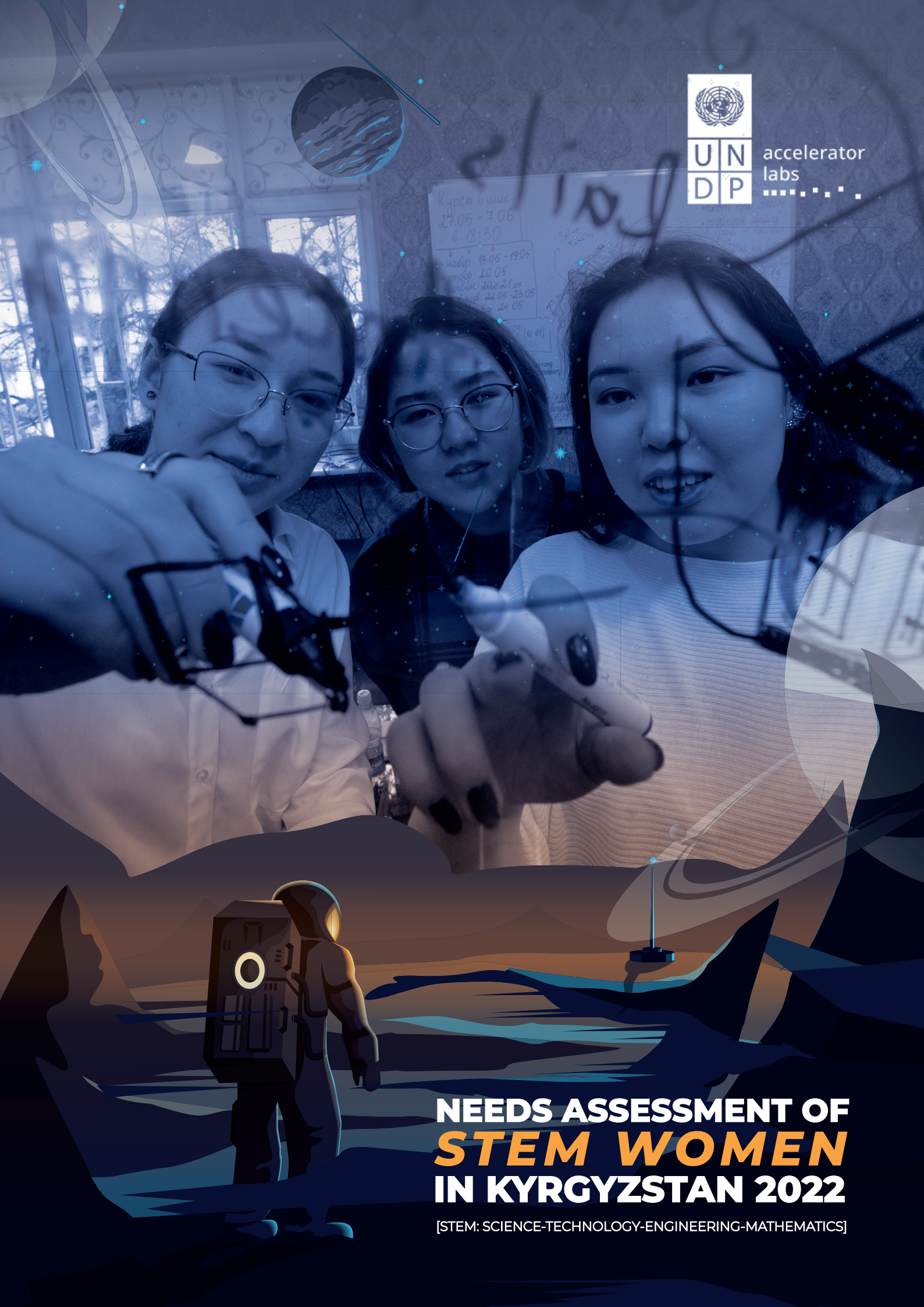

UNDP accelerator labs

NEEDS ASSESSMENT OF *STEM WOMEN* IN KYRGYZSTAN 2022

[STEM: SCIENCE-TECHNOLOGY-ENGINEERING-MATHEMATICS]

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BACKGROUND & ACKNOWLEDGEMENTS

The United Nations Development Programme has played a critical role in addressing the impact of the COVID-19 pandemic on gender equality and women's empowerment globally. In the fall of 2022, the UNDP Country Office in the Kyrgyz Republic commissioned a rapid needs assessment study to understand the changing needs of women in STEM (science, technology, engineering, and mathematics) fields. This study aims to comprehensively understand the structural barriers and challenges faced by women in STEM in Kyrgyzstan in the context of the new normal brought about by the pandemic.

The purpose of this study is to fill the existing knowledge gap on the changing needs of STEM women and to provide a systemic mapping of key stakeholders in the local community involved in promoting gender equality in Technology, Science, and Innovation. By engaging public participants and community partners, the study sought to identify root causes and to co-design solutions to unlock the potential of STEM women in Kyrgyzstan. The inclusive research design included the perspectives of *both* women and men in STEM and non-STEM fields, providing valuable insights and facilitating comparative analyses.

The findings of this study will serve as a basis for experimenting with the development of targeted interventions and sand-box policies to address the challenges identified, with the goal of scaling up best practices and policies nationwide in the future. The findings of the study will also inform the UNDP Country Office's efforts to increase women's participation in STEM, promote gender parity and reduce the gender pay gap, in line with the UNDP Gender Equality Strategy 2022-2025. Leveraging the UNDP & UNICEF's regional platform "STEM4ALL", UNDP is spearheading the formulation of the **STEM4ALL Community in Kyrgyzstan**. UNDP's coordination brings together local community partners to synergize their efforts and mobilize resources to foster an enabling environment for women and men to realize their full potential *through* STEM and prepare for the future of work.

The UNDP wishes to acknowledge the following people for their contributions to the completion of this study:

Researchers:
Dr. Kanykey Jailobaeva & Dr. Temirlan Jailobaev,
Founders of Empirica Research and Consultancy Institute in Kyrgyzstan

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Acknowledgements are extended to all stakeholders who actively participated in this study, providing valuable insights from their extensive work experience in STEM in Kyrgyzstan.

Infographics that visualize the key findings of this report for the public are available on the UNDP Kyrgyzstan website.

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ABBREVIATIONS

KII	Key informant interviews
LM	Labour Market
MoES	Ministry of Education and Science in the Kyrgyz Republic
SNA	Social Network Analysis
STEM	Science, Technology, Engineering, and Mathematics
TOR	Terms of Reference
UNDP	United Nations Development Programme

1 EXECUTIVE SUMMARY

Background

STEM (Science, Technology, Engineering, and Mathematics) is critical to gender equality and digital transformation in the future of work. The World Economic Forum predicts that more than 90% of future jobs will require digital skills with a strong STEM foundation. Emerging occupations such as data analysts, AI and machine learning specialists, and big data specialists are becoming increasingly important to our economic growth and daily lives. Men continue to dominate these emerging professions. This disparity is particularly concerning given that an estimated 180 million women's jobs are expected to be automated over the next 20 years. To remain competitive in the labor market, re-skilling and up-skilling with the Internet and technology will be essential.

In Kyrgyzstan, however, only one-third of women actively use the Internet and are computer literate. The share of female graduates in STEM fields is 31.3%. This is clearly not enough for women to actively participate in the digital transformation process. UNDP advocates for gender equality in digital transformation and has developed a "Gender Equality in Digitalization Strategy" (2022) with recommendations for increasing women's participation in STEM fields and technological innovation.

In order to empower women and girls to engage in STEM, there is a need to map the key stakeholders in the technology, science, and innovation sectors. In addition, a comprehensive understanding of the structural challenges that prevent women and girls from pursuing STEM studies and careers is crucial. In light of this, this needs assessment was launched to understand the situation of women in STEM and to identify actions that could alleviate the existing barriers and promote the involvement of more women in STEM disciplines in Kyrgyzstan. The results of this needs assessment will provide evidence-based solutions, co-designed with STEM women and stakeholders, to support UNDP's efforts to empower more women to pursue STEM fields. **These initiatives aim to increase employment and economic opportunities for women in STEM, ultimately contributing to the reduction of the gender pay gap.**

Methodology

The study used a mixed-methods approach, incorporating various data collection methods and research techniques such as design thinking, user's journey, participatory approach, and social network analysis (SNA) to ensure a comprehensive analysis. The ***quantitative component*** included a survey of 101 STEM women and men and 100 non-STEM women and men in the cities of Bishkek and Osh (two of the largest cities in Kyrgyzstan, located in the northern and southern regions). STEM women were students in their final year of STEM programs at universities. Non-STEM women and men were selected from the general public using a systematic random sampling strategy in different parts of Bishkek and Osh cities, which were identified using a mapping technique. As part of the ***qualitative component***, eleven key informant interviews (KIIs) were conducted with STEM women and representatives of educational institutions (supply side) and industry (demand side). A participatory ***design thinking workshop*** was conducted with the participation of 32 organizations working in STEM. These organizations represented the public, private, and non-governmental sectors, as well as international development agencies. In addition, a comprehensive literature review was conducted, including both local and international best practices. The use of mixed methods in this study facilitated the collection of evidence from

a variety of sources, leveraged existing knowledge, and incorporated successful practices into the analysis and recommendations.

Key Findings

What is the public perception about STEM women and girls in Kyrgyzstan? Why do fewer women/girls choose STEM education/career?

In general, more than half of the STEM and non-STEM women and men surveyed felt that it was up to women/girls to decide what they wanted to do with their lives, indicating that these respondents were neutral towards the participation of women/girls in STEM. In addition, most *STEM women* and *STEM men* surveyed felt that there were no barriers for women/girls to participate in STEM. About a quarter of STEM and non-STEM women thought that STEM women were admired for being strong and independent.

However, the interviews and discussions at the participatory workshop with key STEM stakeholders showed that there are gender stereotypes and social norms that discourage women/girls from participating in STEM. These stereotypes and social norms portray women's/girls' main role as caregivers and that STEM subjects are difficult for women and girls. This was also evident in the survey results. For example, 30% of n*on-STEM women* and *23% of non-STEM men* thought that the intellectual superiority of men over women in STEM fields prevented women/girls from participating in STEM. About 21% of *non-STEM men* also thought that STEM fields were difficult for women/girls. About 24% of *non-STEM men* and *women* also believed that STEM careers were male-dominated, which discouraged parents/caregivers from encouraging their daughters to pursue STEM careers.

Other barriers and challenges that prevent women/girls from participating in STEM include a number of factors that emerged from discussions with key STEM stakeholders. Parents/caregivers are not aware of STEM and the opportunities it offers for women and girls. As a result, parents/caregivers appear to believe that STEM is not for women and girls. At the school level, there are a number of difficulties ranging from a lack of qualified STEM teachers to gender bias among teachers. At the higher-educational level, programs are not up-to-date and not linked to the STEM labor market, which is underdeveloped in Kyrgyzstan. Importantly, universities can increase the participation of women/girls in STEM by providing scholarships for women and introducing some discretions for young mothers, who tend to drop out in the middle of their education due to their family responsibilities. At the policy level, existing policies have STEM-related action points, as STEM is seen as one of the drivers of women's economic empowerment. However, these policies are not fully implemented in practice.

What are the patterns of STEM women's educational/career journeys in Kyrgyzstan?

Interviews with STEM women revealed diverse patterns in their educational and career journeys. However, a common thread emerged in the form of the influential role played by their *self-esteem (referring to their sense of self-worth and values), *self-efficacy (referring to their capabilities to accomplish goals or tasks), and the support of their parents or caregivers. These women demonstrated high levels of self-esteem and self-efficacy, which served as important motivators in their pursuit of STEM goals and ambitions. Despite experiencing fears and doubts, they employed various strategies to cope with these challenges and remain committed to their STEM aspirations.

These women come from diverse family backgrounds, including those with divorced parents or histories of domestic violence, as well as families characterized by strong support and liberal values. Their family backgrounds have significantly influenced their perceptions of their own journeys and their approaches to encouraging women and girls in STEM. For example, STEM women who grew up in supportive family environments tend to adopt an individualistic perspective, believing that success in STEM is primarily determined by personal willpower rather than external factors such as gender norms, stereotypes, or inadequate infrastructure. On the other hand, STEM women from families affected by divorce or domestic violence view their environment as a potential barrier and emphasize the importance of addressing social norms and stereotypes surrounding gender to create equal opportunities. A detailed discussion of the findings is provided below.

Who are the stakeholders in the STEM ecosystem in Kyrgyzstan?

The stakeholder mapping was conducted through a comprehensive process that included a desk study, interviews with key stakeholders, and a participatory design thinking workshop with organizations involved in STEM disciplines. This mapping exercise identified a total of 95 stakeholders within the STEM ecosystem in Kyrgyzstan. The wide range of stakeholders identified through this process reflects the broad spectrum of actors involved in STEM initiatives in the country.

Broadly speaking, these actors can be categorized into eight groups: 1) government institutions, 2) international organizations, 3) NGOs and non-profit organizations, 4) private companties, 5) private schools, 6) non-public universities, 7) public institutes/schools/universities/academies, and 8) religious institutions.

The Social Network Analysis (SNA) conducted as part of the study identified specific stakeholders among the 95 identified who are actively involved in promoting the participation of women and girls in STEM. The analysis also revealed that certain stakeholders play a more prominent role than others. For example, the Ministry of Education and Science of the Kyrgyz Republic (MoES) emerged as a key player among government institutions in driving gender equality initiatives in STEM. The stakeholder analysis also revealed differences in the level of interest and power/influence among different groups of actors. For example, non-profit organizations generally have high interest but low power/influence, mainly due to funding constraints, while government institutions have high power/influence but low interest. A detailed discussion of the results of the analysis is provided in Section 6.5 of the report.

How do STEM women envision the future trends in their community?

The survey conducted among STEM women and STEM men revealed a higher level of optimism regarding future trends in gender parity within STEM fields in Kyrgyzstan. The majority of surveyed STEM women (85%) and STEM men (72%) believed that since we live in an open and democratic society, the participation of women and girls in STEM would naturally increase without the need for specific support. Conversely, a lower percentage of non-STEM women (62%) and non-STEM men (51%) surveyed shared this perspective, suggesting that non-STEM populations tend to be less optimistic about the future of the STEM community, though still relatively positive.

The survey also highlighted that the majority of both STEM (91%) and non-STEM (84%) women agreed that the number of women and girls in STEM should increase and that additional support and encouragement is needed. However, a lower percentage of men from both STEM and non-STEM backgrounds agreed, suggesting that men surveyed, particularly those outside of STEM, are less concerned about women's participation in STEM.

During the interviews, most STEM stakeholders expressed optimism about the future, anticipating an increase in women's participation in STEM. Only one stakeholder expressed concern about women's declining involvement in political, social, and economic aspects due to increasing religiosity, which could potentially affect women's and girls' involvement in STEM.

What are the solutions co-created by STEM women and stakeholders? How can we together join efforts to drive change to advance the gender parity in STEM?

The study participants, including those who participated in interviews, surveys, and the participatory design thinking workshop, were requested to suggest potential solutions to facilitate the advancement of women and girls in STEM. As outlined in Section 6.6, the proposed solutions from these diverse groups of participants focused primarily on four key areas:

1) Raising awareness: Raise public awareness about STEM in general and the importance of women and girls participating in STEM in particular. Suggestions included running targeted campaigns, coordinating public and private sector initiatives, and using various media and communication platforms with storytelling to challenge gender stereotypes and advocate for STEM.

2) Building confidence: Implement programs aimed at increasing the confidence, self-esteem, and self-efficacy of women and girls in STEM. Such initiatives may include mentoring programs, skill-building workshops (soft and hard skills), and hands-on experiences within STEM domain. These interventions serve to build their confidence and interest in STEM.

3) Enhancing education: Enhance the educational system and extracurricular activities for girls and women. This could include developing STEM-centered curricula, providing scholarships and financial aid opportunities, and offering programs that expose girls to STEM subjects from an early age.

4) Engaging families and communities: Work with families and communities to encourage women and girls to pursue STEM education and careers. Initiatives such as parenting schools, community outreach initiatives, and partnerships with local organizations were suggested to ensure a supportive environment for women and girls to enter and to excel in STEM.

Recommendations

Our research has identified critical challenges and provided a set of recommendations for empowering women and girls to enter and excel in STEM. These recommendations take a comprehensive approach, addressing issues of self-esteem, societal perspectives, and educational systems. To increase women's confidence and participation in STEM, we emphasize the importance of interventions that target both individuals and their support networks, with a particular focus on engaging fathers as advocates for STEM engagement. Tailored initiatives are needed to address different perspectives within society, including non-STEM men, who may require special attention. Effective collaboration with education authorities and private sector partners stands as a pivotal element in enhancing STEM education. Initiatives such as mentoring programs and early integration of STEM in the curricula play a key role. Building a network of key stakeholders and using successful STEM women as role models are important steps in shaping the STEM community. Finally, bridging the gap between gender equality policy and policy implementation

requires closer collaboration with community partners and further research to develop effective implementation plans for STEM-focused policies. Future research should include a broader, more diverse sample and provide comprehensive insights for advancing women and girls in STEM in different contexts and regions.

The full list of recommendations can be found in the "Conclusions and Recommendations" section of the report. This section has been reviewed and validated by key national stakeholders in the STEM community to ensure that the proposed actions are relevant, feasible and aligned with the needs of the local context. The report encourages the active engagement and collaboration of these stakeholders in implementing the identified recommendations to create a more inclusive and equitable STEM environment in the country.

2. INTRODUCTION

STEM fields are increasingly important to the future labor market and economic opportunities, as most of the emerging high-paying jobs are in STEM fields (Jiang, 2021). In the coming years, STEM will generate a significant number of additional jobs (UNICEF, 2020). However, despite a steadily increasing demand for STEM workers, there is a substantial shortage of STEM labour supply.

Currently, existing STEM occupations are predominantly male-dominated, leaving women behind. The shortage of women in STEM is a concern because the increasing STEM job opportunities and high salaries are not accessible to women, further widening the existing gender wage gap (Diekman, Weisgram, and Belanger, 2015). Furthermore, current labor market dynamics suggest that by 2030, women-dominated jobs will be largely automated, leaving many women unemployed (UNICEF, 2020). Given that approximately 30-50% of women are less likely than men to use the internet and technology to upskill and/or reskill for future work, there is a high risk that women will be left behind, contributing to existing gender inequalities (UNDP, 2021).

The World Economic Forum's Global Gender Gap Index (2022) shows that Kyrgyzstan's gender parity score ranks 86th out of 146 countries. According to the National Statistics Committee of Kyrgyzstan and UNICEF reports, 1 in 3 girls in Kyrgyzstan is computer literate, and only 21% of women aged 15-49 actively use a computer (UNICEF, 2022). In most cases, existing gender stereotypes and social norms in Kyrgyzstan do not allow girls to pursue STEM subjects/professions. A vivid example is that only 31.1% of female tertiary graduates in Kyrgyzstan are from STEM fields (World Bank, 2018).

COVID-19 has undermined the progress made in gender equality and women's empowerment worldwide. Most of the job losses have affected women. For example, due to the pandemic, women in Europe and Central Asia are expected to be 15 percent less employed than men (ILO, 2021). Meanwhile, COVID-19 has increased the demand for STEM workers. Therefore, there is currently a need to accelerate women's participation in STEM to mitigate the negative impact of COVID-19 on gender equality, close the gender pay gap, and further promote women's empowerment for better economic opportunities.

In the context of Kyrgyzstan, the needs of women in STEM have not been studied since COVID-19. In order to empower women and girls to engage in STEM, there is a need to map the key stakeholders involved in promoting gender parity in STEM and to understand the structural challenges that prevent women and girls from pursuing STEM studies and careers. In light of this, this needs assessment of women in STEM was initiated to understand the recent situation of women in STEM and to identify interventions that could alleviate the existing barriers and promote the involvement of more women in STEM in Kyrgyzstan.

The results of this needs assessment will provide evidence-based solutions, co-designed with STEM women and stakeholders, to support UNDP's efforts to empower more women to pursue STEM fields. These initiatives aim to increase employment and economic opportunities for women in STEM, ultimately contributing to the reduction of the gender pay gap in line with the research hypothesis shown in Figure 1.

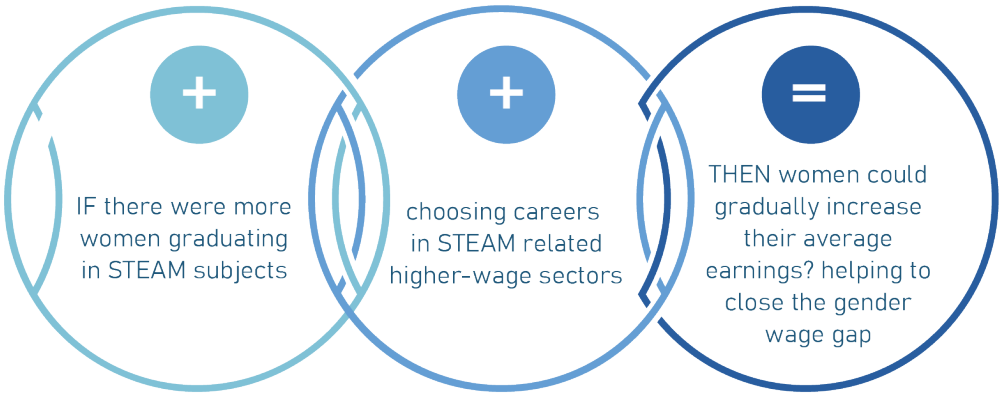


Figure 1: Research hypothesis

The report consists of seven sections. The next section presents the objectives and questions of this research. The fourth section provides a conceptual framework for the study developed from a rapid review of the relevant academic literature and non-academic documents (e.g., reports, concept papers, etc.) and defines STEM. The fifth section spells out the study design, data collection tools, and approaches to data analysis. The sixth section presents the findings of the study. The report concludes by offering a set of recommendations in the seventh section.

