently cited as effective mechanisms for accelerating progress (Löther, 2019; Kahlert, 2023). Empirical evidence suggests that such measures are most successful when they are mandatory, linked to funding or evaluation criteria, and supported by systematic monitoring and accountability.

At the same time, scholars caution that formal policy instruments alone are insufficient if they are not embedded in institutional cultures and everyday academic practices. Symbolic compliance, uneven implementation across institutions, and resistance within academic communities can significantly limit policy impact (Morley & Crossouard, 2016). As a result,

recent studies increasingly emphasize the importance of combining regulatory measures with initiatives aimed at transforming organizational cultures and addressing implicit gender biases.

Research on post-socialist and Central Asian contexts highlights additional historical and institutional specificities. During the Soviet period, women's participation in education and science was actively promoted, resulting in relatively high levels of female educational attainment (Silova, 2011). However, this formal equality often coexisted with persistent male dominance in leadership and decision-making. In the post-Soviet period, economic restructuring and the re-traditionalization of gender roles have created new constraints for women's academic careers, particularly at senior levels (Silova & Magno, 2020). Studies on Kazakhstan indicate high female participation in higher education alongside enduring horizontal and vertical segregation, suggesting that numerical parity has not translated into full equality of opportunities (World Bank, 2023).

Overall, the literature demonstrates that gender equality in higher education is a complex and multidimensional process that extends beyond access and participation. While international research provides a rich set of analytical frameworks and policy instruments, comparative studies that systematically connect international experience with national practice in post-socialist contexts remain limited. Addressing this gap is essential for understanding how global gender equality agendas can be effectively adapted to specific institutional and cultural environments.

Results

International experience: gender equality in higher education in the countries of the Bologna Process

The general situation in Europe. The analysis demonstrates that in European countries participating in the Bologna system, a high level of gender parity among higher education students has been achieved; however, imbalances persist at the level of fields of specialization and academic careers. On average across the EU, women account for approximately 54% of the total number of bachelor's and master's students (European Commission, 2021). Nevertheless, as individuals transition into academic employment-and especially into leadership positions-the representation of women declines. In the European Union in 2021, women constituted on average only 26% of academic staff in higher education category A (full professors) and about 24% of heads of higher education institutions (European Commission, 2021).

This trend has been described as the "leaky pipeline," whereby the proportion of women decreases successively at each stage of the academic career despite gender parity at the student level (Blickenstaff, 2005). The phenomenon of vertical segregation is also commonly described through the metaphor of the "glass ceiling," referring to invisible barriers that hinder women's advancement to the highest academic positions.

The role of Gender Equality Plans in the European context. In recent years, a supranational approach to the institutionalization of gender equality in higher education and research has emerged in Europe, with Gender Equality Plans (GEPs) becoming a key instrument. Since 2022, the existence of a GEP has been a mandatory eligibility criterion for organizations participating in the Horizon Europe programme, which has elevated gender equality to the status of a managerial and financial priority (European Commission, 2021).

In the pan-European understanding, a GEP is a comprehensive strategic document that includes the collection and publication of gender-disaggregated data, analysis of gender gaps in career progression and pay, measures to support work-life balance, the integration of the gender dimension into research and teaching, as well as mechanisms for preventing gender-based violence and harassment.

According to the European University Association, by the end of 2022 more than 85% of European universities had developed or updated their GEPs in response to the new requirements, indicating a high level of institutional engagement within the university sector (EUA, 2022). At the same time, research suggests that the effectiveness of GEPs varies considerably and depends on the extent to which they are embedded in university governance and monitoring systems.

Germany.

In Germany, the issue of ensuring equal rights in science and education is enshrined in legislation and supported by both federal and Länder-level initiatives. The Federal Framework Act for Higher Education (Hochschulrahmengesetz) of 2007 obliged universities to promote gender equality and eliminate existing inequalities, linking higher education funding to compliance with these requirements. At the level of the federal states, all higher education laws include provisions on the appointment of gender equality officers (Gleichstellungsbeauftragte) within universities (Löther, 2019).

The so-called "cascade model" (Kaskadenmodell) of target setting is widely applied: university leadership seeks to ensure that the proportion of women at each subsequent stage of the academic career is no lower than their proportion at the preceding stage (Kahlert, 2023). In addition, universities develop gender equality plans (Gleichstellungsplan), which are comprehensive action programs aimed at ensuring equal opportunities for female staff and students.

At the federal level, one of the most prominent initiatives is the Programme for Women Professors (Professorinnenprogramm), which has been in operation since 2008. Jointly funded by the federal government and the Länder, the programme provides universities with grant funding to establish additional professorships for women, contingent upon a successful evaluation of the university's submitted gender strategies. This programme has contributed to a significant increase in the proportion of women professors in Germany-from approximately 15% in the mid-2000s to 26% in 2022 (Kahlert, 2023).

In addition, research funding organizations and associations (such as the German Research Foundation - DFG) have introduced gender equality standards in project selection processes. Since 2008, the DFG has required universities to comply with "gender-oriented standards" in their organizational structures and human resources policies, making adherence to these standards a criterion in decisions on funding applications for large-scale research networks (Löther, 2019). One of the key elements of these standards is the requirement to apply the cascade principle in recruitment to research positions. Overall, the German experience demonstrates a combination of binding requirements (legislation, staffing quotas, and formal criteria) and incentive-based measures (funding and certification) to promote women's advancement in academia. As a result, the share of women among professors in Germany reached 26%, and among heads of research institutions 22% in 2020 (Bundesregierung/GWK, 2021). Although this trend is improving, the goal of full equality has not yet been achieved.

France

The French model is characterized by the active role of the state in establishing a regulatory framework for equality and by mandatory requirements imposed on the education sector. The 2013 Law on Higher Education and Research (Loi Fioraso) obliged universities and research organizations to ensure gender parity in elections to all governing bodies and introduced the position of an equality officer (chargé de mission égalité) in every university (Ministère de l'Enseignement Supérieur, 2013). The French Ministry of Higher Education and Research also signed a Charter for Gender Equality in Higher Education together with the Conference of University Presidents, calling on universities to implement measures promoting equality among both students and staff.

As a result of these measures, the proportion of women in the governing bodies of French universities has increased: by 2022, women accounted for approximately 28% of members of university governing boards and about 20% of university presidents (Ministère de l'Enseignement Supérieur, 2022). France has also promoted the visibility of women scientists: since 2001, the Irène Joliot-Curie Prize has been awarded annually to outstanding women researchers (L'Oréal-UNESCO, 2023). Overall, the French experience demonstrates the effectiveness of combining legal quotas (ensuring a minimum share of women in committees and governing bodies) with planning instruments (mandatory equality action plans) for the institutionalization of the principle of equal opportunities.

Italy

In Italy, the promotion of gender equality in universities is based on mandatory plans and equal opportunity committees, combined with financial incentives. Law No. 183/2010 established Joint Committees for the Guarantee of Equal Opportunities (Comitati Unici di Garanzia, CUG) in public institutions, responsible for developing internal rules to prevent discrimination (Italian Parliament, 2010). Earlier, in 2006, the Code of Equal Opportunities was adopted, requiring all public institutions to approve a Positive Action Plan (Piano di Azioni Positive, PAP) every three years to eliminate gender barriers (Italian Government, 2006).

The most recent stage is the adoption of the National Strategy for Gender Equality for 2021-2026, which includes provisions aimed at encouraging universities to achieve gender balance among academic staff and leadership (Presidency of the Council of Ministers, 2021). In particular, the strategy proposes taking gender indicators into account when allocating public funding to universities. These efforts have begun to yield results: by 2022, the share of women among university professors in Italy reached approximately 24%, and among rectors about 15% (ANVUR, 2022). Although these figures remain relatively low, a positive dynamic has been established, supported both “from above” (through strategies and recommendations) and “from below” (through initiatives of universities themselves and networks of women academics).

The Netherlands

Historically, the Netherlands had one of the lowest shares of women professors in Western Europe; however, in recent years it has made a significant leap forward due to targeted initiatives. The legal framework in the Netherlands prohibits discrimination in education (the Higher Education and Scientific Research Act includes a general provision on non-discrimination and the obligation of equal treatment of men and women in universities). For a long time, the primary emphasis was placed on university self-regulation and soft measures. In 2017, the government launched the Westerdijk Talent Impulse programme, timed to coincide with the 100th anniversary of the first woman professor in the country. Under this programme, the state allocated funding for the appointment of 100 women professors (Ministry of Education, Culture and Science, 2017). The programme was highly successful: by 2019, all 100 additional women professors had been appointed. This increased the proportion of women professors nationwide from approximately 19% in 2016 to 26% in 2021 (LNVH, 2021).

In 2020, the Dutch Ministry of Education presented the National Action Plan for Diversity and Inclusion in Higher Education and Research (Ministry of Education, Culture and Science, 2020). The plan sets several objectives, including integrating diversity principles into research evaluation and accreditation procedures, improving the monitoring of diversity data, and introducing reward systems for promoting inclusivity. As a result of these measures, the share of women professors in the Netherlands increased to approximately 26%, and the proportion of women in university executive leadership reached around 30% by 2023 (VSNU, 2023).

In addition, grant schemes are in place to encourage the promotion of women to the next career stages. For example, the Aspasia grant provided by the Netherlands Organisation

for Scientific Research (NWO) offers universities a financial bonus if a woman researcher who received a high evaluation in a competitive call (but did not obtain funding) is nevertheless promoted to associate professor or full professor. In this way, universities are incentivized to promote women even if they did not win the grant itself, receiving compensation (€40,000-€120,000) for the promotion of each such candidate. The Netherlands also hosts active professional women's networks and civic initiatives. The LNVH foundation brings together approximately 1,400 women professors and associate professors, lobbying for their interests and conducting research on barriers to career advancement. An annual Girls' Day is also organized as a national initiative, during which technical companies and universities invite schoolgirls aged 10-15 and introduce them to science and ICT in order to stimulate girls' interest in STEM fields. As a result of these measures, the share of women professors in the Netherlands increased from 20% in 2016 to approximately 26% in 2021, while the share of women in university executive leadership rose to around 30%. Although informal academic culture may change slowly, the existence of a National Action Plan and the involvement of all key stakeholders constitute positive factors for further progress.