3. STUDY OBJECTIVE AND QUESTIONS

The overall objective of the study was to **conduct a rapid needs assessment of STEM women in Kyrgyzstan (Bishkek & Osh) with a solutions-oriented focus.** In order to obtain a comprehensive view of the STEM landscape, the study included women and men in STEM, as well as women and men from non-STEM fields, using a comparative analysis. To fully explore this objective, the study had the following specific research questions (RQs) as outlined by UNDP:

RQ1. What is the public perception about STEM women and girls in Kyrgyzstan?
RQ2. What are the patterns of STEM women's educational and career journeys in Kyrgyzstan?
RQ3. Why do fewer women choose STEM education/careers (root cause problem)? i.e., What are the key challenges faced by STEM women?
RQ4. Who are the stakeholders in the STEM ecosystem in Kyrgyzstan?
RQ5. How do STEM women envision the future trends in their community?
RQ6. What are the solutions co-created by STEM women and stakeholders? How can we together join efforts to drive change to advance the gender parity in STEM?

4. CONCEPTUAL FRAMEWORK OF THE STUDY

4.1 DEFINING "STEM"

The literature review shows that individuals and institutions use the term "STEM" to refer to different phenomena, and it is often unclear whether they are referring only to fields of study or to an economic activity that constitutes a STEM field. The abbreviation "STEM" is too general and does not clarify whether some jobs should be considered as STEM jobs or not. This is particularly true for jobs in education, managers, technicians, health professionals, and social scientists. This issue is critical to consider as some sectors are often gender imbalanced. For example, in many European and Central Asian countries, women are overrepresented in the education and health sectors (Munoz Boudet et al., 2021) and underrepresented in industries that rely heavily on mathematics and engineering. Therefore, a clear definition of the boundaries between STEM and non-STEM is essential for this study. To this end, the basic definitions of the four concepts have been reviewed and are presented below:

- **Science** is defined as organised knowledge that seeks to understand the natural world (National Academy of Sciences, USA -National Research Council, 1996).
- Science is an underpinning premise of **Technology**, which focuses on modifying the natural world to meet human wants and needs (Dugger, 2000).
- **Engineering** builds on Technology and includes professions in which knowledge of the mathematical and natural sciences is applied to utilize materials and forces of nature for the benefit of humankind (Dugger, 2010).
- **Mathematics** is the science of patterns and relationships of various phenomena in the natural world (Dugger, 2010). It is "the science of numbers and their operations, interrelations, combinations, generalizations, and abstractions and of space configurations and their structure, measurement, transformations, and generalizations" (Meeriam-Webster Dictionary, 2022). Mathematics has such branches as Algebra, arithmetic, calculus, geometry, and trigonometry (Meeriam-Webster Dictionery, 2022). Mathematics is integral to Technology, Science, and Engineering (Dugger, 2010).

In summary, the above definitions of STEM collectively emphasize their foundation in the natural world, as disting from the social domain. In the Central Asian region, where women's participation in education, health, and social sciences faces fewer obstacles, our focus is squarely on advancing the role of women in STEM fields that primarily delve into the natural sciences (physics, chemistry, etc.), computer science, mathematics, and engineering. Therefore, this study adopts a narrower perspective for STEM, encompassing disciplines and vocations predominatnly rooted in the natural sciences. Social science disciplines, professions, vocations or those with a small component in the natural sciences are excluded from this study. However, this does not mean that future STEM efforts should be limited to the approach outlined here in this study.

4.2 CONCEPTUAL FRAMEWORK

Based on the literature review, a conceptual framework was constructed for this study. The overall purpose of the conceptual framework is to bring together key relevant concepts from the literature and the research questions outlined in this study to better examine the issue at hand.

Given the purpose of this study and the overall hypothesis of the research, the literature on promoting gender equality in STEM education and labor market was reviewed. The literature reviewed proposed a number of different conceptualizations of women's participation in the STEM labor market (Yakman, 2008, 2010; Bybee, 2010; Lee and Nason, 2012; Council, 2014; Diekman, Weisgram, and Belanger, 2015; Erdogan and Stuessy, 2015; Reider, Knestis, and Malyn-Smith, 2016; Kelley and Knowles, 2016; Quigley, Herro, and Jamil, 2017; Marshall and Harron, 2018; Yata, Ohtani, and Isobe, 2020; Falloon et al. , 2020; Roehrig et al., 2021; Munoz Boudet et al., 2021). Each of them had a different focus and context and was developed to meet different objectives. The proposed framework of this study (shown in Figure 2) represents **a comprehensive synthesis of STEM components and factors from the existing literature, specifically tailored to meet the objectives of the study in the Kyrgyzstan context.**

In a nutshell, the literature shows that in order to study women's participation in the STEM labor market, we must recognize the two sides involved in this process: **Supply Side and Demand Side.**

The **Supply side** has two key components: STEM education and contextual factors (external and internal).

- STEM education includes the formal and informal learning experiences of individuals, from early childhood education through primary and secondary schooling to higher education at colleges and/or universities.
- STEM-related contextual factors include governmental and non-governmental policies, programs, and initiatives to promote STEM education and skills acquisition. They also include the presence of STEM role models, parental and peer support, and individual self-efficacy, all of which are critical in fostering an enabling environment for STEM engagement. (Figure 2). Diekman et al. (2015) provide a helpful classification of contextual factors by dividing them into four domains: (i) family influences and expectations, and (ii) peers and other social connections under external factors, as well as (3) self-confidence/efficacy, and (4) a sense of belonging to the STEM culture.

Together, the supply-side components contribute to the development of a skilled and motivated STEM workforce by providing learning opportunities and nurturing a supportive ecosystem that encourages individuals to pursue and excel in STEM disciplines.

The **Demand side** includes the STEM employment and labor market. It encompasses a wide range of industries, organizations and individuals that rely on and require the expertise of STEM professionals to do their jobs (Figure 2). The demand side plays a critical role in creating opportunities and employment prospects for STEM graduates and professionals, thus shaping the overall landscape of the STEM industry.

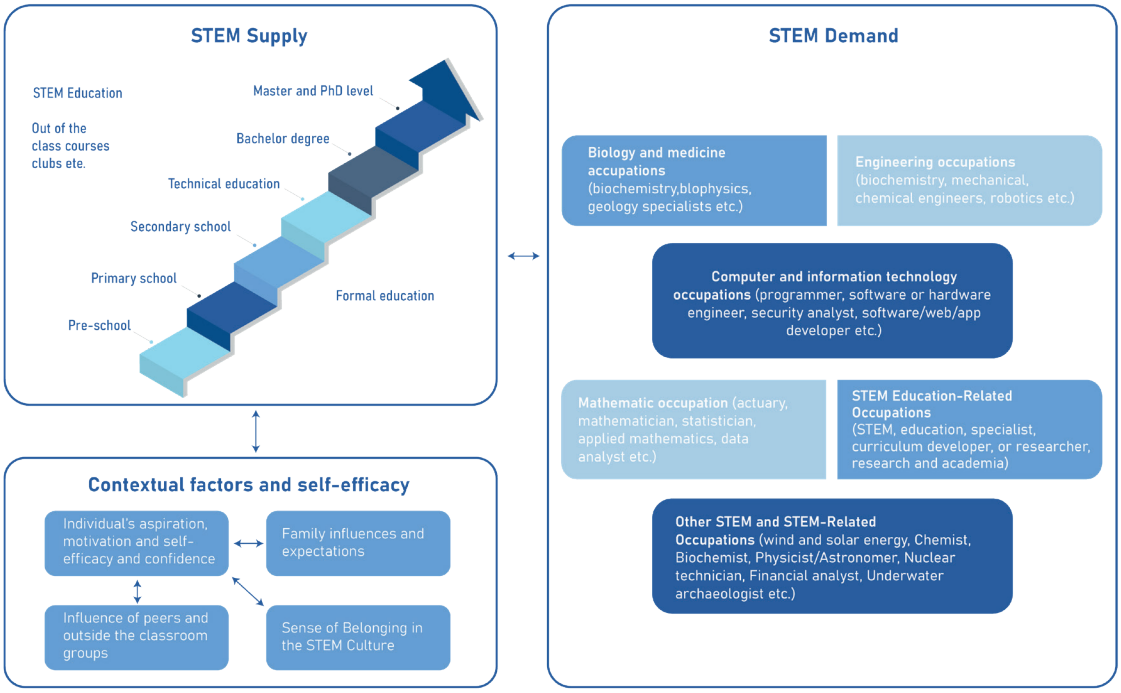


Figure 2: Conceptualisation of the STEM within this study

4.3 STEM SUPPLY SIDE:

STEM Education

The literature emphasizes the critical role of education in promoting women's participation in STEM and the need to address gender stereotypes from early childhood. In addition, the literature indicates that the increasing difficulty of STEM subjects with each grade and the reliance on prior knowledge make it difficult for students to successfully progress in STEM education. For this reason, maintaining students' continued interest and engagement from the earliest years of schooling through graduation is an integral part of the STEM education process.

Interestingly, a long-standing trend in European and Central Asian countries is that more girls perform better in school and are more likely to go on to higher education, with around 70 percent of female students enrolling in university-level degrees compared to 66 percent of male students (WDI, 2017). However, because girls generally underperform their male peers in STEM subjects in school, few female school graduates enroll in STEM university degrees (Munoz Boudet et al., 2021).

The literature also highlights the role of teachers and the school system in motivating students to learn STEM subjects and in reducing the gender gap by providing additional support to girls who need it. Existing challenges identified by teachers in the school system that prevent girls from engaging in STEM revolve around six areas: 1) pedagogical challenges, 2) curricular challenges, 3) structural challenges, 4) student concerns, 5) assessment concerns, and 6) teacher support (Margot and Kettler, 2019).

Contextual Factors

Apart from education, the literature indicates an array of external and internal factors that shape individuals' interest in STEM:

- ***External factors***

External factors such as parental support, existing social norms, gender stereotypes, social and peer support networks, role models, and support in the transition from education to employment have a major impact on women's interest and motivation to engage in STEM. Influencing these factors may be critical to reducing the gender gap in STEM (Munoz Boudet et al., 2021).

Family influences and expectations. The (nuclear) family is often one of the strongest support groups, and its attitudes, beliefs, and behaviors often shape an individual's interests, motivation, and actions. The role of parents is particularly important. The literature suggests that girls are more likely to pursue a career in STEM if one or both of their parents had a career in STEM. This likelihood increases if she has a STEM role model within her close family circle, such as a mother who has a career in STEM (Astin and Sax, 1996). However, the role of family members is not always positive, as family members may impose stereotypical norms on their children and discourage girls (or have low expectations for their daughters) from pursuing STEM careers (Shapiro and Sax, 2011).

Peers and Other Social Connections. A number of studies demonstrate the importance of peer groups outside the classroom in influencing women's career choices and decisions. Specifically, friendships with female friends who are high achievers in math and science facilitate women's persistence in STEM fields and their enrollment in advanced math and physics courses (Riegle-Crumb, Farkas, and Muller, 2006). Often, peers can serve as role models and support active participation in STEM. Mentoring programs such as "Big sisters / Little sisters" that paired older and younger female students in engineering showed that such collaboration increased girls' engagement in STEM (Brainard and Carlin, 1998). However, peer and other social connections can also undermine women's self-confidence and reinforce stereotypical beliefs that women do not belong in STEM (Miller et al., 2000).

- ***Internal factors***

Internal (individual) factors such as interests, beliefs, aspirations and motivation are equally important (as external factors) for women's and girls' participation in STEM. Thus, the literature emphasizes that activities aimed at empowering women/girls and changing their beliefs, attitudes and behaviors toward STEM are important. The concept of self-efficacy within social cognitive theory is often used in the literature to understand internal drivers of behavior.

Self-efficacy is one of the internal/individual factors that influence women's engagement in STEM. It is defined as an individual's belief in his or her ability to act in the ways necessary to achieve specific goals (Muretta Jr, 2005). This is one of the most important factors because an individual's internal interests, motivation, and actions can often override any other external difficulties and challenging environments. A number of studies have been conducted on gender differences in STEM self-efficacy. The results suggest that women tend to report lower levels of academic and mathematical confidence than their male counterparts, even when their academic and mathematical abilities are equal (Shapiro and Sax, 2011). Thus, the focus should also be on increasing girls' science confidence, not just on improving their academic STEM skills (Brainard and Carlin, 1998).

Sense of belonging in STEM. This factor is strongly related to and influences individual self-efficacy. Women often need more support to overcome existing gender stereotypes and social norms and to develop a sense of belonging in STEM. Women often face negative attitudes when choosing STEM careers because the fields of engineering, mathematics, and computer science are stereotypically defined as belonging to men (Shapiro and Sax, 2011). To address this, previous research has consistently documented the importance of breaking these stereotypes, promoting the role of women in STEM, establishing support groups to create a secure sense of belonging for women in STEM, and making STEM careers more attractive to women (Brainard and Carlin, 1998; Han, Sax, and Kim, 2007; Shapiro and Sax, 2011).

4.5 STEM DEMAND SIDE:

STEM employment and labour market

In many high-income countries, STEM jobs account for a significant share of the total labor market, and STEM employment is growing. For example, about 7% (about 9 million people) of all jobs in the United States in 2015 were in STEM. In addition, of all STEM occupations, computer science and engineering occupations were the most in demand (see Figure 3).

Interestingly, nearly all STEM occupations (99%) required some postsecondary education (Figure 4). By comparison, 36% of all U.S. employment in 2015 required no postsecondary education for entry-level jobs (Fayer, Lacey, and Watson, 2017). Moreover, entry-level educational requirements for STEM employment were significantly higher than for other employment sectors, with nearly 80% requiring at least a bachelor's degree. This underscores the importance of **higher education attainment in securing STEM employment.**

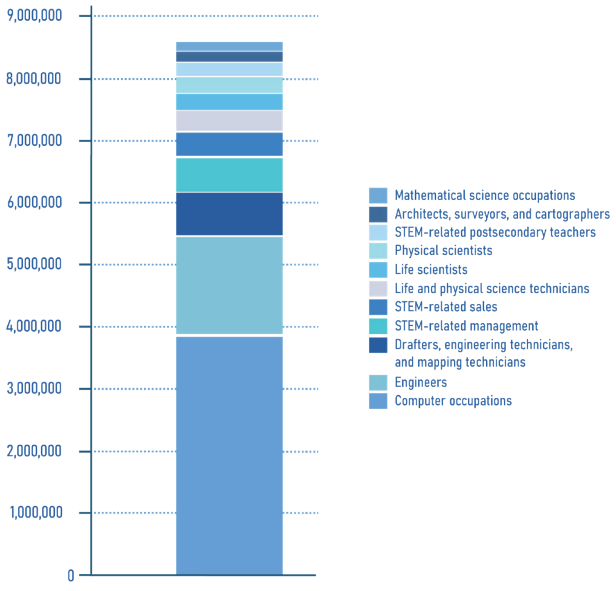


Figure 3: STEM employment by type of STEM occupation in the USA, May 2015.

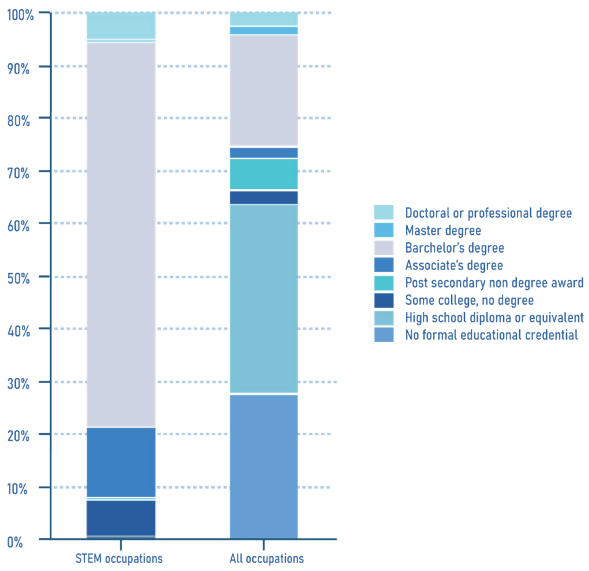


Figure 4: Employment distribution by entry requirements (May 2015),

Source: USA Bureau of Statistics. Adopted from (Fayer, Lacey, and Watson, 2017)

Projections for the US STEM job market show that the Information Technology and Computer-related occupations will account for the most significant number of new STEM jobs by 2024. These were followed by Engineering, Management, and Jobs requiring mathematics skills (Figure 5).

Nevertheless, like many other fields, the **STEM labour market is heterogeneous and has both shortages and surpluses of STEM workers,** depending on the particular job market segment. Xue & Larson (2015) conducted research of the STEM job market and concluded that some areas experience considerable shortages, and there is a high demand for qualified STEM staff. However, at the same time, there is a substantial oversupply of STEM-qualified workers in some areas. **An in-depth review of the employment market and its projection in Central Asian countries is required** to provide an up-to-date **assessment of demand in STEM occupations** across various sectors of the economy.

To sum up, this section developed a conceptual framework for the study based on the literature review. This conceptual framework was used to provide a structure to the data collection and analysis to examine the research questions, as illustrated in **as illustrated in figure 6.** Specifically, the stakeholder mapping referred to the proposed framework as key actors and institutions were mapped against the proposed framework.

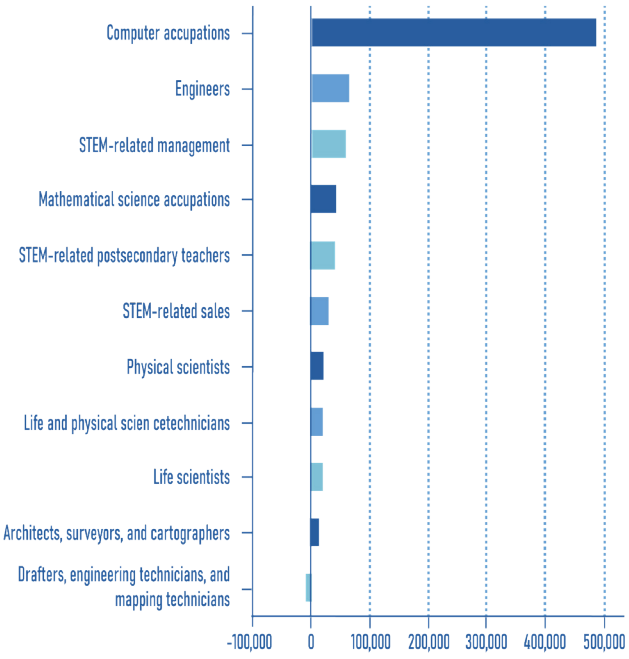


Figure 5: Projected new STEM jobs by 2024, USA. Source: USA Bureau of Statistics. Adopted from (Fayer, Lacey and Watson, 2017)

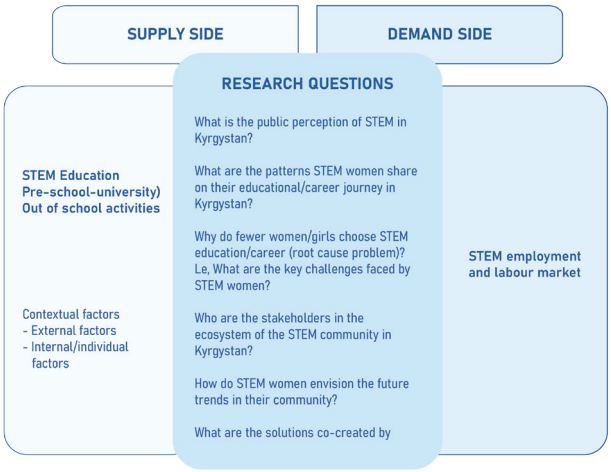


Figure 6: Conceptual framework and research questions

5. METHODOLOGY

5.1 OVERVIEW OF THE STUDY DESIGN

Both qualitative and quantitative research methods were used in the study as they were seen as complementary to each other. Figure 7 provides an overview of the data collection tools applied in the study. Annex 1 spells out from which sources data came to answer the research questions and the concepts/themes that data collection tools covered. A cross-cutting element of the study was stakeholder mapping. Data for this was collected through all data collection tools.

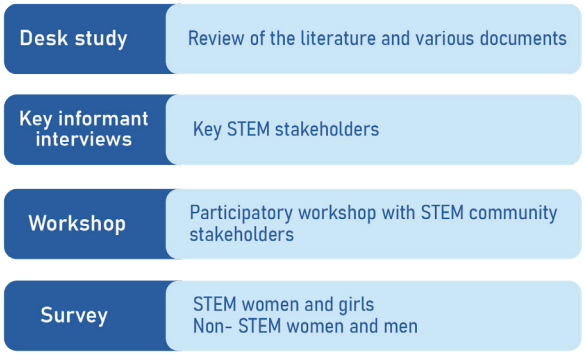


Figure 7: Data collection tools

5.2 QUALITATIVE COMPONENT

Desk study

The desk study involved reviewing relevant academic and non-academic literature from local and international resources on the subject. Over 50 documents were identified and reviewed to produce a conceptual framework and develop necessary study instruments.