Finland

The Nordic countries are traditionally associated with high standards of gender equality; however, in the field of academic research and education they also face specific challenges. In Finland, equality legislation (the Act on Equality between Women and Men of 1986) applies to the education sector as well, requiring teaching and research to promote the objectives of the Act. The law obliges all educational institutions and employers with more than 30 employees, including universities, to have Gender Equality Plans. These plans must cover issues of equal recruitment, pay, working conditions, and the prevention of harassment, among others. However, for a long time insufficient attention was paid to the implementation of this requirement: monitoring of the existence and effectiveness of GEPs in universities was irregular (Ministry of Education and Culture, 2020).

The Finnish government has made efforts to integrate gender mainstreaming. As early as 2010, the first government report on gender equality was published, including objectives related to promoting women in research careers and strengthening gender studies. Nevertheless, for a long time there were no specific strategies on gender equality specifically in science and higher education, as gender was treated as part of broader social policy. In 2020, the Ministry of Education and Culture published the report "Promoting Gender Equality and Non-Discrimination in Higher Education Institutions," which identified shortcomings: most university gender equality plans were outdated and required updating, as no assessment of the effectiveness of previous measures had been conducted. In the same year, the plan "Towards More Accessible Higher Education" was prepared, including measures to widen participation in universities for underrepresented groups, taking into account gender segregation and the distinct challenges faced by men and women as separate categories in access to education (Ministry of Education and Culture, 2020).

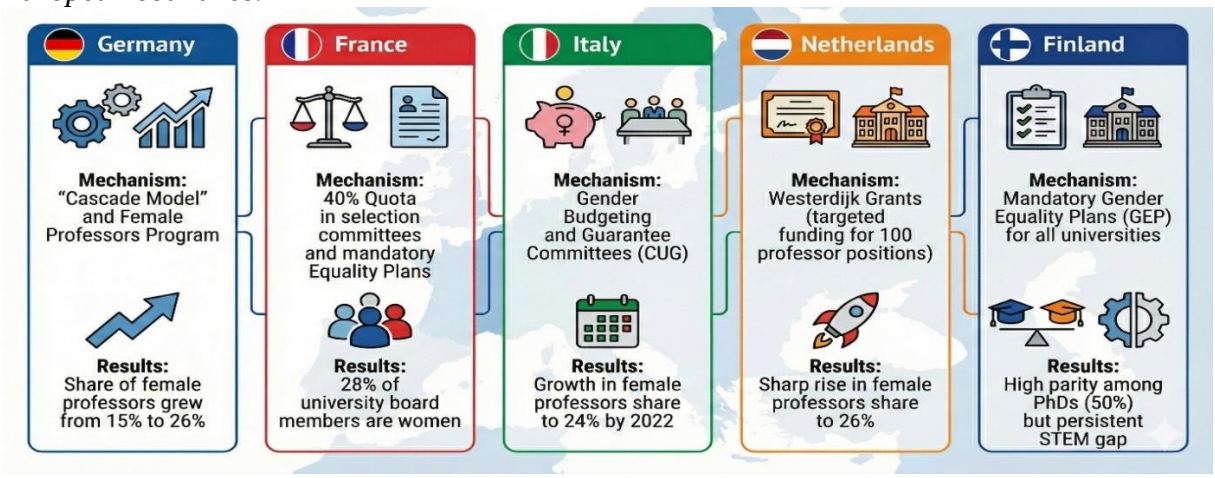
All Finnish universities are required to appoint equality officers (tasa-arvovaltuutettu), yet the implementation of their plans is rarely subject to systematic review. Nevertheless, Finland demonstrates relatively high indicators: women account for approximately 50% of PhD graduates and about 28% of professors as of 2023 (Statistics Finland, 2023). A persistent problem remains strong gender segregation by discipline: women dominate in education and the social sciences but are underrepresented in engineering and ICT. The Finnish experience illustrates that even in contexts of overall equality, targeted efforts are required to monitor policy implementation at the organizational level-in this case, the updating and systematic monitoring of university gender equality plans.

Despite differences in national contexts, the countries of the Bologna Process reviewed above demonstrate a shared tendency toward the institutionalization of gender equality in

higher education through a combination of regulatory, organizational, and financial mechanisms. These instruments range from mandatory gender equality plans and quotas in governance bodies to targeted funding schemes and cascade models of academic promotion; however, in all cases, political commitment and the integration of gender considerations into university governance systems play a decisive role. Comparative analysis indicates that it is precisely the comprehensive and systemic nature of these measures that enables European countries to gradually reduce horizontal and vertical gender segregation, although the pace and depth of change remain uneven. A synthesized comparison of key mechanisms and achieved outcomes in Germany, France, Italy, the Netherlands, and Finland is presented in **Figure 1**, which illustrates the diversity of institutional approaches to promoting gender equality in higher education.

Figure 1.

Comparative matrix of gender equality mechanisms in higher education in selected European countries.



Source: author's elaboration

Against this background, it is methodologically justified to turn to the analysis of the Kazakhstani case, which has evolved under different historical and institutional conditions but has increasingly aligned itself with international and European reference frameworks in recent years. Examining the experience of Kazakhstan makes it possible to assess to what extent high quantitative indicators of women's participation in higher education are accompanied by the development of institutional gender equality mechanisms and how closely the national model converges with the practices of Bologna Process countries.

Kazakhstani practice: achievements and challenges in ensuring gender equality in higher education

Women in the higher education system. Over recent decades, Kazakhstan has maintained a high level of women's participation in the higher education system. By the end of the 1990s, the previously existing gender gap in access to higher education had been eliminated, and women began to predominate among students (Silova, 2011). At present, women account for approximately 55-57% of the total student population in higher education institutions (Bureau of National Statistics, 2024). In terms of the gross enrollment ratio in higher education among young people aged 18-24, Kazakhstan outperforms many countries: around 65% of women in this age group are enrolled in higher education, compared to approximately 54% of men (World Bank, 2023). Gender parity has also been achieved at

preceding levels of education. Thus, at the level of access and participation, Kazakhstan demonstrates a female advantage within the higher education system.

Despite the numerical predominance of women among students, a pronounced differentiation persists in their distribution across fields of study. To provide a clear comparison of the gender distribution of students across major fields of education, Table 1 presents aggregated data on the share of women in higher education by field of study.

Table 1.
Share of women among students by major fields of study

Field of study	Share of women, %	Source
Humanities	>70	UNESCO-UIS, 2022
Education (Pedagogy)	>75	UNESCO-UIS, 2022
Arts, social and medical sciences	>70	UNESCO-UIS, 2022
All STEM fields (graduates)	32-33	Nazarbayev University, 2022
ICT	~25	Ministry of Education and Science, 2023
Engineering sciences	~28	Ministry of Education and Science, 2023
Natural sciences	~45	Ministry of Education and Science, 2023

According to the table, despite the overall numerical dominance of women in the higher education system, the distribution across fields of study demonstrates pronounced horizontal segregation. This pattern largely reflects entrenched gender stereotypes regarding “male” and “female” professions, as well as differences in professional aspirations that are formed already at the school level. Studies indicate that in Kazakhstan women are more likely to orient themselves toward fields related to the social sphere, linguistics, and economics, whereas their motivation to pursue careers in IT, engineering, and related fields is lower, although the situation is gradually changing under the influence of new opportunities in the technology sector. Public policy acknowledges this imbalance: strategic documents on the development of education emphasize the need to attract more girls to technical and natural science fields and to eliminate gender stereotypes in career guidance.

One of the most important indicators of gender equality is the representation of women among academic and teaching staff in higher education institutions and, in particular, in leadership positions. In Kazakhstan, the share of women among research and teaching staff is relatively high at junior levels: approximately 54% of university lecturers are women (Committee on Statistics, 2022). As career advancement progresses to higher academic ranks (associate professor and full professor), the proportion of women gradually declines. However, even among holders of doctoral degrees and professors in Kazakhstan, the figures remain higher than global averages: women account for around 41% of all individuals who have obtained doctoral degrees in the country and approximately 30% of currently active professors (Ministry of Science and Higher Education, 2024).

The most indicative dimension is women’s presence in academic management. According to a 2022 study by the Analytical Center under the Ministry of Education and Science of the Republic of Kazakhstan, women held 22 out of 116 rector positions (approximately 19%) in public and private universities in Kazakhstan (Kazakhstan Institute for Public Development, 2024). However, more recent data for 2024-2025 suggest an improvement in the situation: following a series of new appointments, the share of women rectors exceeded 25%, meaning that every fourth university in Kazakhstan is now headed by a woman (Ministry of Science and Higher Education, 2025). This represents a very high indicator in the global context, exceeding the global average of 20% and the European average of 22% (IAU, 2020).

Overall, the education sector in Kazakhstan has historically exhibited a higher proportion of women in leadership positions compared to other sectors of the economy. This can be partly explained by the legacy of the Soviet period, during which the teaching profession was feminized and women were often promoted to managerial positions within education. Nevertheless, despite this relatively favorable picture, vertical barriers persist: women are less likely to become rectors of large national universities and major research institutions. For example, among the leaders of Kazakhstan's flagship national research universities (such as Nazarbayev University, Al-Farabi Kazakh National University, Karaganda State University, and others), the share of women remains low. Women are also somewhat underrepresented in the structures of academic science: among directors of research institutes of the National Academy of Sciences, men traditionally predominate.