Key informant interviews

Eleven interviews were conducted with key stakeholders representing government institutions, schools/universities (specialising in STEM), informal STEM education, STEM employment sector, groups/activists/NGOs engaged in promoting women in STEM, and STEM women to share their journey. Purposeful sampling was used to select the interviewees.

Table 1: List of interviewees

No	Interviewees
	Government institutions
1	Ministry of Education
2	National Academy of Science
	Schools/Universities (specialising in STEM)
3	Kyrgyz State Technical University
4	Public School in Bishkek[1]
	Informal education (learning centers, etc.)
5	Private School in Osh[2]
6	Kyrgyz Internet Society
	STEM employment sector
7	Mazars (Digital Services Department)

[1] Anonymised to prevent identity reveal of the interviewee
[2] Anonymised to prevent identity reveal of the interviewee

	Groups/activists/NGOs engaged in promoting women in STEM and STEM women to share their journey
8	Engineer[3]
9	Scientist[4]
10	IT specialist[5]
11	STEM champion[6]

Design thinking workshop with a participatory approach

A design thinking workshop was conducted by the Head of the Experimentation of the UNDP Accelerator Lab with STEM practioners (including STEM women and men) and key stakeholders. It aimed to engage the participants in empathizing with STEM women, co-defining problems/barriers/challenges, generating and co-designing solutions, and discussing future trends and risks for the women's/girls' STEM community in Kyrgyzstan (Workshop programme is in Annex 2). Notes of the discussions during the sessions were taken. Key ideas from these discussions are integrated into this report.

Participatory approach implies engaging the target group in the process of the activity in an equal partnership mode to listen to them as well as co-create the outcomes/solutions to the challenges.

UNDP Press Release (11 November 2022):
UNDP STEM4ALL platform invited key stakeholders to co-design solutions | United Nations Development Programme

[3] Anonymised to prevent identity reveal of the interviewee
[4] Anonymised to prevent identity reveal of the interviewee
[5] Anonymised to prevent identity reveal of the interviewee
[6] Anonymised to prevent identity reveal of the interviewee

Figure 8: Discussions at the participatory workshop (Group A)

Figure 9: Discussions at the participatory workshop (Group B)

5.3 STAKEHOLDERS MAPPING

The study initially expected to identify at least 50 key actors that shape the ecosystem of the STEM community in Bishkek & Osh, Kyrgyzstan. The data for the stakeholder analysis was gathered from different data sources. During the desk study, information about individuals and organisations working actively in STEM was extracted. At KIIs, STEM interviewees were asked to reflect on the key actors in their community who play a central role in the involvement of women/girls in STEM and who they work with. At the participatory workshop, a session was run on STEM stakeholders. Each workshop participant was asked to identify key stakeholders in STEM, write them down on post-it notes, and then place them on the matrix of power/influence and interest, shown in Figures 10 - 11. Laying out stakeholders along these dimensions helped to identify ways to engage with each actor.[7] The outcomes of this session are provided in Section 6.4. As a result of these activities, a database of 95 stakeholders in the STEM ecosystem is provided in Annex 6.

[7] UNDP, 2012. Institutional and Context Analysis Guidance Note.

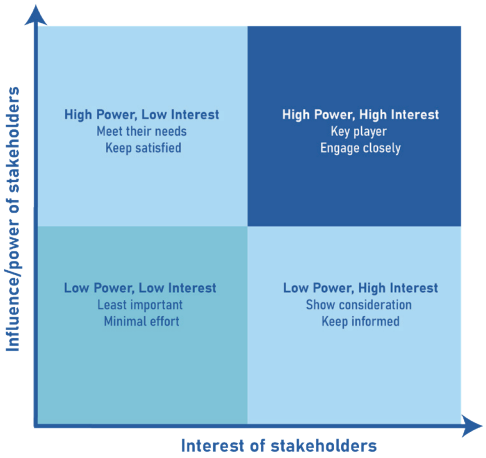


Figure 10: Assessing the power and interest of key stakeholders

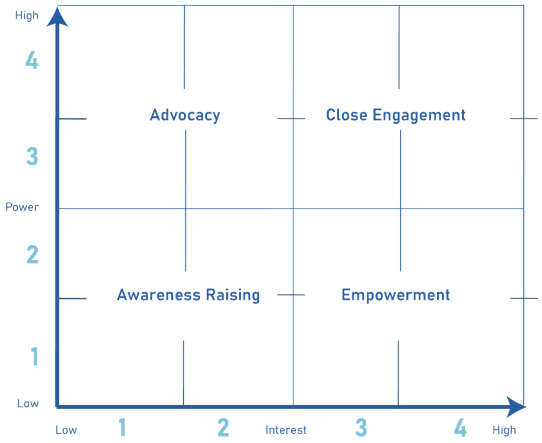


Figure 11: Assessing the power and interest of key stakeholders

Further, a Social Network Analysis (SNA) was applied to analyse the interaction between STEM stakeholders and cross-validate STEM stakeholders identified through the desk study, interviews, and the design thinking workshop. Figure 13 demonstrates the use of SNA to identify, analyse, and visualise relationships between different actors in social networks. The outcomes of the SNA analysis conducted within this study are presented in Section 6.5.

Social Network Analysis is designed to help map and analyse social networks. Its main purpose is to identify and analyse the relationships within and between different actors within social networks.

Figure 12: Definition of SNA. INTRAC, 2017

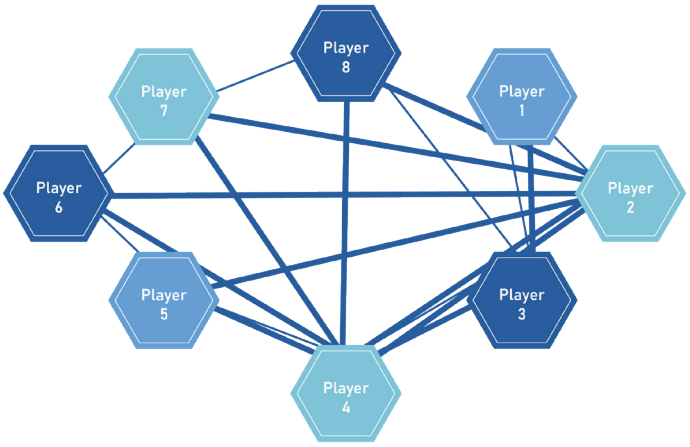


Figure 13: Example of the SNA outcome (Fransen, 2021)

5.4 QUANTITATIVE COMPONENT

Within the quantitative component, a survey questionnaire was administered to respondents of two distinct categories:

- **Category 1** – STEM women and girls. These included female students in the last year of their higher educational programmes in STEM that require knowledge and application (at least 50% of the job) of at least one of the following subjects: Information Technology, Mathematics, Physics, and Engeeninering. In Bishkek, 48 female students took part in the survey. They represented four educational institutes: (i) the Physics, Mathematics, and Informational Technologies Departments of the Kyrgyz National University; (ii) the Informational Technologies Department of Kyrgyz State University Of Construction And Architecture, (iii) the Informational Technologies Department of Kyrgyz-Russian Slavic University, and (iv) Department of Hydro Melioration, Ecology and Land Management of Kyrgyz National Agrarian University. In Osh, 53 female students were surveyed from the Physics, Mathematics, and Information Technologies Department of (i) Osh State University and (ii) Osh Technological University.

- **Category 2** – General population. Research Question 1 (*What is the public perception of STEM women and girls in Kyrgyzstan*) required exploring the existing public perception of women in STEM in Kyrgyzstan. For this reason, 100 respondents from the general population (including men) were surveyed. Including men intentionally in activities related to gender equality is essential because research and interventions that solely focus on women have been criticized for excluding men. Men play an important role in upholding existing gender-biased social norms, attitudes, beliefs, and behaviors. Therefore, involving men in gender equality efforts helps address the root causes of inequality and promotes broader societal change. In sum, the survey respondents from this category were randomly selected respondents over 18 years old people. To ensure a more representative sample, respondents were selected randomly in various parts of the selected cities (i.e., Bishkek and Osh) that were identified using a mapping technique.

Hence, the overall sample size was 201 respondents: 100 respondents from the general population and 101 from STEM female students. This sample size is considered fair for making statistically representative conclusions (Boateng et al., 2018). However, this is an explorative study that will gauge the current situation around people's perception of women in STEM for potential roll-out in the future for a large-scale survey. Table 2 provides a summary of key sample characteristics. 151 (75%) of 201 respondents were women, which is understandable given that Category 1 was meant to consist of women only, as explained above. The remaining 25% of the sample included men; additionally, 7 of 50 men had STEM education. Among STEM respondents (both women and men), the highest education was university-level. Non-STEM respondents had diverse education backgrounds: from basic (9 classes) school education with the least percentage of respondents to university level with the most respondents (Table 2).

In terms of age, STEM women were represented by those aged 20-28 years old, which is understandable given the survey criteria. Among the general population, respondents represented various age groups. For men, it was slightly more normally distributed than for women. 51% of respondents were from Bishkek city, and 49% were from Osh city (Table 2).

Further, considering that the survey focused on STEM women in the last year of their university programme, most of them were not married (85.15%) and did not have a child (95.05%). Among

the other three categories, most non-STEM men reported being married (67.44%) and having a child (67.44%). Regarding STEM men, 42.86% were married and had a child. Almost half of the non-STEM women said being married (46%) and had a child (48%) (Table 2). In other words, the findings presented in this report represent the views of respondents with the different family-related backgrounds.

Table 2: Sample characteristics

Sample characteristics	Men			Women		
	Non STEM	STEM	Total	Non STEM	STEM	Total
	n = 43	n = 7	n = 50	n = 50	n = 101	201
Respondents' education level						
Basic (9 classes) school education	2 (4.7%)	-	2 (4%)	1(2%)	-	1 (1.5%)
Secondary/ general (11 classes) school education	11(25.6%)	-	11 (22%)	6(12%)	-	6 (8.5%)
Secondary technical/special (college)	7(16.3%)	-	7(14%)	13 (26%)	-	12 (10%)
Bachelor's degree / University- Not finished/currently studying	6 (14%)	2(28.6%)	8 (16%)	12 (24%)	93(92.1%)	105(56.25%)
University (incl. bachelor, diploma, master) level	17(39.5%)	5(71.4%)	22 (44%)	18 (36%)	8 (7.9%)	26 (23.9%)
Respondents' age group						
under 20	2 (4.7%)	-	2 (4%)	8 (16%)	-	8 (5.3%)
20-28	13(30.2%)	4(57.1%)	17 (34%)	22 (44%)	97 (96%)	119 (78.8%)
29-39	15(34.9%)	1(14.3%)	16 (32%)	8(16%)	3 (3%)	11 (7.28%)
40+	13(30.2%)	2(28.6%)	15 (30%)	12(24%)	1 (1%)	13 (8.6%)
Respondents' place of residence						
Bishkek city	22(52.4%)	3(42.9%)	25 (51%)	29 (58%)	48(47.5%)	77 (51%)
Osh city	20(47.6%)	4(57.1%)	24 (49%)	21 (42%)	53(52.5%)	74 (49%)
Respondents' ethnicity						
Kyrgyz	35(81.4%)	7(100%)	42 (84%)	39 (78%)	96 (95%)	135 (89.4%)
Uzbeks	3 (7%)	-	3 (6%)	8 (16%)	4(4%)	12 (7.9%)
Russian				1 (2%)	1(1%)	2 (1.3%)
Other	5(11.639%)	-	5(10%)	2(4%)	-	2 (1.3%)
Marital status						
Married	29(67.44%)	3(42.86%)	32(64%)	23(46%)	15(14.85%)	38 (25.17%)
Single/not married	12(27.91%)	4(57.14%)	16(32%)	26 (52%)	86(85.15%)	112(74.17%)
Divorced	1(2.33%)	-	1 (2%)	-	-	-
I am in a relationship and we live together	-	-	-	1 (2%)	-	1 (0.66%)
Prefer not to answer	1(2.33%)	-	1 (2%)	-	-	-
Yes	29(67,44%)	3(42,86%)	32(64%)	24(48%)	5(4,95%)	29(19,21%)
No	14(32,56%)	4(57,14%)	18(36%)	26(52%)	96(95.05%)	122(80.79%)

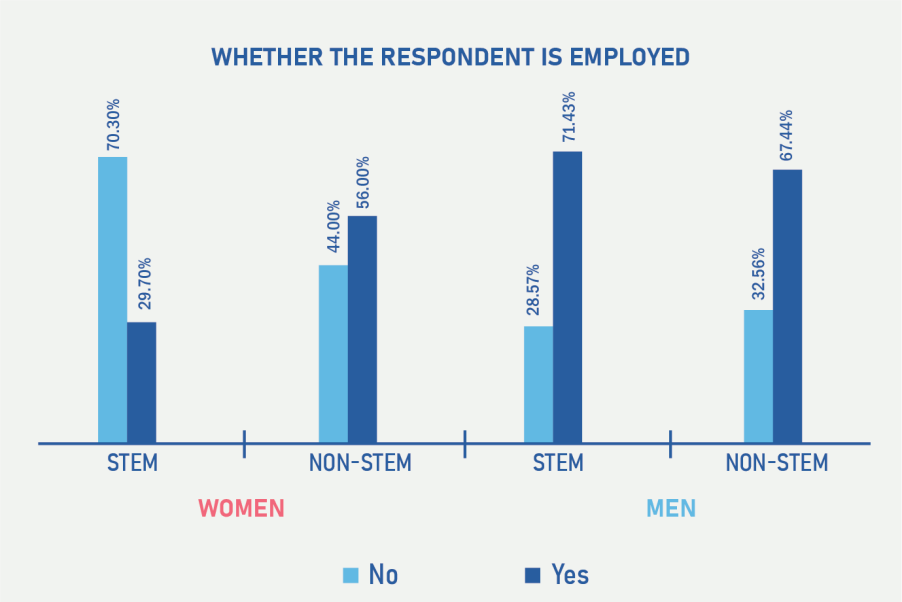


Figure 14: Employment status of survey respondents

Concerning employment, the least employed category was STEM women, which is understandable since the survey targeted students in the last year of their university programme in STEM fields. Those STEM women who were employed (29.70%) mainly worked in education, accounting/banking/finance, health, public services, computing/IT, and retail. Among non-STEM women, 56% were employed predominantly in such areas as accounting/banking/finance, business/consultancy/management, healthcare, retail, education, and marketing/advertising/PR. Among men, those in STEM reported slightly higher employment (71.43%) than non-STEM men (67.44%). STEM was mostly employed in engineering, computing/IT, property/construction, energy/utilities, law enforcement/security, and retail. Understandably, non-STEM men reported being employed in different fields, notably accounting/banking/finance, business/consultancy/management, retails, and transport/logistics (Figure 14).

5.5 DATA ANALYSIS

Quantitative data were analysed in SPSS 26 software. Before the data analysis, data cleaning and standard checks were carried out to ensure data was free of errors. Data checks also included examining extreme and implausible values patterns of missing data (i.e., checking if missing data was random or had specific patterns).

All the interviews were recorded with the permission of the research participants. The recordings were transcribed. Transcripts were coded using a *thematic approach*. The research team reviewed the recurrent themes and wrote up summaries for them. Quotes were used to demonstrate the findings presented in the report.

The quantitative and qualitative analyses were brought together to cross-validate and triangulate the findings and build upon each other's results. The team looked at where the findings from each method agreed and offered complementary information on the same issue or appeared to contradict each other. The procedures used for data verification, quality control, and ethics are described in Annex 3.

5.6 STRENGTHS OF THE STUDY AND AVENUES FOR FUTURE IMPROVEMENT

The key strength of the study was that it used a set of different data collection tools and data analysis approaches, such as a participatory approach, Social Network Analysis, public survey, design thinking workshop, in-depths interviews, future foresight, and a user's journey. The use of these tools and approaches enabled the research team to collect data from different sources and triangulate the findings. The use of a participatory approach (a human-centric design) allowed to ensure that voices of different STEM stakeholders are heard and included to this report.

At the same time, the study had a few limitations based on which a number of recommendations is made for future research projects. The study focused on the urban context only because it was a pilot study and aimed to experiment the tools and methodology before potenial scale-up. The study had a sample size of 201 people (50% - STEM and 50% - non-STEM) due its pilot nature. The sample size had only few representatives of various ethnic groups. The analysis did not have disaggregate findings by a marital status and number of children (if any). Section 7 provides a number of recommendations from a methodological perspective for future research on a similar topic.

6 FINDINGS

6.1 PATTERNS OF STEM WOMEN ON THEIR EDUCATIONAL AND CAREER JOURNEYS IN KYRGYZSTAN

The study showed that STEM women and girls could have different patterns of their educational and career journeys, which are shaped by various factors, notably self-efficacy, family, community, educational institutions, labour market, policies, and a broader social context in Kyrgyzstan (see Figure 15). As conceptualised in Section 4, self/self-efficacy, family, and community are contextual factors that lay the foundation of the Supply Side. Education and educational institutions are the core element of the Supply side. Labour market represents the core element of the Demand side (Figure 16). The collected data showed that some factors (e.g., self-efficacy, family) could play a more prominent role in STEM women's journeys than others. This set of factors can also have a positive impact on some STEM women/girls and a negative one on others. Consequently, these experiences shape the perception of STEM women/girls about their journey. For example, when survey participants were asked, "Who influences your career and employment decisions and plans the most?" 47% of STEM women said that their parents influenced their career and employment decisions and plans the most. When these respondents were asked if their parents supported their work and/or study in STEM, 76% said that their parents supported and encour-

Figure 15: Factors shaping patterns of STEM women on their educational/career journey in Kyrgyzstan

aged them to work and/or study in STEM. The remaining 24% said that their parents supported them to a moderate extent (16%) or did not support (8%). Further, 44% of STEM women (vs. 20% of non-STEM women) stated that it was their decision to pursue a career/education in STEM, indicating that women already in STEM may have a stronger sense of self-efficacy (i.e., belief that they have capacity/worth to be in STEM) and also showing that self-efficacy of non-STEM women/girls may need strengthening (discussed more below). Interestingly, only 9% of STEM women said that school/college/university teachers influence their career and employment decisions. Of this 9%, only half said their teachers supported their engagement in STEM.

The dynamic of responses among STEM men reflects the patterns of answers given by STEM women to some extent, mainly because around 43% of STEM men also said that their parents played an influential role in their decisions and plans around career and employment.

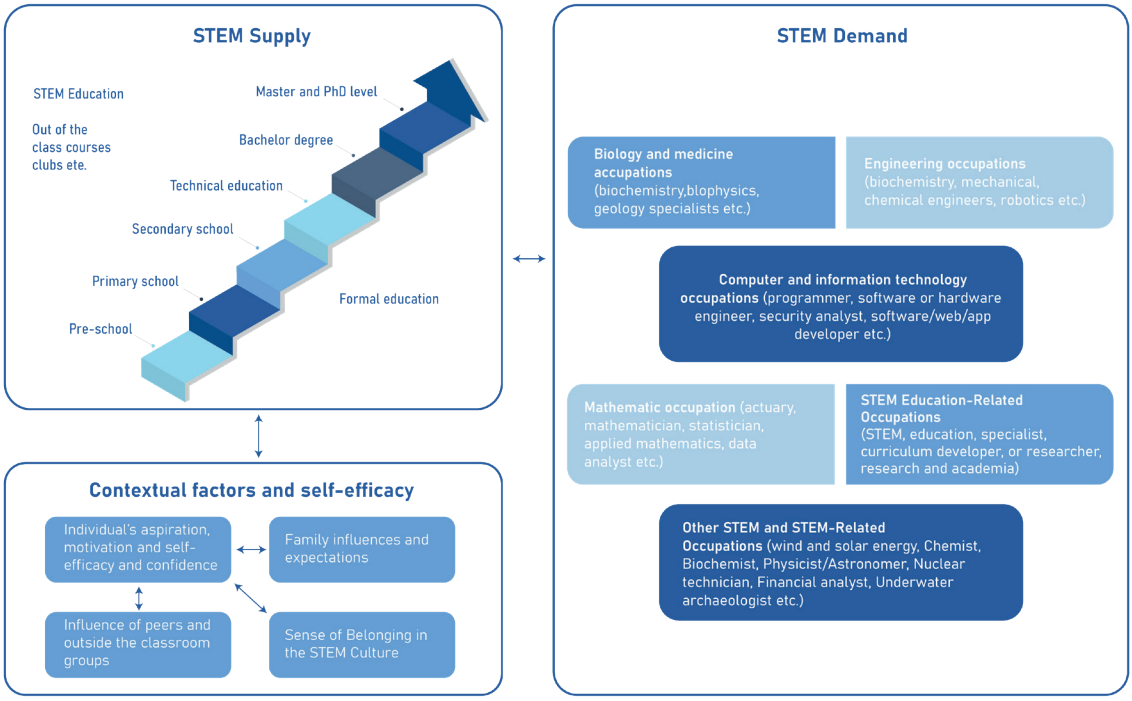


Figure 16: Illustration of the Supply and Demand sides

The trends in the responses of non-STEM women and men differ from those of their counterparts in the STEM group. These statistics provide valuable insights for designing interventions to attract more women into STEM and to support the transition from non-STEM to STEM. Table 3 shows that the decisions/plans of non-STEM women and men regarding their careers and development are influenced by several actors. Non-STEM women are influenced by their parents (38%), extracurricular activities (28%) and role models/celebrities they follow on social media (20%). Regarding the latter, when asked if role models/influential people they follow on social media support their involvement in STEM, all non-STEM women who selected this option indicated that these role models/influential people do not support their involvement in STEM. This is consistent with what was said repeatedly in the interviews and in a workshop with stakeholders, that there are very few role models of STEM women and limited storytelling about women's participation and success in STEM. As a result, the public is not aware of these women and their stories, which could play an important role in engaging more girls and women in STEM.