Studies focusing on the Kazakhstani academic space point to the presence of typical gender-related challenges, including a "glass ceiling" in women's careers, shaped by both institutional factors (such as insufficient transparency of selection procedures for leadership positions and the influence of male-dominated informal networks) and sociocultural factors (stereotypes about leadership and the double burden borne by women in balancing paid work and domestic responsibilities). Women researchers in Kazakhstan often face the need to balance family responsibilities with academic careers, which can slow their professional advancement. Self-limitation is also evident: surveys show that some women are less likely to apply for senior positions due to concerns about increased responsibility, exposure to criticism, or a lack of mentorship. Thus, the statistically observed decline in the share of women at the upper levels of the academic hierarchy reflects a complex set of interrelated causes that require targeted policy responses.

State policy and initiatives. Kazakhstan has ratified all major international agreements on gender equality, including the United Nations Convention on the Elimination of All Forms of Discrimination against Women (CEDAW). Since the late 1990s, a national gender policy has been gradually developed in the country. In 1998, the National Commission on Women's Affairs and Family and Demographic Policy was established under the President, with the mandate to promote gender initiatives at the governmental level. In 2006, the Gender Equality Strategy for 2006-2016 was adopted, containing provisions aimed at expanding women's participation in the economy, politics, education, and other spheres. In the education sector, the strategy focused on eliminating gender disparities in access to education (which was effectively achieved ahead of schedule) and on revising curricula to incorporate gender perspectives. As a result of the implementation of this strategy, the elimination of the gender gap in literacy and education was officially declared. In 2009, the Law of the Republic of Kazakhstan "On Equal Rights and Equal Opportunities for Men and Women" was adopted, proclaiming equal rights for both sexes in access to education, employment, and career advancement. The next stage was the approval in 2016 of the Concept of Family and Gender Policy until 2030 (which replaced the previous strategy). This Concept sets an ambitious goal of ensuring equal rights, benefits, responsibilities, and opportunities for women and men in all spheres of society by 2030 and eliminating all forms of gender discrimination. In education, the Concept envisages the introduction of gender education, the promotion of a culture of non-violence, the removal of stereotypes from textbooks, and related measures. The practical implementation of these objectives is reflected in the State Programme for the Development of Education and Science. For example, in the State Programme for the Development of Education and Science for 2020-2025, one of the guiding principles is the provision of equal learning conditions regardless of gender, and among the quality indicators is the achievement of parity between women and men in technical and vocational programmes.

In the context of higher education, Kazakhstan has relatively few specialized programmes comparable to those in Europe (such as grant schemes exclusively for women

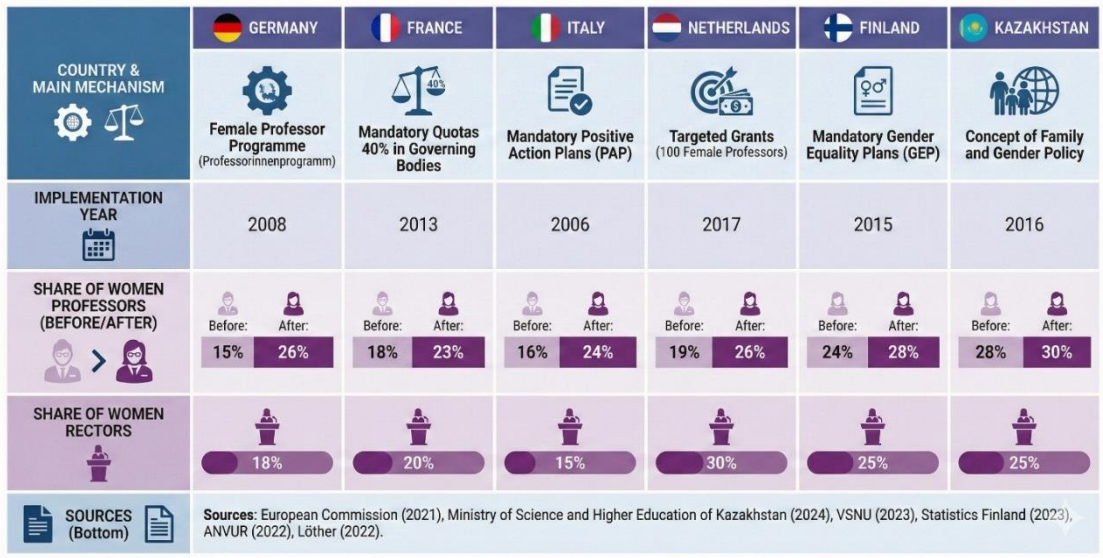
researchers). Nevertheless, a number of initiatives are being implemented with the support of international partners. For instance, gender resource centers have been established at some universities, and projects aimed at integrating gender-related courses into curricula are being carried out. One example is a project on the introduction of a gender equality course in pedagogical universities with the support of UNESCO. In April 2024, UNESCO, jointly with the Ministry of Education of the Republic of Kazakhstan, conducted an analysis of national educational programmes and textbooks in terms of gender sensitivity. Experts highlighted the need to include topics related to gender norms and the prevention of stereotypes in educational content, as well as to take gender aspects into account in policy development and the design of educational materials. It is expected that the recommendations resulting from this analysis will be used to revise school and higher education curricula.

Kazakhstan also participates in a number of international initiatives aimed at supporting women in science and education. For example, Kazakhstani academics and researchers regularly become recipients of scholarships under the L'Oréal-UNESCO "For Women in Science" programme (L'Oréal-UNESCO, 2024). UNDP implemented a pilot Gender Equality Seal project for public institutions in Kazakhstan in 2022-2024, and some universities have expressed interest in a similar certification. In addition, a number of Kazakhstani universities voluntarily join global movements promoting academic equality, for instance by organizing events in support of girls in science (annually on 11 February, the International Day of Women and Girls in Science, proclaimed by the United Nations).

Comparative analysis of mechanisms and outcomes. Unlike many European countries, Kazakhstan does not yet have a mandatory requirement for each university to adopt a formal gender equality plan or to appoint a designated gender equality officer. Within universities, issues of equal opportunities are more often addressed by general departments responsible for student affairs or social development, without the establishment of a dedicated position. However, certain elements of international best practice are gradually being introduced: transparency in recruitment is increasing (vacancies are publicly advertised), and concepts of academic ethics and the inadmissibility of harassment have been introduced (in 2018, a Memorandum on Counteracting Discrimination and Harassment in Higher Education Institutions was signed). Kazakhstan, which already has a strong foundation in the form of gender parity among students, now faces the challenge of focusing on qualitative aspects of equality-women's representation in positions of influence, the elimination of hidden barriers, and the creation of a university culture of equal opportunities. National policy documents acknowledge this task: the Concept until 2030 calls for gender audits of organizations and the widespread implementation of equality principles. Thus, Kazakhstan has favorable initial conditions (the absence of discrimination in access and even women's advantage in education) and is seeking to adopt advanced international practices to address the remaining challenges.

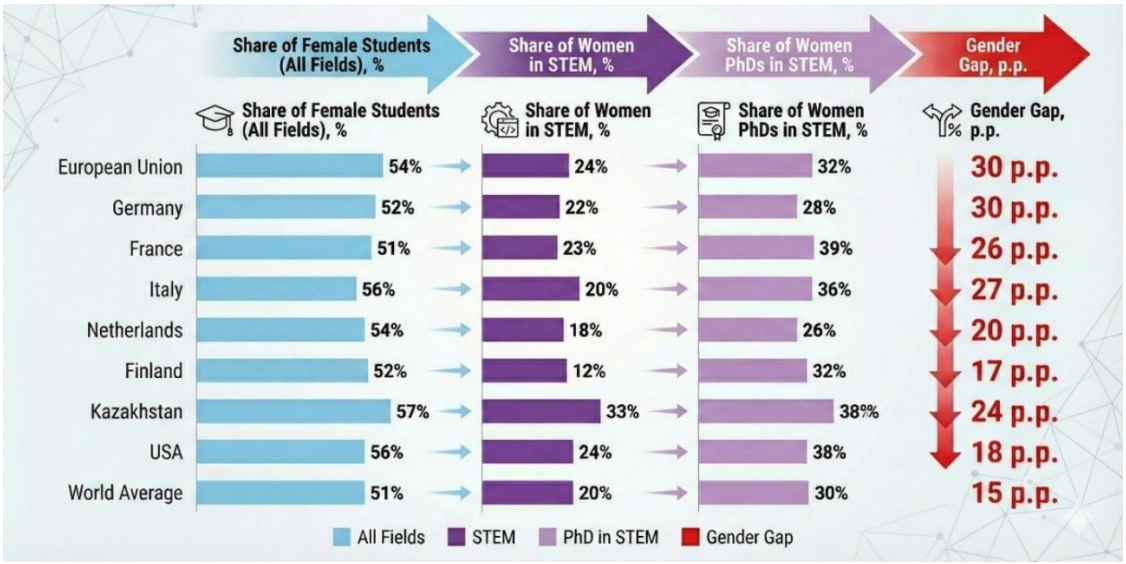
A comparison of European experience and Kazakhstani practice reveals both common features and specific characteristics. Figure 2 presents a comparative overview of the main mechanisms and their outcomes.

Figure 2.
Comparative analysis of mechanisms for ensuring gender equality in higher education



As shown in the table, Kazakhstan, in terms of the share of women professors (30%) and women rectors (25%), is at the level of or above the indicators observed in most European countries. However, it is important to note that European countries have demonstrated more dynamic growth in these indicators over the past 10-15 years as a result of targeted policy programmes. Figure 3 illustrates gender segregation in STEM education across different countries.

Figure 3.
Gender segregation in STEM education: an international comparison (2020-2024).



Sources: European Commission (2021), UNESCO Institute for Statistics (2023), National Science Foundation (2022), Bureau of National Statistics of Kazakhstan (2024).