Table 3: Responses to the question, "Who influences your career and employment decisions and plans the most?" It was a multiple-choice question. Percentages do not add up to 100%

	Statement	Women		Men	
		STEM	Non STEM	STEM	Non STEM
1	Parents	46.50%	38.00%	42.90%	20.90%
2	It is my decision	44%	20%	14.30%	23.30%
3	School/University teachers	9%	14%	14.30%	7.00%
4	Extracurricular activities:clubs, courses, tutoring	8.90%	28%	14.30%	14.00%
5	Peers and friends	8.90%	14%	14%	18.60%
6	Class/group mates	4.00%	16%	14%	25.60%
7	Role-model/famous people that I follow on social media	3.00%	20%	0.00%	9.30%
8	Religious leaders	3%	10%	0%	9.30%
9	Government and its institutions	1%	4%	0%	9.30%
10	Do not want to answer	4%	6%	14.30%	18.60%

Self-efficacy (supply side: contextual and individual factors)

When asked what kept them going on their STEM journeys, the STEM women/girls interviewed attributed it to their qualities of perseverance, self-motivation, determination, and belief in their abilities and worth (i.e., self-efficacy). These women talked about persevering with their ideas, goals, and ambitions despite everything (e.g., opinions of others, norms, customs/traditions), as illustrated in the quotes from STEM women A and B. One of these STEM women strongly believed that having a "victim" mentality is not good and that one needs to show agency and use all the efforts available in their environment and work hard to achieve their goals. Nevertheless, STEM woman C's quote shows that they still face self-esteem issues, especially at the beginning of their STEM journey. In addition, although STEM women primarily linked their STEM journey to their attributes and self-efficacy, the discussion below will show that their family environment and parents/caregivers played a significant role in shaping their STEM journey.

"I have such a character [not caring for opinions of others] that I say "it's great that you have such opinions, well, live with it, I'm not going to argue with you, I'm not going to prove something". And what I advise girls. Go and dream and do what you want. There is no formula, no recipe, no truth, no secret, no one ingredient. It's just if you want something, work 24/7, and go for it even if you don't succeed." (STEM woman A)

"I was such a child all along who does what she wants and tries to achieve on her own. I wanted to study in the budget group. I was accepted to the contract group. My parents said that I can study in the contract group because they would pay. But I did not want to. I said that if my knowledge is not enough to study in the budget group, then I am not worth to study there. I have been stubborn since childhood" (STEM woman B)

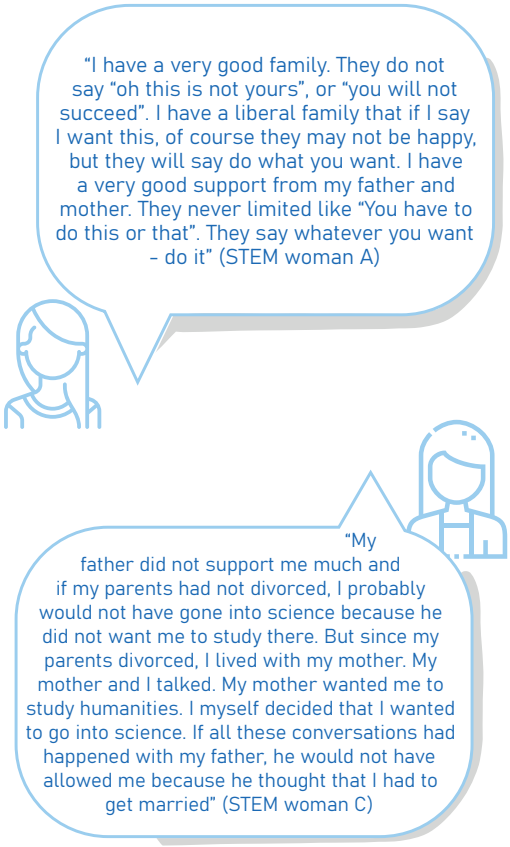
In addition, the statistics in Table 3 showed that non-STEM women may have lower levels of self-efficacy to engage in STEM. This was echoed in the interviews and in the design thinking workshop, where discussions indicated that low self-efficacy (belief in one's own ability) and self-esteem are significant barriers for girls/women to choose a STEM career/study. STEM woman C saw the roots of this problem in traditional upbringing. For example, as the quote illustrates, it is traditional to show respect, especially to

"Why soft skills are important, because I will tell you about my example. I had a traditional upbringing. We have a saying: "Girls don't talk loudly, don't laugh, don't ask questions." We didn't have such a thing that we could ask our grandparents a question. It wasn't normal. You have to respect your parents, and if you start asking something, it means that you don't respect them. This is especially true for girls. Our girls need to raise their self-esteem. I had to raise my self-esteem a lot in the beginning" (STEM woman C)

women/girls, by not speaking up in front of older people. She emphasizes that girls need to be supported to build their self-esteem and strengthen their voice. Other interviewees and workshop participants noted that women and girls also need to improve their soft skills, such as language skills, critical thinking and communication.

Family and Community (supply side: contextual and individual factors)

Supporting parents/caregivers were said to be important for women/girls to pursue STEM career or education. For example, STEM woman A shared that her family supported her decision to study a master's programme abroad and provided financial assistance for this, despite the fact that relatives were against it as they thought that STEM woman A should prioritise marriage. She also considered her parents' support exceptional because the parents of her friends did not allow them to study abroad[8]. Another example is STEM woman B, who highlighted that her family was liberal and never imposed restrictions on her, allowing her to pursue her goals (see quote)[9]. She particularly recognised her father's role, who she admired, because he was a kind person eager to support others[10].



In the case of the other two STEM women (C&D), their mothers played a prominent role in shaping their STEM careers. These STEM women came from families where their parents/caregivers experienced relationship issues (i.e., divorce, domestic violence, and women's economic dependence on men)[11]. In these families, mothers had to get employed later in life to become independent and provide better opportunities for their children. Thus, these mothers acted as role models for their daughters to pursue education, skill development, and financial independence. For example, the mother of STEM woman D had to travel to South Korea for work. This experience exposed her to the environment of advanced technologies. As a consequence, she encouraged her daughter (STEM woman D) to study software engineering[12]. Fathers of STEM women C and D did not encourage their STEM journey. For example, the father of STEM woman C openly did not want her to study STEM because he thought she would get married; thus, he did not see a point in pursuing education in STEM as it is a hard subject (see quote above)[13].

[8] Interview with STEM woman B, October 2022
[9] Interview with STEM woman A, October 2022
[10] Ibid
[11] Interviews with STEM women C and D, October 2022
[12] Interview with STEM woman D, October 2022
[13] Interview with STEM woman D, October 2022

The interviewees from schools extensively discussed the role of parents/caregivers. They emphasised that most parents in cities tend not to give freedom to their children in deciding their future profession. Parents make choices for their children without considering their talents and interests. As a result, children end up studying what they do not like and are not interested in, which they give up and do not pursue in the future[14]. Hence, teachers emphasised the significance of career coaching in schools, including workplace visits. For example, children do not have any idea what people with an engineering education do and, thus, cannot make an informed choice of their future profession.

The interviewed teachers also talked about the role of parents/caregivers in shaping the confidence and self-esteem of children. They noted that sometimes parents misjudge their children's abilities and do not see their talents and potential. As a result, they discourage them from taking up new fields of study or interest. Some parents neglect the academic and developmental aspects of child-rearing, especially in their child's adolescent years. This especially concerns girls since parents do not expect much from girls compared to boys. For example, STEM woman C shared that her parents' attitude was more indifferent toward her future than her brother's[15]. Against the backdrop of this context, participants of the workshop indicated that parenting courses should be provided in schools for parents to provide adequate support and encourage their children, especially daughters, to pursue their interests and do well in school[16].

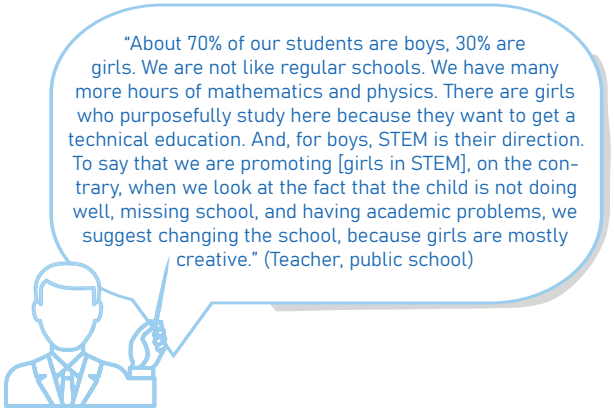
Further, as shown above, extended family members can also influence the journey of STEM women. For example, STEM woman A talked about pressure from her extended family to get married when she returned from abroad after completing her master's programme. Subsequently, she had to get married but managed to pursue her STEM career. Echoing this, comments in the survey showed that building and maintaining a family is seen as the prerogative of women, indicating that some members of the public may have a deep-seated belief that it is a woman's responsibility to care for her family. Such beliefs can explain the stereotypes discussed at the design thinking workshop that women cannot have a family if they have a STEM career.

Educational institutions (supply side)

The conceptual framework discussed in Section 4 showed that the STEM supply side comprises formal education (schools, colleges, universities) and informal education (out-of-the-class courses, clubs, and other initiatives). Interviews and workshop with STEM stakeholders made it clear that education reforms are necessary to promote STEM and girls' participation in it. This was also reflected in the survey where 54% of non-STEM women and 47% of non-STEM men said that the involvement of girls and women in STEM would not improve until radical changes are made in the education system (more discussion in future trends in Section 6.4). Discussions with STEM stakeholders pointed out that schools need better qualified and motivated teachers (especially in STEM), better pay for teachers, and up-to-date books, equipment, and infrastructure for STEM[17].

[14] Interview with the representative of schools in Bishkek and Osh cities, October 2022
[15] Interview with STEM woman D, October 2022
[16] Ibid
[17] Interviews and workshop with STEM stakeholders, Ocotber 2022
[18] Interview with a teacher from a private school, October 2022
[19] Interview with the representative of the private sector, October 2022

There were also some specific comments where schools can improve for better participation of girls in STEM. For instance, an interviewed teacher asserted that students at school should not learn individual subjects of STEM like mathematics and physics but rather have project-based learning to connect how STEM can help to solve real-life practical problems[18]. This was also noted by the interviewed representative of the private sector, who said that STEM on its own is unnecessary. STEM in the context of life is what matters. STEM should be accompanied by other soft skills like communication, responsibility, motivation, teamwork, meeting deadlines, and knowledge of languages (especially English). If a person with excellent knowledge in mathematics does not know how to apply it in real life and does not meet the work deadlines, which leads to dissatisfied clients, there is no need for such a specialist[19].



The importance of career counseling at school and a lack of workplace visit opportunities were common themes in the STEM stakeholders' discussions. Some STEM women interviewed talked about missed opportunities because they were unaware of the available professional options and opportunities[20,21]. STEM woman D said that she was not exposed to different IT facilities in school and, thus, did not choose IT at her university (even though she had an opportunity). She was not aware of what IT was about[22]. These insights from the qualitative data may explain that only 11% of survey respondents said that teachers/schools influence their decision-making around career plans.

Further, teachers may have gender biases and stereotypes, as illustrated by the quote where a teacher says that girls are creative and boys are for STEM. It also shows that teaching approaches may not necessarily meet the STEM needs of girls. It may be that girls need a different approach to increase their interest in STEM.

Regarding the out-of-class activities, the survey showed that they are important for STEM women/girls since 56% of the surveyed STEM women (highest among all participant groups, Figure 17) said that they took a training/course outside of their formal school, college, or university on IT, mathematics, physics, or chemistry. This suggests that such opportunities must be expanded and made available to girls. The interviews with STEM stakeholders showed that COVID-19 had accelerated the emergence of online STEM courses and teaching platforms[23]. One of the examples is IlimBox (Ilimbox.kg), launched in the recent few years, which provides STEM content in Kyrgyz. Easy Science is another example of online STEM content.

[20] Interview with STEM woman A, October 2022
[21] Interview with STEM woman D, October 2022
[22] Ibid
[23] Interview with a STEM women B, October 2022

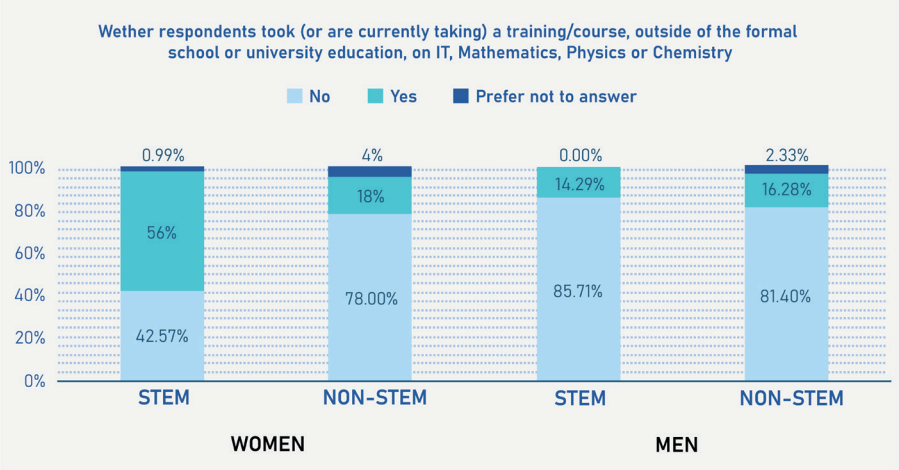


Figure 17: Responses to the questions "Did you take or are you currently taking) a training/course outside of the formal school or university education in IT, mathematics, physics, or chemistry?"

In relation to the universities, interviewees shared that universities with STEM education should ensure that their teaching material is up-to-date since STEM is a dynamic field that develops quickly, especially with the advancement of technologies. For example, all of the interviewed STEM women studied abroad to obtain adequate knowledge in their area. Further, universities should build a better link with the private sector to ensure that their students are equipped with the knowledge and skills demanded in the labour market[24]. For example, STEM woman A noted that a Public University where she studied chemistry did not necessarily make her appreciate that chemistry is an interesting subject and can be helpful for people. She got to know this when working on environmental issues. She understood what her topic was all about, which strengthened her interest and commitment. This indicates a strong need for linking education and works placement to increase and sustain the interests of women/girls in their STEM career. Making the subjects interesting and showing their practical usage and benefit to people's needs motivates women to work in these fields.

Labour market (demand side)

A poor STEM labour market is an off-putting factor that disengages women from STEM in Kyrgyzstan. For example, one of the interviewed STEM women said that when she returned from abroad after completing her master's programme, she could not find employment in STEM, and as a result, she had to leave abroad again.

> ***"When I returned, I had expectations that I was such a good specialist, with such a good education, with knowledge of English. I thought that I would find a job here without problems. But I faced the reality that it was impossible to find a job here. I applied for all the vacancies that are possible. When I saw this reality, I was very upset"*** (STEM woman B)

However, interviewees noted that the labour market could be different depending on the STEM area. For example, the IT area has expanded in Kyrgyzstan. Interviews showed that, with the time and development of various sectors, STEM skills are needed more in Kyrgyzstan. Different sectors of labour market are becoming more automated and digitilised using modern equipment requiring specialised skill and knowledge. For example, the same interviewee, who could not find a job after her master's degree, was more successful in finding a job the second time she returned from abroad as she was invited to launch new equipment in the Centre of Diagnos-

tics and Expertise. Another example is a private sector company that used to provide financial services. However, with the development of IT, their clients want new financial services that are up-to-date and integrate the innovation offered by IT. Thus, they had to expand the range of their services to include IT-based products in finance that require people with different sets of knowledge and skills[25]. Hence, IT is becoming an essential skill for everyone to have[26]. Moreover, interviews indicated that the emerging IT companies established and run by women also tend to have teams consisting mostly of women. This might be due to the belief that women would be promoted faster in companies run by women[27].

Despite this, the numbers of women and girls applying to IT positions remain low[28]. The interviewed IT company claimed that they have a recruitment procedure that does not discriminate because the recruitment is based on merit. Moreover, they have quotas for women that they strive to achieve - 45% of their employees should be women. However, currently, only around 30% of the employees are women because there are very few applications from women in the first place[29]. This may be due to the fact that women/girls do not feel competent enough to apply due to lower self-esteem. This was a lesson learned from one of the interviewees. When recruiting staff with IT skills, his team put a note that "girls are encouraged to apply". As a result, one girl applied who said that she normally would not apply for such IT vacancies. However, since there was a note that girls were encouraged to apply, she was motivated to apply[30]. Such best practices can be used to increase applications from women and girls.

Employment options around hard science, such as chemistry and engineering, are limited, and those which are available may not necessarily be conducive for women with children. For example, interviewees noted that it would be difficult for women engineers with children to go away for a few days to the mining area for work[31]. Another STEM woman (D), who was involved in engineering, also said that she had to move to non-STEM work to maintain her personal life. She also noted that engineering is not well developed in Kyrgyzstan as there are no laboratories and equipment, and thus, limited employment options. The limited participation of women in hard STEM employment is evident from the statistics, which indicate that men constitute 84% of employees in the mining industry, 91% in the production of gas, electricity, and water, 89% in the transport and communication, and 97% in construction. Meanwhile, women predominantly work in health and social services (84% are women), education (81%), and hotels and restaurants (58%)[32].

Further, interview and workshop discussions identified that STEM women face a problem with promotion at their workplace. For example, a MoES representative noted that, even though there may be many candidates of science among women, there are very few high-level women scientists. This interviewee thought that this was due to the family responsibilities of women. He said that while men do their research in 4 years, it may take up to 10 years for women to do it because she has children on the way and go on maternity leaves[33]. Thus, he noted that women need sup-

[24] Interview with a representative of a private company, October 2022
[25] Interview with the representative of the private company, October 2022
[26] Interviews with STEM woman D and an NGO leader, October 2022
[27] Interview with a representative with a IT company, October 2022
[28] Interviews with STEM woman B and a representative with a IT company, October 2022
[29] Interview with a representative with a IT company, October 2022
[30] Interview with a representative of the non-profit initiative, October 2022
[31] Interview with STEM woman B, October 2022
[32] ADB (2019) Kyrgyz Republic: Country Gender Assessment. Available at https://www.adb.org/sites/default/files/institutional-document/546966/kyrgyz-republic-country-gender-assessment-2019.pdf
[33] Interview with the representative of MoES, October 2022

port from their families as well as institutions. Moreover, if speaking only about science, salaries are small. As a result, women do not see any financial motivation to continue their work on their science projects after their maternity leave since the prospect of a high-paid job is minimal, and women opt for staying at home rather than working[34]. Nonetheless, it was also said that when women get older, and their childbearing responsibilities subside, some of them return to their projects and can continue their participation in STEM[35]. Other problems faced by STEM women indicated in the comments in the survey include the fact that men in STEM do not take women's participation and contribution in STEM seriously and tend to give administrative tasks related to documents.

Policies

STEM stakeholders said at interviews and workshop discussions that policies promoting gender equality are important for promoting women's participation in STEM. In particular, workshop participants assessed that Kyrgystan has an adequate legislative and policy framework for gender equality. They emphasised that according to the legislation, there should not be any gender-based discrimination. Thus, everyone who wants to engage in science can do so without any barriers[36]. However, the issue is that gender equality legislation and policies are not implemented fully in practice. For this reason, the workshop participants identified this gap between the legislation and its implementation as one of the root causes of women's limited participation in STEM.

A rapid review of the literature on policies identified that women's/girls' participation in STEM is part of the main gender-related policy documents. Kyrgyzstan ratified several key international human rights convention on human rights and gender equality, notably the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) in 1997 and the Optional Protocol of CEDAW in 2002. The constitution of the country guarantees human rights and gender equality. In August 2008, Kyrgyzstan adopted a law, "On State Guarantees of Equal Rights and Equal Opportunities for Men and Women," which was passed in August 2008 and is the key legislative document that aims to ensure equality between women and men. There is a national strategy for gender equality until 2030 and a national plan for the promotion of gender equality for 2022-2024. These documents have overarching five aims: 1) economic empowerment, 2) cultural policy and functional education, 3) strengthening protection against gender discrimination and fair justice, 4) promotion of gender parity in decision-making and development of women's political participation, and 5) regulatory policy[37].