Thus, Kazakhstan demonstrates the smallest gender gap in STEM among the countries considered (24 percentage points), which can be explained both by the Soviet legacy of actively

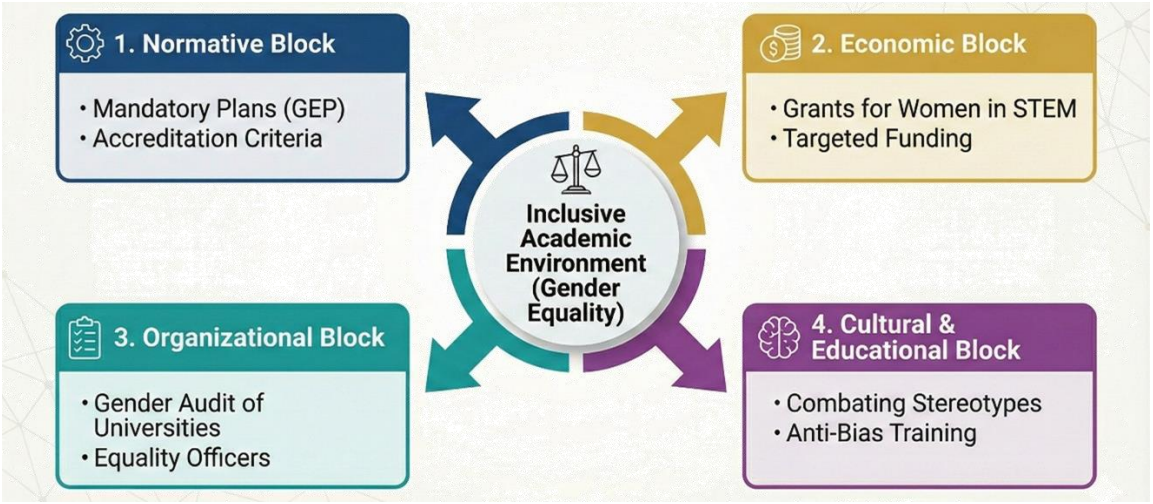
involving women in technical professions and by the relatively high overall level of women's education.

Discussion

The reviewed European country cases provide Kazakhstan with a range of potentially effective solutions. First, a key priority is the institutionalization of gender equality within higher education institutions through the introduction of mandatory action plans and the designation of responsible officers. Requiring each university to adopt an up-to-date gender equality plan with clearly defined objectives—such as increasing the share of women professors, reducing gender imbalances among students across fields of study, and implementing training to address gender bias—could help structure and systematize institutional efforts in this area. As demonstrated by practices in countries such as Finland and France, these plans should be regularly updated (every two to three years) and their implementation systematically evaluated. The overarching logic of these measures and their interconnections with other gender policy instruments are illustrated in Figure 4, which presents a strategic framework for the institutionalization of gender equality in higher education in the Republic of Kazakhstan.

Figure 4.

Strategic framework for institutionalizing gender equality in higher education in the Republic of Kazakhstan



Source: developed by the author based on international best practices and national policy analysis.

However, second, structural gender imbalances within higher education systems persist: women and men are unevenly distributed across fields of study and across levels of the academic hierarchy (Blackmore, 2014). This phenomenon is universal in nature: from Europe to Asia, women remain underrepresented in STEM fields and in senior university leadership. The underlying causes lie both in enduring societal gender norms and in the internal cultures of academic organizations.

In many countries, targeted policy interventions have been required to begin addressing these disparities. For example, in European states the introduction of quotas and mandatory plans has encouraged universities to work consciously on the recruitment and retention of women staff. Comparative analysis shows that political will and institutional mechanisms are key drivers of change. Where governments or universities themselves have implemented

systemic approaches (Gender Equality Plans, targeted funding, cascade models), an acceleration in the growth of women's participation indicators can be observed (Kahlert, 2023).

Specific features of Kazakhstan. Kazakhstan's practice demonstrates an interesting combination of achievements and challenges. On the one hand, many problems typical of developing countries are absent: there is no literacy gap, girls enter universities on an equal footing with boys, and women are widely represented in the academic profession (Silova, 2011). Kazakhstan thus has favorable starting conditions, including the absence of discrimination in access and even women's numerical advantage in education.

On the other hand, hidden barriers to the full realization of educated women's potential persist. Figuratively speaking, horizontal and vertical segregation "narrows the funnel": many women enter the system, but their share decreases at the top (although it remains above the global average). Although 54% of all research staff in the country are women (Committee on Statistics, 2022), their contributions are concentrated primarily in the humanities and social sciences.

Notably, Kazakhstan surpasses many European countries in terms of the share of women rectors (approximately 25%) (IAU, 2020). This advantage can be explained by several factors. First, the total number of universities in Kazakhstan is relatively small (around 125), and managerial decisions on rector appointments are often taken at the state level with considerations of representativeness. Second, the education sector is traditionally perceived as socially acceptable for women leaders, which minimizes societal resistance to female leadership in this domain.

Nevertheless, the quality of these achievements requires closer examination: do women holding rector positions face the same opportunities as men? Are "gendered leadership stereotypes" being reproduced, whereby women are more often entrusted with leading pedagogical or humanities-oriented universities, while technical universities are predominantly headed by men? Research on Central Asia suggests that women's leadership is often confined to specific niches and is not accompanied by a systemic redistribution of power. Therefore, a mere increase in the number of women at the top is a necessary but insufficient condition for achieving gender equality.

Lessons from international experience for Kazakhstan. The European country cases reviewed offer Kazakhstan several potentially effective solutions. First, the institutionalization of gender equality within universities through mandatory action plans and designated responsible persons. Introducing a requirement that each university have an up-to-date equal opportunities plan-with concrete targets such as increasing the share of women professors, reducing gender imbalances among students by field, and conducting anti-bias training-could help structure institutional efforts. Such plans should be updated every two to three years and their implementation evaluated, as is practiced, for example, in Finland and France.

Second, monitoring and data publication. International practice (EIGE, *She Figures*) demonstrates that the public disclosure of indicators (the share of women at each level, gender pay gaps, representation in governing bodies) creates incentives for progress and provides a basis for informed managerial decisions. In Kazakhstan, national statistics already publish some of these data, but they could be expanded and analyzed in greater depth (for example, gender breakdowns by field of study, type of institution, and academic rank). Accountability fosters a competitive dynamic: when universities see that peers perform better, this can motivate corrective action to avoid lagging behind.

Third, supportive programmes and incentives. Kazakhstan could consider introducing special grant schemes for early-career women researchers (analogous to European scholarships and awards), such as competitive funding for the best research projects led by women or prizes for women lecturers for teaching innovation. Measures similar to the Dutch initiative of appointing 100 women professors could also be effective: centrally funding additional

positions for talented women researchers ready to take up professorial roles. This would help rapidly increase the share of women in senior academic positions and challenge stereotypes about a supposed "lack" of qualified women candidates. Naturally, such programmes must be transparent and merit-based to avoid doubts about qualifications.

The fourth lesson concerns combating bias and supporting work-family balance. European experience (especially from the Nordic countries) indicates that sustainable equality requires changes in organizational culture: providing training for selection committees on unconscious gender bias, introducing flexible working arrangements, and supporting parents (for example, through extended paid parental leave or on-campus childcare facilities). In Germany, for instance, many universities have undergone the "family-friendly university" audit (*Familiengerechte Hochschule*) to improve conditions for combining work and family responsibilities. Such an audit could also be useful for Kazakhstani universities, given that a significant proportion of academic staff are women with family obligations.

While international solutions can be adapted, it is important to take the Kazakhstani context into account. Some measures (such as quotas in committees or leadership bodies) are relatively feasible and could be introduced through ministerial regulations. Others, such as making Gender Equality Plans a prerequisite for research funding, are more difficult to apply directly, given that research funding in Kazakhstan is less extensive and competitive than EU grant schemes. Instead, the presence of elements of gender policy could be made a condition for receiving state grant support (for research projects or targeted investments). Another important dimension is the role of society: efforts to promote gender equality within universities must be supported by broader societal progress toward equality. If traditional norms remain strong in society, universities alone cannot overcome them. Therefore, work on gender stereotypes must begin at earlier stages -through schools, career guidance, and the media.

Conclusion

The analysis conducted demonstrates that significant progress has been achieved over recent decades in reducing the gender gap in higher education at the levels of access and participation. Women are now not only actively involved in the educational process but also constitute the majority among students and graduates, indicating the formal achievement of gender parity. At the same time, this progress is largely quantitative in nature and does not eliminate structural imbalances within the higher education system itself.

At a deeper level, persistent forms of horizontal and vertical gender segregation remain. Women continue to be concentrated in the humanities, education, and social sciences, while their representation in STEM disciplines remains limited. Simultaneously, as academic and managerial hierarchies are ascended, a decline in the share of women is observed, pointing to the existence of career advancement barriers and the phenomenon of the "glass ceiling." These dynamics indicate that formal equality of access does not automatically translate into equality of opportunities and outcomes.

International experience confirms that overcoming such imbalances requires systemic and institutionally embedded measures. The most effective approaches are comprehensive in nature and combine regulatory frameworks, targeted support for women at critical stages of academic careers, the implementation of gender equality plans at universities, and the development of mechanisms for regular monitoring. Equally important is work with cultural and social norms that shape educational and professional trajectories from the early stages of socialization.

Kazakhstan, despite its high level of women's participation in higher education and relatively favorable starting conditions, faces structural challenges similar to those observed in many other countries. The lack of systematic institutionalization of gender policy at the

university level, limited monitoring, and insufficient integration of gender criteria into education governance and funding constrain the transition from quantitative achievements to qualitative change. Under these conditions, further progress toward gender equality requires a shift in focus from declarative principles to sustainable managerial and educational practices.

In the long term, ensuring gender equality in higher education should be viewed not only as a matter of social justice but also as a strategic resource for the development of human capital, scientific capacity, and an innovation-driven economy. With the consistent implementation of comprehensive measures, Kazakhstan has the potential to build a more inclusive and effective higher education system and to assume a leading position in the region in the field of gender-responsive education policy.

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Conflict of Interest Statement

The authors declare no potential conflicts of interest regarding the research, authorship, or publication of this article.

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