While STEM is not recognised as a separate priority in the National Plan, it is included to some of the priorities. Notably, under its priority on economic empowerment, the National Plan has such actions as (i) organising activities at the local level for professional/career counseling for economically inactive women of working age, (ii) revising the list of prohibited professions for women, (iii) introducing quotas women students at higher education institutions in such areas as environment and livelihoods, agriculture and fisheries, energy, technical machinery, and equipment, (iv) running mentoring programmes with the involvement of the High-Tech Park on online entrepreneurship, (v) running career guidance and mentoring programme for girls, (vi) conducting training and courses for women in rural areas on IT. Under the priority on the rights, obligations, and service access of workers, employers, and labor migrants, the National Plan has such

[34] Interview with the representative of a Public University, October 2022
[35] Ibid
[36] Interview with the representative of the National Academy of Science, October 2022
[37] Government of Kyrgyz Republic (2022) Decree on the National Strategy of the Kyrgyz Republic on the promotion of gender equality until 2030 and [39] National Plan on the promotion of gender equality in the Kyrgyz Republic for 2022 - 2024. ADB (2019) Kyrgyz Republic: Country Gender Assessment. Available at https://www.adb.org/sites/default/files/institutional-document/546966/kyrgyz-republic-country-gender-assessment-2019.pdf

activities as (i) creating an IT hub in Osh for youth and women to learn various digital skills for the development of the digital economy, (ii) conducting Training of Trainer on new educational standards and subjects (artificial intelligence, cybersecurity, neural networks, mechanical engineering) for Kyrgyz State Technical University and Osh Technical University, (iii) conducting training on blogging and YouTube[38].

However, the review of the literature also indicated that the issue is that legislative and policy documents are not fully implemented. For example, the CEDAW observations on the implementation of gender policies in Kyrgyzstan in 2015 indicated that there is a lack of political will to implement gender commitments, coordination across various bodies assigned responsibility for the implementation is weak, and the responsible bodies also lack the capacity and authority to implement gender policy[39]. The weakness of poor implementation of the policies on gender equality was also noted in the introduction of the National Plan on Gender Equality for 2022 - 2024[40].

Societal context

On a societal level, stereotypes and gender norms have been repeatedly indicated by study participants as barriers for women/girls to advance in STEM careers/education. In particular, stereotypes were identified at the design thinking workshop as one of the root causes of poor engagement of women in STEM careers/education. These stereotypes are a set of behaviour that people believe women should adhere to. They appeared to shape women's life decisions. For example, one of the interviewed STEM women said that when her mother offered her to study software engineering, she did not want to pursue this option because she thought that this would make her less attractive to men as a potential wife[41]. She also believed that girls needed to choose humanitarian/social science subjects. This respondent noted that this stereotype was so naturally ingrained in her thinking that she did not even understand to what extent they impacted their choice and decision. This example is important to see that girls at the point of decision-making may be guided by the stereotypical thinking perceived to be prevalent in society, which is difficult to even grasp that they have. This also means that gender norm discussions at schools could help girls think critically about rules and expectations in their communities to understand how they limit or empower them. Some STEM women asserted that such types of discussions around gender norms should start in preschool because children start developing gender perceptions already at that point.

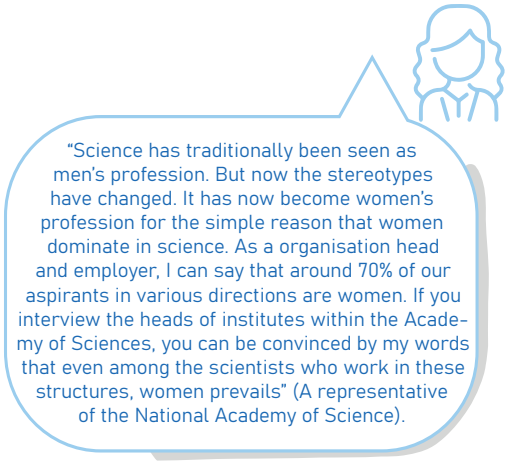
The point about girls being expected to study humanitarian/social science subjects was also shared by the interviewed teachers. They said that parents/caregivers doubt if they can send their daughters to STEM extra-curriculum activities such as robotics[42]. They also talked about parents investing more in the education of their sons rather than their daughters because the former is a future breadwinner, while the latter will get married, and STEM subjects are difficult for girls[43].

[38] Government of Kyrgyz Republic (2022) Decree on the National Strategy of the Kyrgyz Republic on the promotion of gender equality until 2030 and National Plan on the promotion of gender equality in the Kyrgyz Republic for 2022 - 2024.
[39] ADB (2019) Kyrgyz Republic: Country Gender Assessment. Available at https://www.adb.org/sites/default/files/institutional-document/546966/kyrgyz-republic-country-gender-assessment-2019.pdf
[40] Ibid
[41] Interview with STEM woman D, October 2022
[42] Interview with the representative of school, Osh city, October 2022
[43] Interview with the representative of school, Osh city, October 2022

Religion and the interpretation of religious texts were also discussed by the research participants. Some interviewees noted that some religious leaders might be promoting norms that do not respect the rights of women (e.g., promoting marriage among girls below the age of 18) and are against the available gender and human rights legislation in Kyrgyzstan[44]. These insights from the interviews are echoed in the literature. For example, a recent Country Gender Assessment by Asian Development Bank (2019)[45] also indicates a resurgence of conservative gender norms and stereotypes in Kyrgyzstan that portray women mainly as mothers and wives. In line with this, there were survey participants who said in open comments that women's/girls' primary goal was to be a mother and a wife (a care-giver) and that they could work in any field, including STEM, but only with the permission of their husbands (care-providers). Quote 3 shows that the rationale for such a view is religion, as providing for women is the men's responsibility according to the Shariat and, thus, women should get their husband's permission to work:

"Women should first think about their families" (STEM man, survey comment)

"In principle, women can work. However, it should be based on Shariat. She can work if her husband allows her and if she manages to do everything around the house. It is better if she works where there are many women and fewer men not to mingle with. In principle, it is the responsibility of men to provide for women. If the man allows his wife to work, it is fine. That is why the question is not whether she can or cannot work [the question is whether her husband allows or does not allow]" (non-STEM man, survey comment).



"Women do a much better job than men. Women can work. But, of course, with the permission of her husband" (non-STEM woman, survey comments)

[44] Interview with the representative of the National Academy, October 2022
[45] ADB (2019) Kyrgyz Republic: Country Gender Assessment. Available at https://www.adb.org/sites/default/files/institutional-document/546966/kyrgyz-republic-country-gender-assessment-2019.pdf

6.2 WHY DO FEWER WOMEN AND GIRLS CHOOSE STEM EDUCATION AND CAREERS (ROOT CAUSE PROBLEM)?

When asked what prevents women/girls from building a career in the fields that require strong skills in Mathematics, Physics, Information Technology, Engineering, and Chemistry, responses of STEM and non-STEM groups were different, indicating that their perceptions of the situation around womens'/girls' participation in STEM have many differences.

For example, 66% of surveyed STEM women and 57% of surveyed STEM men thought that women/girls did not think that there were any barriers at all. The reason for this may be that every STEM environment has women and men (though the numbers may be misbalanced), and, as a result, once men or women are in STEM, their working environment becomes a norm. For example, men interviewed by the MoES and the National Academy of Science said that participation of women in STEM is not an issue because most of the candidates in science (reported to be 70%) were women. In fact, the interviewee from the MoES insisted that the promotion of STEM should be not only for women but for the whole public because the interest in science in Kyrgyzstan was not great[46]. Moreover, he did not see any gender biases in the families and parenting. Similarly, his counterpart in the National Academy of Science asserted that science does not know gender and that is why everyone is equal in science[47].

Women interviewees from STEM educational institutions also expressed similar views. For example, a school teacher noted that traditionally only men had taught mathematics and physics in their school. However, lately, all the new teachers who come to their school have been women. The university lecturer also stated that most of her candidates for science and students were women. At the design thinking workshop, a similar statement was made by a woman representative of a public STEM university who said that she never realised that the participation of girls in STEM was an issue. In addition, as discussed in Section 6.1, women who succeed in STEM may have a strong sense of self-efficacy which may explain the fact that they do not see any barriers. The responses of non-STEM women and men followed a different pattern than those of STEM women and men. Their answers are very important for promoting women's/girls' participation in STEM because these statistics provide supporting evidence for the discussion above around key factors impeding womens'/girls' participation in STEM. In contrast to the surveyed STEM women and men, only 32% of non-STEM women and 37% of non-STEM men said they did not see any barriers. Thirty percent of surveyed non-STEM women and 23% of non-STEM men thought that women/girls could not advance in STEM because men were intellectually superior to women in STEM (Table 4). Interestingly, non-STEM men had the largest percentage among all four groups who said that STEM subjects were difficult for women/girls. These numbers show the existence of gender stereotypes in society, as discussed above. Next, 24% of surveyed non-STEM women and 23% of surveyed non-STEM men thought parents did not allow their daughters to pursue employment in these fields because they were male-dominated, and 12% of non-STEM women thought that boys got more support and encouragement from parents/teachers on STEM than girls. These statistics support the above-stated idea that some parents do not consider STEM to be appropriate for girls/women. Eighteen percent of non-STEM women (vs. 12%) thought that schools do not provide enough support to girls to advance in STEM, indicating that the education system requires reform to meet the STEM needs of girls better, as stated above (Table 4).

[46] Interview with the representative of MoES, October 2022
[47] Interview with the representative of the National Academy of Science, October 2022

Table 4: Responses to the question "In your opinion, what prevents women/girls from building a career in the fields that require strong skills in Mathematics, Physics, Information Technology, Engineering, and Chemistry?"

	Statement	Women		Men	
		STEM	Non STEM	STEM	Non STEM
1	I do not see any barriers at all	66.30%	32.00%	57.10%	37.20%
2	I think that boys get more support and enco uragement from parents/teachers on these subjects than girls	15.80%	12%	0%	9.30%
3	I think that men intellectually superior to women in these subjects	10.90%	30%	14.30%	23.30%
4	I think that schools do not provide enough support to girls to advance in STEM subjects	8.90%	18%	14.30%	11.60%
5	I think that parents do not allow their daughters to pursue employment in these fields because they are male-dominated fields	6.90%	24%	0%	23.30%
6	I believe these fields take too much of time and energe and will interfere to build a family	4%	6%	2%	0.00%
7	I think that these subjects/field are difficult for women/girls	2%	14%	14.30%	20.90%
8	I think that females do not need hard jobs as earning money is their husband's responsibility	1%	0%	0%	9.30%
9	I think women are not carable to take leading positions in STEM	1%	0%	0%	2.30%
10	Other	2%	4%	14.30%	2.30%
11	Do not want to answer	3%	2%	0%	0%

6.3 PUBLIC PERCEPTION OF STEM WOMEN AND GIRLS IN KYRGYZSTAN

When asked about the perceptions of girls and women pursuing STEM careers and education in the country, the majority of survey participants from all groups expressed that it was ultimately up to women and girls themselves to decide their career paths, and that societal opinions or concerns were not significant. Around a quarter of STEM and non-STEM women thought that STEM women were admired as strong and independent women/girls. Men in both categories were less of this view, as only 14% of STEM men and 16% of non-STEM men agreed with this statement. Interestingly, 14% of non-STEM men also thought that STEM women were looked down at as being in STEM for women was not normal or widely accepted in society as these subjects were not for women (Table 5).

Table 5: Resposes to the questions "In your opinion, how do people in the country perceive girls and women who pursue careers and education that require strong knowledge in Mathematics, Physics, Chemistry, engineering, and Information Technology?"

	Statement	Women		Men	
		STEM	Non STEM	STEM	Non STEM
1	I think that nobody cares, as this is down to women/girls themselves to choose what they will do with their lives	51.5%	52.0%	57.1%	62.8%
2	I think they are admired with, as they are strong and independent women/girls	31.7%	32.0%	14.3%	16.3%
3	I think they are looked down at, as this is not normal or not widely accepted in society as these subjects are not for women	9.9%	6.0%	0.0%	14.0%
4	Do not know/Prefer not to answer	1.0%	6.0%	14.3%	4.7%
5	Other	5.9%	4.0%	14.3%	2.3%

In the survey comments, the STEM men who participated highlighted the importance of acknowledging women's and girls' rights to pursue their chosen vocations and work in fields that align with their interests and provide economic opportunities. They emphasized the growing significance of IT in today's world, emphasizing the need for both girls and boys to study and engage in this field.

> ***"Girls have rights. Every girl has a right to find her path in life"*** (STEM man, survey comment)

> ***"IT is very popular now. Our life is connected very much to technology, that is why all young people should study IT, no matter girl or boy"*** (STEM man, survey comment)

> ***"My two daughters work in IT. Through this job, they do what they like and earn a living. One should not put restrictions on girls. There is nothing better than doing well in the area that one loves"*** (STEM man, survey comment)

Non-STEM women also shared this point of view on the importance of IT in the current times. As the quote below demonstrates, these women also noted that women/girls are becoming more independent because old stereotypes around STEM are disappearing, and people are more aware of IT jobs.

> ***"Lately, I have seen and heard that women/girls are becoming independent. There are no restrictions like before. There are less of such sayings like "you should sit at home. Do not do this because this is men's work". I cannot say that this is totally gone. 60-70% of the population started understanding about IT"*** (non-STEM woman, survey comment)

6.4 HOW DO STEM WOMEN ENVISION THE FUTURE TRENDS IN THEIR COMMUNITY?

When asked about future trends in women's/girls' participation in STEM, 85% of surveyed STEM women expressed optimism, believing that more women/girls would naturally enter STEM due to living in an open and democratic society without the need for special support. STEM men (72%) were the second group adhering to this point. The next group with a similar outlook was non-STEM women (62%). Lastly, only half of the non-STEM men agreed with this statement. In

other words, despite having relatively high percentages, non-STEM men and women were less optimistic about this than STEM women and men (Table 6).

Further, STEM (88%) and non-STEM (84%) women almost equally agreed that if women and girls received adequate support and encouragement, their participation in STEM would improve. Men, especially non-STEM ones, were less of this opinion; though, it should be emphasised that the percentages of men who agreed with the statement were still relatively high (63% for STEM men and 57% for non-STEM men) (Table 6).

The next point that deserves a discussion is the fact that a much higher percentage of non-STEM women (54%) and men (47%) than STEM women (38%) and men (27%) said that radical reforms need to be implemented in the society and education system to increase women's/girls' participation in STEM. This again supports the idea consistently emerging from the data that STEM men and women may not necessarily see the full range of barriers preventing women and girls' participation in STEM. It also means that the obstacles for half of the non-STEM women are the current situation in society and the educational system (Table 6).

Table 6: Responses to the questions "To what extent do you agree or disagree with the following statements?"

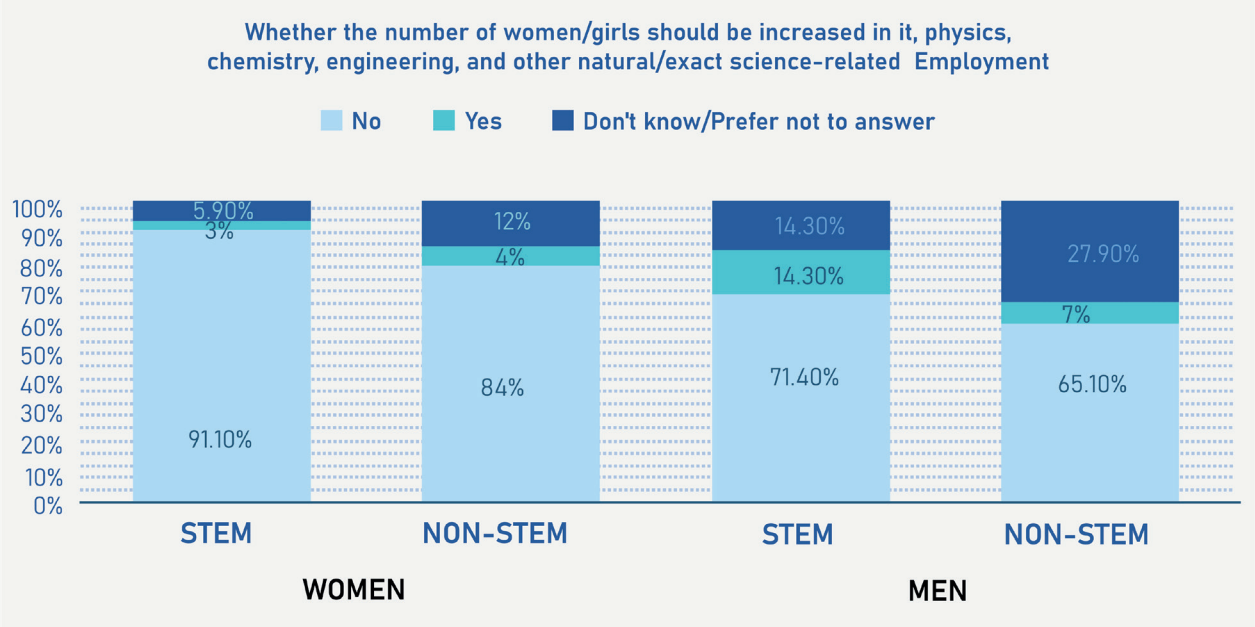
	Statement	Women		Men	
		STEM	Non STEM	STEM	Non STEM
1	More women/girls will enter STEM as we live in an open and democratic special support to women/girls	85.20%	62.0%	71.50%	51.20%
2	Women's/girl's participation in STEM can improve when adequate support and encouragement for girls/women are provided	88.10%	84.00%	62.80%	57.20%
3	The situation of limited participation of women/girls in STEM will not change until radical reforms are implemented in society and in the education system	35.70%	54.00%	28.60%	46.50%
4	The situation of limited participation of women/girls in STEM will get worse as our society becomes more traditional	24.70%	46.00%	28.60%	37.20%
5	There is no need to do anything regarding women's/girl's participation in STEM as the current situation is absolutely fine	31.70%	36.0%	28.60%	27.90%

The survey respondents were also asked if the number of women/girls should be increased in STEM. As can be seen from Table 7, women, especially STEM ones (91%), thought that the number of women in STEM should be increased. In the open comments, women commented that participation of women/girls in STEM would benefit the whole society to grow and people to advance intellectually:

> ***"As far as I am concerned, it is wrong to say that women should be below men and that they should stay at home. I am really against this. This is because every person has a right to decide what to do with their life. Whatever men can do, we [women] can do too. It is wrong to say, "no, you cannot do it; girls should stay at home." It is absolutely wrong. On the contrary, we should support and encourage girls and create the conditions for girls [to participate in STEM]. Only then will our country develop, and our people will grow intellectually"*** (non-STEM women, survey comment)

Men were also of this opinion but to a lesser degree, especially non-STEM men (65%) (Table 7). This suggests that non-STEM men consistently express views that are less supportive of women's/girls' participation in STEM (though the situation is not as glim since the percentages are still relatively high, indicating that there is a strong basis to build on the promotion of women's/girls' participation in STEM).

Table 7: Responses to the question "In your opinion, do you think the number of women/girls should be increased in IT, Physics, Chemistry, Engineering, and other natural/exact science-related employment?"



During the interviews, various stakeholders resonated with the perspectives shared by certain survey participants, indicating a synchronization in public views and a consensus on the potential sources of future employment. For this reason, they emphasised that for Kyrgyzstan to develop, it needs a labour force qualified in STEM[48]. In all, the interviewed stakeholders thought that the participation of women/girls in STEM would only increase because of the time demands. STEM women talked about changes in the perceptions of women and that more women are coming to understand that their role is not only to look after children and stay home and that they can self-realise and develo[49].

[48] Interview with a teacher from the private school, October 2022
[49] Interview with a STEM woman, October 2022

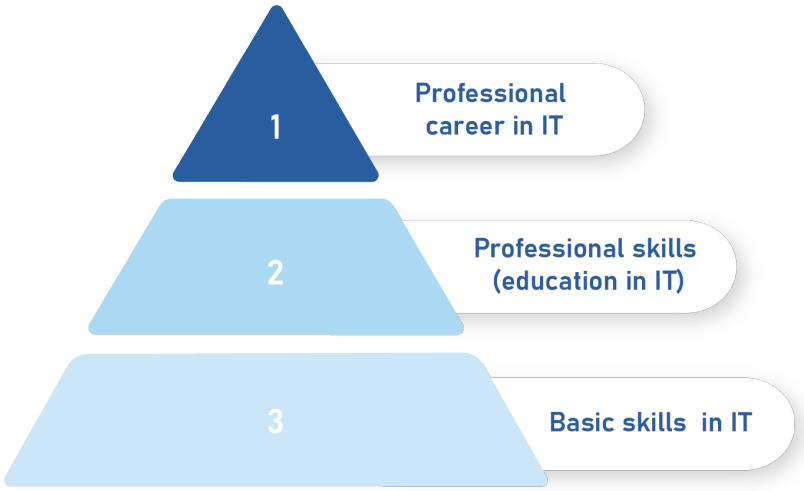


Figure 18: Pyramid of IT skills

Only one interviewee (men) thought that the trend was negative. He thought that the participation of women/girls in the social, political, and economic areas of life has declined, which may be due to the rise of religiosity. Despite this, this interviewee said that IT skills are paramount now for everyone, especially women, to access the benefits of the economy. He said everyone needs to have basic IT skills to use different social media platforms and electronic communication tools and ensure digital security. Thus, his initiative works on that level so that women and girls have the essential IT skills and decide if they want to advance in this area, as shown in Figure 18[50].

6.5 WHO ARE THE STAKEHOLDERS IN THE ECOSYSTEM OF THE STEM COMMUNITY IN KYRGYZSTAN?

Through a combination of desk study, key informant interviews with STEM stakeholders, and a stakeholder workshop, a total of 95 stakeholders operating within the STEM community ecosystem in Kyrgyzstan were identified during the research process. Broad eight categories of the stakeholders emerged during the analysis: 1) government institutions, 2) international organisations, 3) NGOs and not-for-profit organizations, 4) private companies, 5) private schools, 6) non-public universities, 7) public institutes/research centres/academies, and 8) religious institutions. The names of these organisations are provided in Table 8 and other details, such as telephone numbers, websites, and social media accounts, are provided in Annex 6.

[50] Ibid

Table 8: List of STEM stakeholders

1. Government institutions	2. International organisations	3. NGOs and not-for profit initiatives	4. Private companies	5. Private schools	6. Non-public Universities	7. Public institutes/universities/research centres/academies	8. Religious institutions
Ministry of Education and Science (MoES); Teachers' qualification center under MoES; Ministry of Energy; High Technology Park; National Academy of Science; Kyrgyz Patent; State Agency for Protection of Personal Data; Education Department of Bishkek City Administration; Local self-governance bodies	World Bank; GIZ; UNESCO; UN WOMEN; US Embassy; UNICEF; UNDP; JICA	KSSDA (Kyrgyz Software and Services Developer's Association); Kyrgyz Space Program; Forum of Women's NGOs; Women Support Center; Bishkek Feminists Initiatives; Union of Women Entrepreneurs of Kyrgyzstan; Women's League of Central Asia; Demilgeluu Ishker Ayaldar; Small Hydropower Association; ProKG; Otunbaeva Foundation; Center for Protection of Children; TSI (Chemistry); TechAim; Peritech; Internet Kyrgyz Society; Civic Platform; Association of Women in Energy; Electric Stations JSC National Energy; Network – Education Center; BioTech; WE Central Asia; Erkinkyz; TechWoman; Innovation Laboratory; Weincrypto; MUGALIM; KG Analytics; Agency for quality assurance in education "EdNet"; Nazyk Kyz; Future of Country; Association of Creative Industries; Ilimbox	IT Academy; Neobis; Codify; Namba One; Digital Business and Distant Banking Services; IT Attractor	Kyrgyz-Swedish Mathematical School; "U-create" center in Osh city; "Ail school" in Osh city; Salymbekov Business School; UniCode Coding School	American University of Central Asia; Technical School of Innovation AUCA; University of Central Asia	Kyrgyz State Technical University; Kyrgyz-Slavic University; Osh Technological University; Kyrgyz Lead Institute for Engineering Surveys; Kyrgyz Academy of Education; Children's Engineering, Technical Academy "Altyn Tuiun"; Innovation Centre; Institute of Communications and Information Technology; High-Mountain Observatory of Atmospheric Physics of KRSU; Typhoon Scientific-Engineering and Educational Center "SPEKTR"; Nanotechnology Center; Design Bureau "New Technologies for High-Mountain Quarries"; Research Institute of Physical and Technical Problems; Research Institute of Chemical Technology; Research Institute of Fundamental, Applied Research and Innovative Technologies at ZhASU; Research Institute of Innovative Technologies at KUU; Research Institute at the NSU; Institute of Fundamental and Applied Research at Osh State University; Research Center for Biotechnology and Biodiversity; Institute of Natural and Technological Sciences at BatSU; Institute of Automation and Mechanical Engineering; Institute of Mathematics Institute of Physics, National Academy of Sciences of the Kyrgyz Republic; Institute of Biotechnology Institute of Chemistry and Phytotechnology; Research Institute of Energy and Economics at SCPEN	Muftiat; Religious Affairs Committee; Kyrgyzstan's Islam University

As explained in the Methodology section, participants of the STEM design thinking workshop were asked to individually identify key stakeholders in STEM and assess their power/influence and interest in the promotion of women's/girls' participation in STEM (Figures 19-20).

Figure 19: Stakeholder session. Photo A

Figure 20: Stakeholder session. Photo B

The outcomes of this analysis are presented in the Figure 21. The large group is the government institutions such as the Ministry of Education and Science (MoES), the Teachers' Qualification Center (TQC) under MoES, and others (see Figure 21). The role of MoES and TQC was contested among workshop participants. The agreement was that these institutions have high power/influence on women's/girls' participation in STEM. However, their interest was assessed differently - from mid-low to mid-high (Figure 21). In the case of other government institutions, such as the National Academy of Science, its power/influence and interest were rated low. Local self-governance bodies were also in the lower half of Figure 21, indicating that they have middle-range power but low interest in promoting women and girls in STEM. This analysis demonstrates that government bodies at the national and local levels can be closely engaged and empowered with awareness-raising support (depending on their functions) (Figure 21).

The group also includes public institutes/universities/research centres (Table 8). These actors are the least engaged in promoting women's and girls' participation in STEM. A few representatives of this group were interviewed. As explained above, since they have women employees/researchers, they did not consider the participation of women in STEM to be an issue. Further, most of these institutes, universities, and research centers did not come up during the stakeholder analysis session at the workshop with the stakeholders. Only Kyrgyz State Technological University (KSTU) was indicated in the Interest-Power/Influence matrix by the workshop participants. In other words, out of all actors in this group, only KSTU was considered a key one. As shown in Figure 21, KSTU was rated to have high power/influence but low interest in the participation of women in STEM. This analysis indicates that KSTU and other public institutes/universities/research centres/academies, such as Kyrgyz Academy Education, need empowerment and awareness-raising (Figure 21).

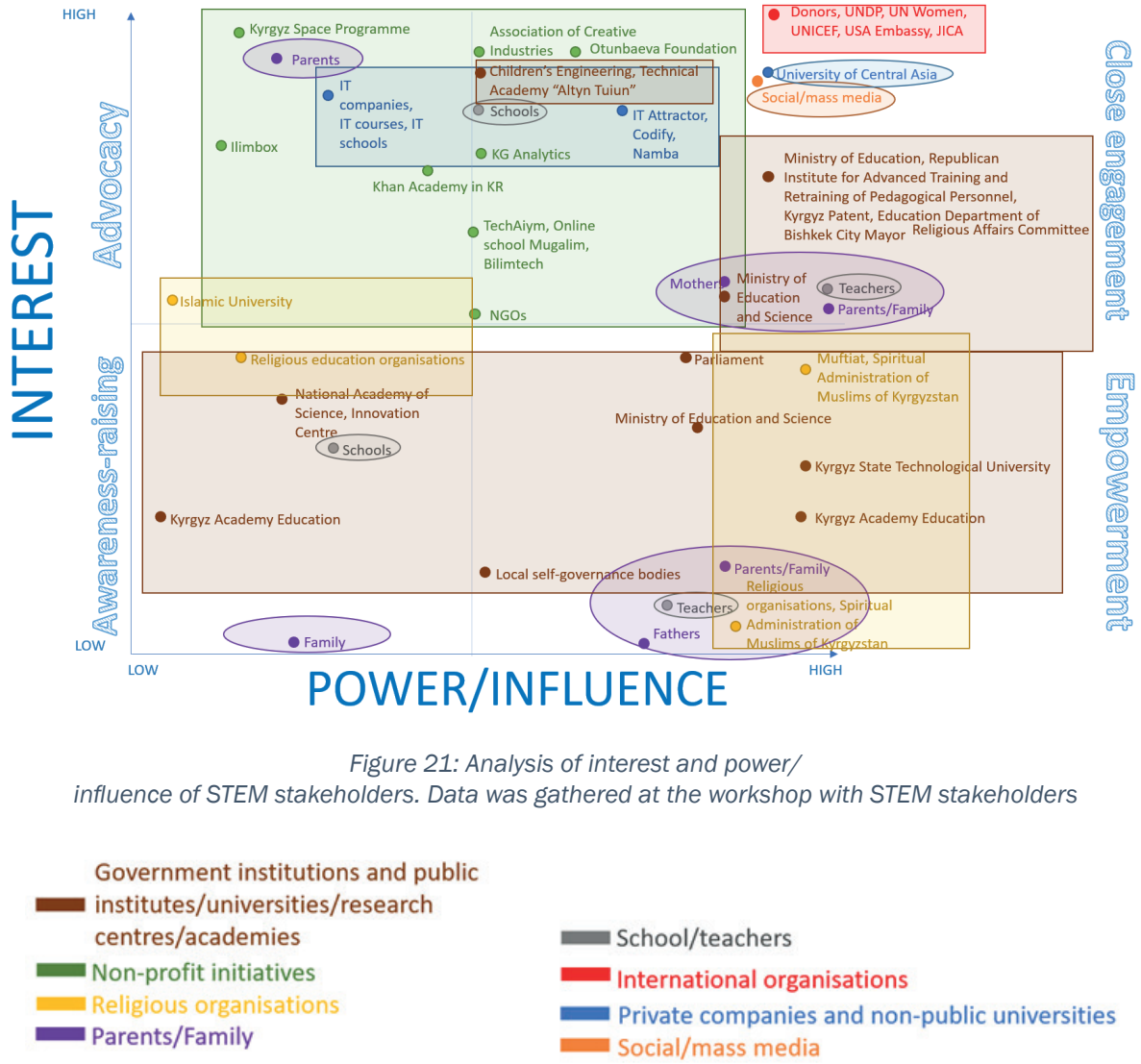


Figure 21: Analysis of interest and power/ influence of STEM stakeholders. Data was gathered at the workshop with STEM stakeholders

The next largest group are NGOs and non-profit organizations, which include such actors as TechAiym, Online school for teachers Mugalim, Bilimtech, Ilimbox, and Kyrgyz Space Programme. The interviews showed that these stakeholders carry out a range of activities to promote women's and girls' participation in STEM. Examples include programmes for women/girls to increase their STEM skills (e.g., IT, engineering) and build their self-esteem and efficacy by providing mentorship and coaching support[51]. The workshop participants rated their interest high, but their power/influence on the women's/girls' participation in STEM ranged from very low to mid-low (Figure 21). The limited power comes from a lack of funding for the continuous running of their programmes and activities. Their funding mostly comes from international/multi-lateral organisations, while other actors, such as the government and private sector, are the least interested in and/or capable of financially supporting their initiatives. The analysis illustrated in Figure 21 shows that NGOs/not-profit organizations can be involved in advocacy and close engagement to promote women/girls in STEM in Kyrgyzstan (Figure 21).

[51] Interviews with the representatives of NGOs and not-profit initiatives on STEM, October 2022

Several entities with funding resources were identified that support the initiatives on the participation of women and girls in STEM in Kyrgyzstan. UNICEF, US Embassy, and UNDP were among the commonly indicated funding-providers in the interviews with STEM stakeholders. At the workshop with the stakeholders, other funding-providers were also mentioned, such as UN Women and JICA (Japan International Cooperation Agency). The interest and power/influence of funding-providers was identified to be high as their main funders of STEM activities in Kyrgyzstan.

The next group is not large and broadly can encompass private companies and non-public universities. Their interest was consistently rated high. However, their power/influence was contested. Some workshop participants thought that IT companies had low power/influence on the participation of women/girls in STEM. In contrast, other workshop participants believed that some specific IT companies had a relatively high power/influence. This suggests that these specific stakeholders can be closely engaged in promoting women and girls in STEM. Meanwhile, other companies first need to be identified to be included in advocacy for more participation of women and girls in STEM.

The next group is faith-based organisations. As shown in Figure 21, religious education organisations such as Islamic University were rated by the workshop participants as with mid interest and low power/influence on promoting women and girls in STEM. The interest of religious organisations such as Muftiat was contested. Some workshop participants viewed their interest as very low, while others thought it was close to the middle point. However, in both cases, the power/influence was identified to be high. It should be noted that the Government institution - Religious Affairs Committee - was added to the government institutions in Figure 21 as it does not promote religion but regulates different religious groups. Religious organisations can be engaged in STEM for women through awareness-raising and empowerment.

The next group in Figure 21 includes schools and teachers. As illustrated in the figure, these actors are scattered which explains that there are schools and teachers with different levels of interest and power/influence to promote girls' participation in STEM. This supports the discussion in Section 6.1 that showed that some teachers and schools support and encourage the participation of girls in STEM, while others do not do that for different reasons ranging from outdated teaching methods to lack of infrastructure. Further, interviews with stakeholders showed that there are private schools that put emphasise on STEM, especially IT and robotics. They seek to attract teachers in these areas. However, there is a lack of staff who can teach STEM [52].

Parents and families are the last but not the least stakeholders that the workshop participants identified. They are also scattered in Figure 21. The interest and power/influence of parents/families depend on their context. As discussed in Section 6.1, some parents influence their child's career and academic journey very much; however, they may not necessarily be interested in STEM. Other parents are not fully engaged in their child's education and show little interest. Their engagement could have a significant influence on their child's academic performance and future career options, including STEM. Interestingly, the role of mothers and fathers were split in Figure 21, which shows that mothers may have high interest but a low power/influence, while fathers have the opposite - a low interest but a high power/influence.

[52] Interview with a teacher of school, October 2022

To further explore the interaction between different STEM stakeholders and cross-validate the findings that emerged from the interviews and the design thinking workshop, a Social Network Analysis was conducted. As explained in the Methodology section, stakeholders were requested to indicate in the survey who they cooperate with/work on STEM. The interactions between different stakeholders are presented in Figure 22. Groups of actors are color-coded, keys to which can be found in the legend. The size of the bubble indicates the centrality of the actor (more organisations said that they work with the actors). As can be seen, in each sector, there are large players.

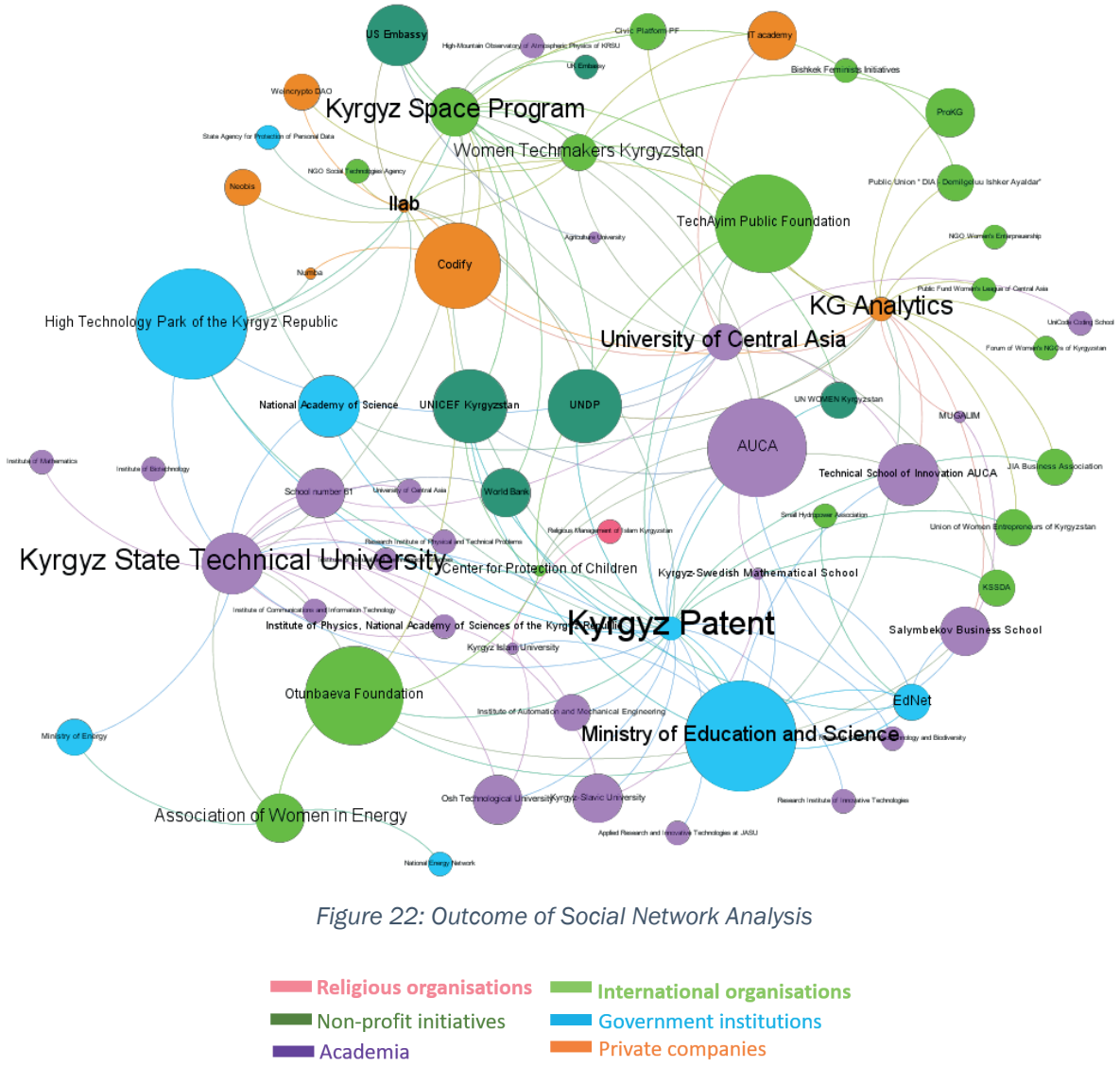


Figure 22: Outcome of Social Network Analysis

6.6 WHAT ARE THE SOLUTIONS CO-CREATED BY STEM WOMEN AND STAKEHOLDERS? HOW CAN WE TOGETHER JOIN EFFORTS TO DRIVE CHANGE TO ADVANCE THE STEM WOMEN COMMUNITY?

Study participants taking part in different data collection exercises (i.e., interviews, a survey, a workshop) were asked to share possible solutions to drive changes to advance the STEM women community in Kyrgyzstan. Their responses, split into sub-sections by respondent groups, are presented below. The Recommendation section discusses the common threads in the solutions proposed by different categories of study participants.

Solutions offered by the interviewed STEM stakeholders

Awareness-raising

At interviews, stakeholders stated that awareness of people about women/girls in STEM should be raised. The key idea stated at the interviews with stakeholders was that success stories of STEM women/girls should be promoted so that they could serve as role models for the public. Discussions with STEM women showed that there are great stories to be shared, not only about the success of these women but also about challenges and how they overcame them in their journey. These stories can have an inspiring effect on women and girls to pursue their goals in STEM and overcome the personal and social challenges that can come up on their way. Some women even have practical tips that they have applied in their lives which can be used by others[53]. Moreover, these stories need to come from a variety of women to show that there are different patterns and ways to succeed in STEM. In other words, the power of storytelling needs to be used in STEM information campaigns. These stories should show the path that people went through - from the start to their achievement together with the challenges and opportunities they had and the effort that they put in (e.g., studying or taking courses, etc.). Some stakeholders suggested that these stories can be not only about STEM women/girls but also about women leaders in Kyrgyzstan. For example, the MoES representative noted that historically Kyrgyzstan had had women leaders (e.g., Kurmanjan Datka, Kanykei - Manas' wife) and that these examples and new ones (e.g., Rosa Otunbaeva, Aigul Tolopova, Asel Sartbaeva) should be widely used in the information campaign[54].

Further, one of the stakeholders interviewed said an important idea that the work with the population on raising their awareness should be made relevant to the local context in terms of echoing some ideas from the local traditions in the content of the information campaign. For example, when his team conducts activities on STEM with the population, they try to connect STEM ideas with local traditions that used to exist for centuries. For example, they invite Manaschy to convey a message that it was said in Manas epic that education is important for boys and girls. They also invited tokmo akyns so that they could sign about the importance of digital skills in the traditional instrument (komus) in Kyrgyz[55]. They also invite religious leaders to their awareness-raising activities to show that religion does not prohibit the education of girls. Although they mostly worked with women religious leaders, the interviewee highlighted the importance of working with men religious leaders because the participation of women/girls in STEM concerns everyone in society. The experience of the design thinking workshop showed that the discussions could be enriched when representatives of religious organisations contribute to them[56].

[53] Interview with STEM women C, October 2022
[54] Interview with the representative of the MoES, October 2022
[55] Interview with the representative of the STEM non-profit initiative, October 2022
[56] Notes and observations from the workshop, November 2022

Finally, some of the interviewees said that information campaigns should be mostly in the Kyrgyz language. For example, the leader of the non-profit initiatives emphasised that all the training materials and campaign content should be in Kyrgyz. This is because Kyrgyz is commonly spoken in the regions, while there is little content and educational/training material in Kyrgyz. Hence, this study participant recommended all international organisations prioritise Kyrgyz in their work to increase the effectiveness and impact of their projects[57]. Running programmes without Kyrgyz will always have a limited effect as people will not engage fully.

Schools and extra-curriculum

The interviewed stakeholders said schools should provide career counselling and mentorship programmes[58], and their teaching methods should focus more on learners where teachers are more like facilitators of the learning process, with most effort coming from students who not only learn the material in theory but also learn how it is used in practice. This is because STEM requires one to be innovative[59]. Schools also need infrastructure. Robotics is a vivid example of this, as it requires equipment[60]. Further, stakeholders noted that a lack of qualified teachers is a challenge[61]. Thus, stakeholders pointed out that STEM should be a priority in the national education policy so that barriers (teachers, infrastructure, etc.) to the provision of STEM education are addressed systematically.

At the tertiary education level, some stakeholders noted that universities should ensure that their STEM programmes are up to date to meet the requirements of the labour market. For example, an interviewee from the Technical University said that they are already working in that direction and supporting their students in engaging in start-ups[62]. Another problem that the university teacher shared is that some young women start their STEM education and get married in the middle of their programme. As the quote below shows, these young women must give up their education and careers since they have children and must stay home. These women end up being without education and dependent on their husbands, which puts them in difficult positions in the possible case of family disintegration. For this reason, this interview said that the universities could consider giving discretions for these women and creating conditions that would enable young mothers to study while attending to the needs of their families[63].

> ***"Many girls give up their education because they get married and have a child in their first or second years of education. Then she takes a break. While she is at home, she has more children, and her husband then tells her to stay at home. And she has to put an end to her career. Maybe universities need to reconsider their method of providing education to women. Maybe more discretions can be provided to women. Maybe she can be given an option of flexible attendance of classes. Maybe a group of young mothers can be organised. Young women should not put an end to their careers. She becomes dependent on her husband. What if something happens like divorce or death of a husband, and a woman is left with children and with no education and no opportunities".*** (University teacher, interview)

[57] Interview with the representative of the STEM non-profit initiative, October 2022
[58] Interview with the representative of the private school, October 2022
[59] Interview with the representative of the private school, October 2022
[60] Interview with the representative of the private school, October 2022
[61] Interview with the representative of the private school, October 2022
[62] Interview with the representative of the Kyrgyz Technological University, October 2022
[63] Interview with the university teacher, October 2022

In the interviews, stakeholders said that the government could introduce quotas or decrease the tuition fees for women for STEM subjects such as engineering. This could potentially attract more women to STEM programmes[64]. Alternatively, providing scholarships for women could also stimulate a greater choice of STEM by women/girls.

Soft skills, self-esteem, and self-efficacy

The interviewed stakeholders, who worked with STEM women, shared from their experience that STEM support is more effective when women are also provided with soft-skill- and self-esteem-building support[65]. For example, a schoolteacher said that debate clubs should be organised for girls where they can speak up because, in some families, girls are brought up in a more conservative way where they are expected to be modest and quiet. To overcome this, girls need to be given opportunities to speak up and practice speaking and leadership skills[66].

STEM women also highlighted the importance of the emotional well-being of women to deal with feelings of fear and doubt in their abilities. Thus, interviewees noted that support such as different self-esteem-building exercises could benefit women and girls[67]. One of the STEM women recommended translating popular books on managing fears into Kyrgyz and promoting these books[68]. It was also recommended to normalise the idea that everyone has fears and that one should try to pursue their goals and ambitions despite these fears. STEM women said that they already talked about fear, self-confidence, and mental health because these things need to be recognised, acknowledged, and discussed to progress in promoting women and girls in STEM.

Families, communities, and social norms

STEM interviewees said that it is necessary to work with families, especially with men, to ensure that families provide encouragement and support to girls from early childhood for them to succeed in STEM and broadly in life. It is crucial to change the gender norms and perceptions around women's/girls' roles in society so that society sees them not only as mothers/wives/care givers, but acknowledges that they have rights to self-realisation. Some STEM women emphasized that the key message should be: Women's rights are human rights and women can pursue any field.

Solutions offered by STEM stakeholders at the design thinking workshop

At the workshop session on solutions, STEM stakeholders worked on three problem statements that emerged from the discussion of key root causes of limited participation and involvement of STEM women identified in the data. For each problem statement, a range of solutions was offered.

[64] Interview with the representative of the MoES, October 2022
[65] Interview with STEM woman D, October 2022
[66] Interview with a school teacher, October 2022
[67] Interviews with STEM women A and C, October 2022
[68] Interview with a STEM woman A, October 2022

Figure 23: Design Thinking workshop participants co-ideated solutions

Problem statement 1. **A low level of public awareness among stakeholders (state institutes/parents/teachers/youth, etc.) on the importance and values of STEM leads to the limited participation of women and girls in STEM.**

Proposed solutions:

1) To build a sustainable ***informational infrastructure***, consistent government or public funding and interconnection between stakeholders in this informational cycle are essential (Figure 24). Moreover, active collaboration and cooperation among stakeholders, such as educational institutions, research centers, industry experts, and government agencies, will facilitate the efficient flow of information, data sharing, and knowledge exchange.

Figure 24: Solutions for problem 1

2) To establish ***science museums*** that are financed by the government to promote interest in science, particularly among young people. These museums would provide visual representations of scientific concepts, making them more accessible and engaging for the public. Additionally, interactive sections, specifically designed for children, would allow hands-on exploration of scientific principles. It is crucial for the government to take responsibility and allocate regular funding for the establishment of at least one science museum in each province. The ***Methodical Centres***, operating under the Ministry of Education and Science, should actively support these museums by developing resources and materials. Furthermore, the ***Data Centres*** should collab-

orate with the Methodology Centre to provide relevant data, such as the demand for STEM professions and average salaries in the country. This informational infrastructure requires consistent government or public financing to ensure the availability of necessary equipment, laboratories, and resources within the field of STEM.

Problem statement 2. **Women and girls are not confident in their capabilities to excel in STEM.**

Proposed solutions:

1) To promote STEM women role models to raise public awareness of their success and inspire others.

2) To run self-esteem courses for women and girls in educational institutions to foster confidence in their abilities to succeed in STEM.

3) To establish parents' schools to enhance their understanding of the opportunities available for girls and women in STEM fields and provide guidance on supporting and encouraging their daughters' participation in STEM.

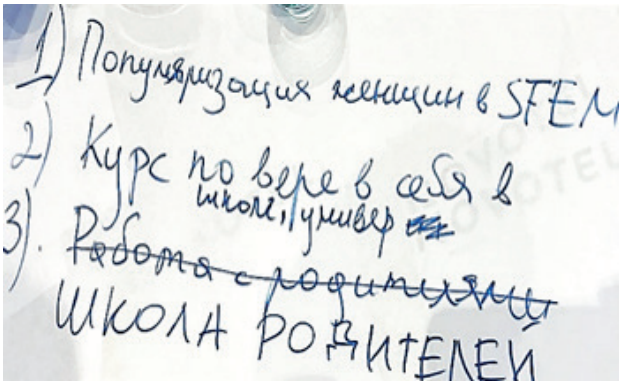


Figure 25: Solution for problem 2

Problem statement 3. **There is a gap between the existing gender equality policy and its practical implementation that halts the progress of women's participation in STEM.**

Proposed solutions:

1) To introduce STEM education grants to support families financially, enabling them to afford STEM education, tutoring, and extracurricular activities of their daughters. There should be a transparent and accessible financial mechanism to ensure grants are distributed to STEM girls in needs.

2) To introduce quotas for STEM activities: Implement quotas at different levels of local self-governance to ensure the inclusion of women and girls in STEM initiatives. Allocate a portion of the budget for STEM activities and assign quotas for women and girls' participation, encouraging their active involvement and fostering gender equality in STEM. There is a need to enhance the capacity of local self-governments to design, develop, and implement such a policy.

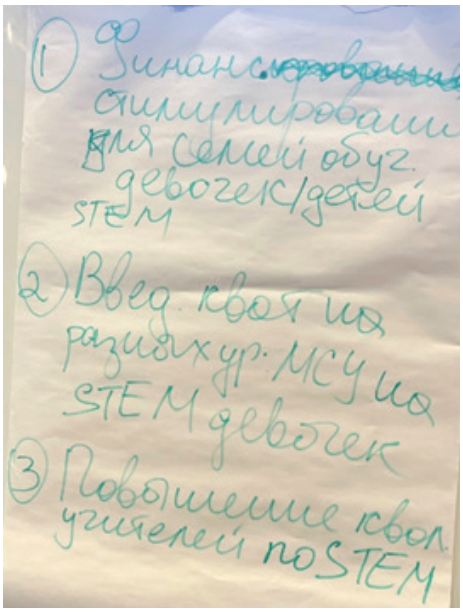


Figure 26: Solutions for problem 3

3) To ensure adequate support for girls'/women's engagement and success in STEM, it is crucial to enhance the qualifications of teachers/tutors in STEM subjects. By increasing the expertise of teachers in STEM education, they can provide effective guidance and mentorship to girls, fostering their interest and achievement in STEM fields.

Solutions offered by survey participants

The surveyed STEM and non-STEM women and men expressed different levels of agreement with solutions to promote the participation of women and girls in STEM. Around 60% of surveyed STEM women and 67% of surveyed STEM men said that public awareness about the success stories of STEM women should be increased. Between 24-29% of surveyed STEM women thought that it was also necessary to promote high-quality teaching in STEM at schools, train and educate parents, and create and promote extracurricular STEM education courses/activities at the local level. STEM men agreed with these solutions. But, 33% of them also thought creating and running STEM mentoring initiatives for women and girls was necessary (Table 9).

In the non-STEM category, most of the surveyed non-STEM women (47%) and non-STEM men (54%) thought that the solution should be training and educating parents/caregivers to encourage girls to participate in STEM. The next three solutions that around one-quarter of non-STEM women and men agreed on were advocating for government programmes and initiatives to promote women in STEM, increasing public awareness about STEM women's success stories, and creating and promoting extracurricular STEM education courses/activities at the local level (Table 9).

Table 9: Responses to the question "What are your recommendations/ solutions to increase the number of girls in STEM?"

	Statement	Women		Men	
		STEM	Non STEM	STEM	Non STEM
1	Increase awareness of public about success of women in STEM	59%	36.7%	66.7%	32.6%
2	Train and educate parents to encourage girls to participate in STEM	24.0%	46.9%	50.0%	53.5%
3	Advocate for government programmes and initiatives to promote women in STEM field	22.0%	38.8%	33.3%	30.2%
4	Create and promote extracurricular STEM education courses/activities at the local level	29.0%	30.6%	33.3%	34.9%
5	Promote high quality teaching in STEM subjects at schools	28.0%	24.5%	0.0%	2.3%
6	Tackle gender stereotypes and social norms to encourage and promote women's/girl's participation in STEM	19.0%	22.4%	16.7%	23.3%
7	Creat and run STEM mentoring initiatives for women/girls	7.0%	18.4%	33.3%	14.0%
8	Other	2.0%	2.0%		

CONCLUSIONS AND RECOMMENDATIONS

WOMEN'S SUPPORT GROUPS

CONCLUSION

a) The low self-esteem and confidence of women and girls in their abilities in natural science compared to their male counterparts was highlighted in the literature and confirmed by some of the interviewees. This disparity can be attributed to a variety of factors, including gender norms, career expectations, family roles, and stereotypical assumptions that hinder their active participation in STEM. The influence of low expectations of STEM, especially within their support network, shapes the interests of girls and women in these fields. When these expectations are reinforced by prevailing stereotypes, they can result in reduced self-esteem within the realm of STEM. In contrast, boys and men are often expected and encouraged to excel in the sciences, which are fundamental to STEM.

b) The importance of the closer support group, especially parents or primary caregivers, in shaping girls' / women's engagement in STEM was a recurring theme across different data sources, including the literature review (see section 4), interviews and the design thinking workshop. In these discussions, participants often distinguished between the roles of their mothers and fathers, recognizing that fathers can have a significant impact on a girl's engagement in STEM, despite often expressing less interest in their participation in STEM.

RECOMMENDATION

Addressing the challenge of increasing girls' self-esteem and belief in their abilities requires a comprehensive approach, as the study findings indicate. This can be achieved by implementing interventions that target both individual girls and their close support groups, including parents (with special attention to mothers and fathers), teachers, peers, religious leaders, and other influential people in their lives. These interventions should aim to challenge and dispel stereotypical beliefs that associate STEM careers with conflicting gender roles within the family, with particular emphasis on the role of fathers in promoting girls' engagement in STEM.

STEM vs NON-STEM GROUPS

CONCLUSION

The results of the study indicate that different clusters within society have different perspectives on the participation of women and girls in STEM and their future prospects. Non-STEM women and non-STEM men were less optimistic about increasing the number of women/girls in STEM. However, non-STEM women emphasized the need for more support and encouragement to increase women's participation in STEM. Conversely, fewer non-STEM men expressed the belief that the number of women in STEM should be increased and acknowledged the importance of support and encouragement. These differences highlight the importance of targeted interventions and tailored approaches to address the specific needs and attitudes of different social groups.

RECOMMENDATION

In order to effectively promote the participation of women and girls in STEM, it is crucial to tailor initiatives to specific target groups, taking into account their different attitudes and perspectives. The study findings highlighted that certain clusters, such as non-STEM men, may be less supportive of women's participation in STEM. It is therefore recommended that this group be prioritized in future STEM initiatives, including targeted information campaigns and outreach to male parents/caregivers to address and overcome any barriers or reservations they may have.

EDUCATION SYSTEM

CONCLUSION

The extensive review of STEM literature conducted in this study focused primarily on STEM education, underscoring the critical role of a well-established STEM education system in promoting the engagement of women and girls in STEM. The existing schooling system is currently undergoing significant reforms; however, it remains uncertain whether these reforms will effectively promote STEM education. Workshop discussions highlighted the significant challenges facing STEM education, including the lack of motivated and qualified STEM teachers, large class sizes (especially in public schools), high teacher turnover, and low salaries. Nearly half of the respondents expressed the need for radical changes in the education system to encourage greater participation of women and girls in STEM fields. These findings underscore the urgency of addressing these challenges and implementing comprehensive reforms to create an inclusive and supportive STEM education environment.

RECOMMENDATION

Close cooperation with the Ministry of Education and Science of the Kyrgyz Republic and related organizations is highly recommended to promote gender-balanced STEM education in schools, colleges and universities. It is important to focus on specific actions, such as improving career counselling services, implementing learner-centered teaching approaches, promoting project-based learning, improving STEM infrastructure, ensuring better compensation for teachers, and improving the qualifications of STEM teachers. These areas require thorough examination and discussion in order to develop effective strategies and transparent mechanisms that promote gender equity and quality STEM education throughout the education system.

The initiation of mentoring programs such as "Big Sisters - Little Sisters" is a valuable recommendation to consider. These programs can provide a platform for like-minded girls to share knowledge and experiences, which can build their confidence and create a supportive STEM network. By pairing experienced women in STEM as "big sisters" with younger girls as "little sisters," mentoring programs can provide guidance, advice, and encouragement, helping to address the confidence and support needs of girls pursuing STEM fields. These programs can play an important role in fostering a sense of belonging and empowerment among girls and women in STEM.

Exploring the introduction of STEM education and skills into preschool and school curricula is an important step to consider. By integrating STEM subjects at an early age, children (girls) can develop a strong foundation and interest in these fields, fostering their long-term engagement and success in STEM.

Work closely with universities, which play an important role in the STEM community network. Collaboration with universities can focus on promoting current STEM programs, making connections between education and the STEM job market, and exploring initiatives such as quotas for women in STEM faculties and the provision of scholarships and seed grants for their families. In addition, providing more flexibility and support for young mothers in STEM programs can help ensure their continued participation and success.

Taken together, these measures help create a supportive ecosystem that promotes STEM education, provides opportunities for women/girls, and bridges the gap between academia and STEM industry.

SHAPING THE STEM COMMUNITY

CONCLUSION

The stakeholder mapping conducted in this study revealed the presence of various organizations from different sectors within the STEM ecosystem in Kyrgyzstan. This mapping helped to identify key stakeholders who play an important role in the advancement of women/girls in STEM. In addition, the actors were analysed based on their level of interest and power/influence in the field.

By identifying and engaging with these key actors, efforts can be focused on building strategic partnerships and collaborations to effectively promote women/girls in STEM. This approach allows for targeted interventions and initiatives that leverage the influence and resources of these stakeholders to drive positive change in the participation of women/girls in STEM.

Overall, stakeholder mapping provides a valuable basis for developing tailored strategies and fostering effective collaboration across sectors to achieve the common goal of gender equality and increased representation of women in STEM.

RECOMMENDATION

It is strongly recommended to establish a network of key organizations/community partners supporting women in STEM, using existing active stakeholders as a core group. This STEM community network should bring together stakeholders and partners from different sectors and aim to formalize their common goals and activities. Regular meetings and knowledge exchange events within the network will provide a platform for sharing best practices and lessons learned, and fostering collaboration in the promotion of women in STEM. In addition, the network can serve as a forum for developing policy documents and conducting advocacy campaigns to raise awareness and drive positive change.

Working closely with interested organizations will lead to synergistic results and strengthen the sector as a whole. By working together, the STEM Community Network can create a supportive environment for information dissemination, policy development, and promotion of women's participation in STEM. The network's efforts will facilitate coordination, collaboration, and amplification of initiatives, ultimately contributing to gender equality and increased representation of women in STEM.

INFORMATION CAMPAIGN

CONCLUSION

Promoting women and girls in STEM within the community and in public is vital for challenging gender norms and stereotypes.

RECOMMENDATION

The study findings highlight the effectiveness of using role models, storytelling, particularly successful women in STEM, to inspire and motivate girls. Promoting these role models among key target groups can help challenge gender stereotypes and reassure parents about the potential success of women in STEM.

Additionally, the idea of constructing science museums for children and youth emerged during the workshops as a means of fostering interest in STEM from an early age. Incorporating interactive exhibits and hands-on activities in these museums can engage youngsters and ignite their curiosity in the STEM field.

POLICY

CONCLUSION

The design thinking workshops revealed several challenges, with one notable issue being the gap between gender equality legislation and its practical implementation. This suggests that while there may be policies in place to promote gender equality, there are barriers and limitations in translating these policies into effective action on the ground.

RECOMMENDATION

In order to close the gap between gender equality legislation and practice, it is recommended to establish close cooperation with organizations specializing in gender equality from the very beginning of the policy design phase. By working together on policy development and implementation, these organizations can leverage their expertise and resources to promote gender equality in STEM.

In addition, further research on policy development specifically focused on STEM is suggested to gain a deeper understanding of the challenges and opportunities in this area.

FUTURE RESEARCH

CONCLUSION

This rapid needs assessment was conducted within three months in 2022 as a pilot study. It acknowledges several limitations. Firstly, it focused solely on the urban context, which restricts the generalizability of the findings to the rural population of the country. Additionally, the sample size of 201 respondents may limit the ability to disaggregate data and provide representative values for important variables such as ethnic minorities, marginalized groups, marital status, number of children in the family, education level of parents, and level of religiosity. It is important to consider these limitations when interpreting the study's findings and to recognize the need for further research that includes a more diverse and representative sample in a longer period of researching time.

Another limitation of the study is the inadequate representation from the *private sector*, particularly STEM industries and businesses. The perspectives and insights from these stakeholders could have provided valuable recommendations for addressing the challenges and promoting women/girls in STEM from the demand side. The lack of their input may limit the comprehensiveness of the recommendations and the potential for effective collaboration between the public and private sectors.

RECOMMENDATION

It is recommended that a similar study be conducted at the national level, including all regions and rural areas of the country, to gain a more comprehensive understanding of the challenges and opportunities related to women in STEM. This would allow for a more representative sample and provide insights into the specific circumstances and barriers faced by women/girls in different contexts. It is important to recognize that populations living in rural areas may have different experiences and perspectives due to varying levels of access to resources such as the Internet and technology.

In addition, conducting research at the national level would help shed light on the awareness and prioritization of STEM education and careers across the country. Findings from such a study would provide a more nuanced understanding of the issues and inform targeted interventions and policies to promote women/girls in STEM across the economy.

To ensure robust and representative findings, it is recommended that the sample size for the study be increased to between 1000 and 1500 participants. This larger sample size would allow for more in-depth analysis, allowing for meaningful examination of various variables such as location, ethnicity, marital status, number of children in the family, parental education level, and more. By including a diverse range of participants, the study would capture a broader range of experiences and perspectives, leading to more comprehensive and reliable results.

REFERENCES

ADB (2019) Kyrgyz Republic: Country Gender Assessment. Available at https://www.adb.org/sites/default/files/institutional-document/546966/kyrgyz-republic-country-gender-assessment-2019.pdf

Astin, H. S. and Sax, L. J. (1996) 'Developing scientific talent in undergraduate women', **The equity equation: Fostering the advancement of women in the sciences, mathematics, and engineering**, pp. 96–121.

Boateng, G. O., Neilands, T. B., Frongillo, E. A., Melgar-Quiñonez, H. R., & Young, S. L. (2018). Best Practices for Developing and Validating Scales for Health, Social, and Behavioral Research: A Primer. Frontiers in Public Health, 6, 149. https://doi.org/10.3389/FPUBH.2018.00149/BIBTEX

Brainard, S. G. and Carlin, L. (1998) 'A six□year longitudinal study of undergraduate women in engineering and science', **Journal of Engineering Education**. Wiley Online Library, 87(4), pp. 369–375.

Bybee, R. W. (2010) 'Advancing STEM education: A 2020 vision', **Technology and engineering teacher**. International Technology Education Association, 70(1), p. 30.

Council, N. R. (2014) **STEM integration in K-12 education: Status, prospects, and an agenda for research**. National Academies Press.

Diekman, A. B., Weisgram, E. S. and Belanger, A. L. (2015) 'New routes to recruiting and retaining women in STEM: Policy implications of a communal goal congruity perspective', **Social Issues and Policy Review**. Wiley Online Library, 9(1), pp. 52–88.

Dugger, W. E. (2000) 'Standards for Technological Literacy. Content for the Study of Technology.', **Technology Teacher**. ERIC, 59(5), pp. 8–13.

Dugger, W. E. (2010) 'Evolution of STEM in the United States', in **6th biennial international conference on technology education research**.

Erdogan, N. and Stuessy, C. L. (2015) 'Modeling successful STEM high schools in the United States: An ecology framework', **International Journal of Education in Mathematics, Science and Technology**, 3(1), pp. 77–92.

Falloon, G. **et al.** (2020) 'Understanding K-12 STEM education: A framework for developing STEM literacy', **Journal of Science Education and Technology**. Springer, 29(3), pp. 369–385.

Fayer, S., Lacey, A. and Watson, A. (2017) 'STEM occupations: Past, present, and future', **Spotlight on Statistics**. US Department of Labor, Bureau of Labor Statistics Washington, DC, 1, pp. 1–35.

Government of Kyrgyz Republic (2022) Decree on the National Strategy of the Kyrgyz Republic on the promotion of gender equality until 2030 and National Plan on the promotion of gender equality in the Kyrgyz Republic for 2022 - 2024.

Han, J. C., Sax, L. J. and Kim, K. A. (2007) 'Having the talk: Engaging engineering students in discussions on gender and inequity', **Journal of Women and Minorities in Science and Engineering**. Begel House Inc., 13(2).

ILO (2021). Building forward fairer: women's right to work and at work at the core of the COVID-19 recovery

Jiang, X. (2021) 'Women in STEM: Ability, preference, and value', **Labour Economics**. Elsevier, 70, p. 101991.

Kelley, T. R. and Knowles, J. G. (2016) 'A conceptual framework for integrated STEM education', **International Journal of STEM education**. Springer, 3(1), pp. 1–11.

Lee, K.-T. and Nason, R. (2012) 'Reforming the preparation of future STEM teachers', in **Proceedings of the 2nd International STEM in Education Conference**. Beijing Normal University, pp. 33–39.

Margot, K. C. and Kettler, T. (2019) 'Teachers' perception of STEM integration and education: a systematic literature review'.

Marshall, J. A. and Harron, J. R. (2018) 'Making learners: A framework for evaluating making in STEM education', **Interdisciplinary Journal of Problem-Based Learning**, 12(2).

Meeriam-Webster Dictionary, 2022, https://www.merriam-webster.com/dictionary/mathematics

Miller, P. H. **et al.** (2000) 'A desire to help others: Goals of high-achieving female science undergraduates', **Women's Studies Quarterly**. JSTOR, 28(1/2), pp. 128–142.

Munoz Boudet, A. M. **et al.** (2021) 'Women and STEM in Europe and Central Asia. Report No: AUS0002179.', **World Bank**. ERIC.

Muretta Jr, R. J. (2005) 'Exploring the four sources of self-efficacy.' ProQuest Information & Learning.

National Academy of Sciences-National Research Council (1996) **National science education standards**. Joseph Henry Press.

Quigley, C. F., Herro, D. and Jamil, F. M. (2017) 'Developing a conceptual model of STEAM teaching practices', **School science and mathematics**. Wiley Online Library, 117(1–2), pp. 1–12.

Reider, D., Knestis, K. and Malyn-Smith, J. (2016) 'Workforce education models for K-12 STEM education programs: Reflections on, and implications for, the NSF ITEST program', **Journal of Science Education and Technology**. Springer, 25(6), pp. 847–858.

Riegle-Crumb, C., Farkas, G. and Muller, C. (2006) 'The role of gender and friendship in advanced course taking', **Sociology of Education**. SAGE Publications Sage CA: Los Angeles, CA, 79(3), pp. 206–228.

Roehrig, G. H. **et al.** (2021) 'Beyond the basics: a detailed conceptual framework of integrated STEM', **Disciplinary and Interdisciplinary Science Education Research**. Springer, 3(1), pp. 1–18.

Shapiro, C. A. and Sax, L. J. (2011) 'Major selection and persistence for women in STEM', **New Directions for Institutional Research**. Wiley Online Library, 2011(152), pp. 5–18.

UNDP (2021) 'Gender equality in digitalization'. Available at: https://www.undp.org/eurasia/publications/gender-equality-digitalization.

UNDP, 2012. Institutional and Context Analysis Guidance Note.

UNICEF (2020) 'Towards an equal future: Reimagining girls' education through STEM'. Available at: https://www.unicef.org/media/84046/file/Reimagining-girls-education-through-stem-2020.pdf.

UNICEF (2022), Press Release: In Kyrgyzstan, only 1 out of 3 girls have computer literacy (unicef.org)

WDI (2017) 'Gross enrollment ratio for ECA countries excluding high income.'

World Bank (2018), Human Development Report Country Profile

World Economic Forum (2022), Global Gender Gap index

Vaus, D. de. (2014). Survey in social research (six edition).

Xue, Y. and Larson, R. C. (2015) 'STEM crisis or STEM surplus? Yes and yes', **Monthly labor review**. NIH Public Access, 2015.

Yakman, G. (2008) 'STEAM education', **An overview of creation a model of integrative education. PATT**.

Yakman, G. (2010) 'STEAM: A framework for teaching across the disciplines', **Virginia Polytechnic and State University**.

Yata, C., Ohtani, T. and Isobe, M. (2020) 'Conceptual framework of STEM based on Japanese subject principles', **International Journal of STEM Education**. SpringerOpen, 7(1), pp. 1–10.

ANNEX 1 – Study design, data collection tools per research question, including target group

Table 10: Study design, data collection tools per research question, including target group

Question	Target group	Method	Concepts/themes to explore and examine
RQ1. What is the public perception of *[probably of women in]* STEM in Kyrgyzstan?	General public (qualifying criteria is provided in Section 4.4) STEM women/ girls	Survey	STEM Education Self-efficacy Contextual factors (family, peers, community, individual factors) Sources of information Key stakeholders promoting or impeding STEM Future trends Solutions
RQ2. What are the patterns STEM women share on their educational/career journey in Kyrgyzstan?	STEM women/ girls to share their education/ career journey (qualifying criteria is provided in Section 4.2)	Key informant interviews Desk study User's journey	
RQ3. Why do fewer women/ girls choose STEM education/career (root cause problem)? What are the key challenges faced by STEM women?	STEM women General public Non-STEM women/girls	Survey KIIs Desk study Design Thinking workshop	
RQ4. Who are the stakeholders in the ecosystem of STEM community in Kyrgyzstan?	Stakeholders STEM women/ girls	Desk study KII Design Thinking workshop Survey	
RQ5. How do STEM women and stakeholders envision the future trends in their community?	Stakeholders (qualifying criteria is provided in Section 4.3) STEM women/ girls	KII Design Thinking workshop Survey	
RQ6. What are the solutions co-created by STEM women and stakeholders? How can we together join efforts to drive change to advance STEM women's community?	Stakeholders STEM women/ girls	Design Thinking workshop	

ANNEX 2 – Design thinking Workshop programme

Objective:
The design thinking workshop's main objective is to generate a discussion among women, girls, and key STEM stakeholders and reveal existing barriers and challenges for the girls in Kyrgyzstan to enter STEM field, and generate solutions to address identified difficulties. The workshop will also include a session on stakeholder mapping to engage the workshop participants in identifying key stakeholders, their level of interest in initiatives aiming to promote a gender balance in STEM, and the type of engagement is possible with each of them within the future initiatives towards gender balanced STEM in Kyrgyzstan.

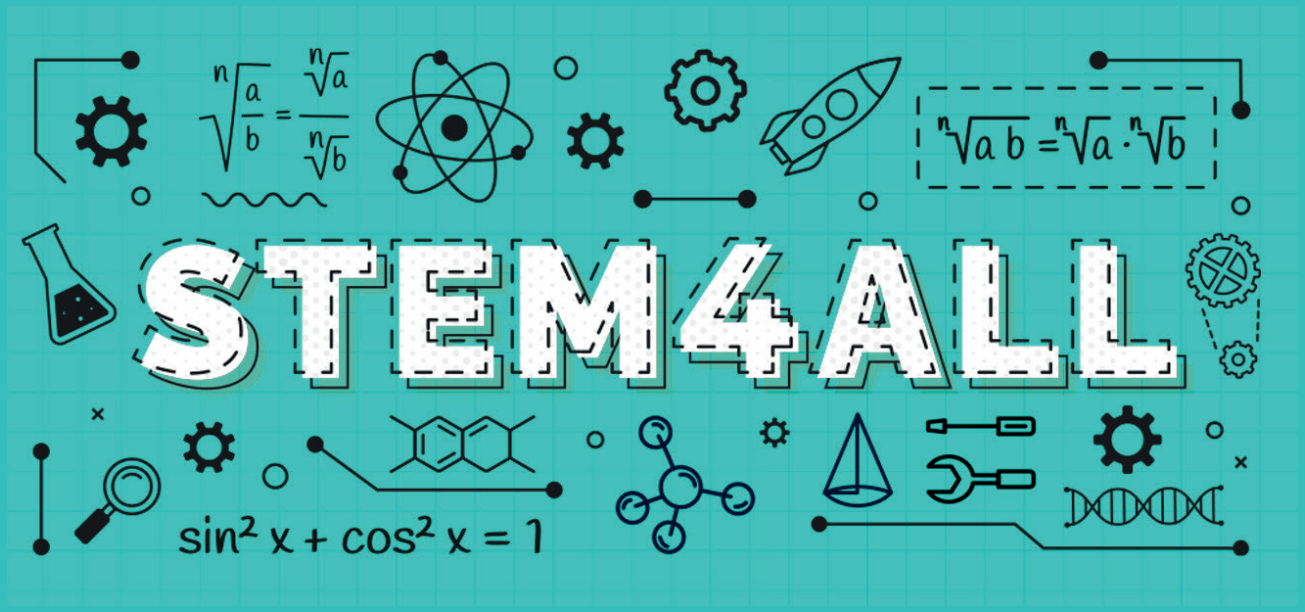
Expected outcomes:

- Key barriers and challenges to women's/girls' participation in STEM identified;
- A number of potential solutions identified and discussed;
- Stakeholders are mapped out; their power and interest in promoting women in STEM are assessed; ways of engagement with the identified stakeholders are discussed.

Principle:
The design thinking workshop will be based on the participatory principal where the voices of women and girls will be engaged in discussion and lead in the identification of challenges and creation of solutions to address these challenges.

Facilitator:
Jenny Jenish kyzy (Ensi Tszie), Head of Experimentation, UNDP Accelerator Lab in Kyrgyzstan

Participants:
STEM women, girls in STEM or studying towards STEM occupations, key STEM community actors and organisations.



INVITATION

Dear STEM Partner,

On behalf of the United Nations Development Programme Accelerator Lab (UNDP AccLab), I would like to appreciate your significant contribution to STEM in Kyrgyzstan.
UNDP AccLab has been championing for gender parity in STEM together with our regional platform STEM4ALL since 2021. At present, we are conducting the first needs assessment of STEM. As part of the research, we would like to invite key stakeholders to participate in the STEM workshop on November 11 (9 AM - 6 PM) at NOVOTEL HOTEL (Manas 16, Bishkek). This workshop will be focused on potential solutions that we might work on together in 2023.

Are you open for STEM partnership? Join us!

Contact point UNDP:
Jenny Jenish kyzy (Ensi Tszie),
ensi.tszie@undp.org
+7 778 996 5851 (whatsapp)

STEM Workshop Agenda

11 November 2022 (9 AM - 6 PM)

Venue: Novotel

Time	Session
09:00	**Welcoming coffee & registration**
09:30 – 09:40	Opening remarks and networking exercise
09:40 – 09:50	**UNDP Kyrgyzstan on STEM** Introduction by Head of Experimentation, UNDP Accelerator Lab *Ms. Jenny Jenish kyzy (Ensi Tszie)*
09:50 – 10:00	**Presentation on the preliminary findings on STEM needs assessment** by Empirica Research & Consultation Institute *Mrs. Kanykei Jailobaeva, Mr. Temirlan Jailobaev*
10:00 – 12:00	**Session 1** STEM women persona drawing STEM women's journey (user's journey) Barriers/Challerges on STEM Root-cause problem discussion
12:00 – 13:00	Lunch
13:00 – 14:30	**Session 2** Solutions co-creation for women to participate in STEM
15 минут	Music Break
14:45 – 16:00	**Session 3** Stakeholder mapping and assessment
16:00 – 17:30	**Session 4** Future foresights on STEM in Kyrgyzstan
17:30 – 18:00	Closing remarks, Certificates, & Open-mic for participants

ANNEX 3 – Data verification, quality control, and ethical consideration

Data verification and quality control
To ensure the quality of data, a number of control measures were put in place. The lead consultant was be responsible for the overall management of the project, fieldwork implementation, and strict adherence to the methodology of the study. Experienced interviewers/enumerators of Empirica were mobilised. The lead consultant supervised the quality of the collected data. Regular debriefing sessions were carried out to discuss any issues and challenges to take timely measures to address and make necessary adjustments to the process if required.

Ethical Considerations
The research team observed the key ethical principles of social research: voluntary participation, informed consent, confidentiality/anonymity, and no harm (security and safety). Enumerators/interviewers were provided with information sheets on the key principles of ethics, which they will read out or explain to the study participants before inviting them to participate in the research. Study participants were informed fully about 1) the aims of the study, 2) why they are invited to participate in the study, and 3) what the benefits of the study would be. They were also be made aware that it should be their decision whether or not to participate in the study based on the information that they receive.

During interviews, study participants were asked permission to record the interviews and discussions. Study participants were explained that recording would assure the accuracy of the data. They were also be assured of confidentiality and anonymity. They were informed that their names would be anonymised in the report, and their responses would be kept confidential. For this reason, the final report does not have any names. For direct quotes, only the details of the interviews were provided.

Once the data was collected, the names of the survey respondents were codified and separated from the data to make sure anonymity. The file with the names of survey respondents and their details was encrypted with a password.

ANNEX 4 – Survey questionnaire

Survey in English, Russian, and Kyrgyz languages

__You can change the language of the questionnaire on the top of the page/ Сурамжылоонун тилин баракчанын башында өзгөртсөңүз болот / Вы можете поменять язык анкеты в начале страницы.__ By the request of the UNDP Kyrgyzstan, we at the Research and Consultancy Institute are conducting a study on STEM (Science, Technology, Engineering, and Mathematics) field. The goal is to understand the existing situation in STEM. Even though you are not in STEM, or not aware of STEM, please answer our survey questions because we are interested in your opinion and it is important for us to assess to what extend people are familiar with STEM. There are no right or wrong answers. We simply want to know your opinion on the matter. Could we ask you a few questions? We will ensure the confidentiality of your responses. Your answers will be used only in a generalised form. If you have any questions or comments, you can ask them from me or can call our office on 0771 494949. It will take around 15-20 minutes to complete the survey. Do you give consent to the survey?	__Вы можете поменять язык анкеты в начале страницы / Сурамжылоонун тилин баракчанын башында өзгөртсөңүз болот / You can change the language of the questionnaire on the top of the page__ Мы - Исследовательсктий Институт Empirica - проводим исследование для ПРООН в Кыргызстане по STEM (это сфера объединяющая естественные науки и инженерные предметы в единую систему). Цель состоит в том, чтобы понять существующую ситуацию в STEM. Даже если Вы не вовлечены STEM сферу или не знаете о STEM, пожалуйста, примите участие в нашем опросе, потому что нам важно оценить, насколько люди знакомы с этой сферой. Здесь нет правильных или неправильных ответов. Мы просто хотим знать Ваше мнение по определенным вопросам. Можем ли мы задать Вам несколько вопросов? Мы гарантируем конфиденциальность Ваших ответов. Ваши ответы будут использованы только в обобщенном виде. Если у вас есть какие-либо вопросы или комментарии, вы можете задать их мне или позвонить в наш офис по телефону 0771 494949. Заполнение анкеты займет около 15-20 минут. Даете ли Вы согласие на проведение опроса?	__Сурамжылоонун тилин баракчанын башында өзгөртсөңүз болот / Вы можете поменять язык анкеты в начале страницы / You can change the language of the questionnaire on the top of the page__ Биз - Эмпирика Изилдөө институту - ПРООН-Кыргызстан үчүн STEM тармагы боюнча изилдөө жүргүзүп жатабыз (STEM тармагы бул табият илимдери менен инженердик сабактарды бирдикте караган аймак). Изилдөөнун максаты STEM тармагындагы абалды түшүнүү. Сиз STEM тармагы менен алектенбесеңиз же STEM жөнүндө билбесеңиз да, биздин сурамжылоого катышыңызды суранабыз. Сиздин ой пикириңиз жана суроолорго берген бааңыз биз үчүн маанилүү. Сурамжылоодо туура же туура эмес жооптор жок. Биз айрым маселелер боюнча сиздин пикириңизди гана билгибиз келет. Сизге бир нече суроо берсек болобу? Жоопторуңуздун купуялуулугуна/конфиденциальностуна кепилдик беребиз. Сиздин жоопторуңуз жалпы тенденцияны аныктоо үчүн гана колдонулат. Суроолоруңуз же пикириңиз болсо менден сурасаңыз болот же, 0771 494949 телефону аркылуу биздин офисибизге чала аласыз. Сурамжылоону бүтүрүү үчүн болжол менен 15-20 мүнөт талап кылынат. Сурамжылоого катышууга макулсузбу?	
Yes	Да	Ооба
No	Нет	Жок

Please indicate the mode of survey completion:	Укажите способ заполнения опросника:	Сурамжылоонун толтуруу жолун кандай?
• I am completing the form online	• Я заполняю форму онлайн	• Мен сурамжылоону онлайн толтуруп жатам
• The data is collected face-to-face by an interviewer	• Данные собираются интервьюером лицом к лицу	• Маалыматтар интервьюер тарабынан бетме-бет чогултулуп жатат
Your gender:	**Укажите пожалуйста ваш пол:**	**Сиздин жынысыңыз:**
• Men	• Мужчина	• Эркек
• Women	• Женщина	• Аял
• Prefer not to answer	• Предпочитаю не отвечать	• Жооп бергенден баш тартам
Education/ Образование / Билим		
What was your highest level of education?	**Какой уровень Вашего образования?**	**Сиздин билим деңгээлиңиз?**
• 1. No formal education	• 1. Нет образования	• 1. Билимим жок
• 2. Primary (4 classes) school education	• 2. Начальное (4 класса)	• 2. Башталгыч класстар (4 класс) деңгээлде
• 3. Basic (9 classes) school education	• 3. Неполное среднее (9 классов)	• 3. Толук эмес орто билим (9 класс) деңгээли
• 4. Secondary/ general (11 classes) school education	• 4. Среднее общее (11 классов)	• 4. Жалпы орто мектеп (11 класс) деңгээли
• 5. Primary technical (VTS)	• 5. Начальное профессиональное (ПТУ)	• 5. Башталгыч кесиптик билим (ПТУ) деңгээли
• 6. Secondary technical / special (college)	• 6. Среднее профессиональное / специальное (колледж)	• 6. Орто кесиптик / атайын билим (колледж) деңгээли
• 7. Bachelor's degree / University - Not finished/ currently studying	• 7. Не законченное высшее образование / В процессе обучения	• 7. Толук эмес жогорку билим / Окуу процессинде
• 8. University (incl. bachelor, diploma, master) level	• 8. Дипломы ВУЗов (вкл. бакалавриат, диплом специалиста и магистратуры)	• 8. ЖОЖдын диплом (бакалавриат, адистиктин жана магистратуранын дипломун кошкондо)
• 9. Candidate or PHD level	• 9. Кандидаты или доктора наук	• 9. Илимдин кандидаты же доктору
• Other (write)	• Другое (напишите)	• Башка (жазыңыз)
(skip logic, i.e if Other option is selected) **What is your education level**	**Напишите Ваш уровень образования:**	**Сиздин билим деңгээлиңизди жазыңыз:**

Did you take (or currently taking) a training/course, outside of the formal school or university education, on IT, Mathematics, Physics or Chemistry?	**Проходили ли Вы (или в проходите в настоящее время) обучение/курсы вне формального школьного или университетского образования, по информационным технологиям, математике, физике или химии?**	**Сиз IT, математика, физика же химия боюнча расмий мектептен же университеттен тышкаркы окууларды/курстарды алгансызбы (же азыр алып жатасызбы)?**
• Yes	• Да	• Ооба
• No	• Нет	• Жок
• Prefer not to answer	• Предпочитаю не отвечать	• Жооп бербегенден баш тартам
What is your field of university education (i.e., main subject/s)? Please select the closest sector of your education.	**Какова сфера вашего образования (т. е. основные предметы)? Пожалуйста, выберите ближайшую подходящую сферу вашего образования из списка:**	**Сиздин билимиңиздин негизги багыты (б.а. негизги сабактар)? Тизмеден эң жакын сизге тиешелүү болгон тармакты тандаңыз:**
• Natural sciences (heavy on such subjects as Information Technology, Mathematics, Physics, Engineering, Chemistry, other)	• Естественные науки (фокус на такие предметы как информационные технологии, математика, физика, инженерия, химия и др.)	• Табигый илимдер (так илимдер IT, математика, физика, инженерия, химия сыяктуу предметтерге көп басымы бар)
• Social science (economics, finance/banking, politics, law/jurisprudence, sociology, anthropology, tourism/hospitality, etc.)	• Социальные науки (экономика, финансы/банковское дело, политика, право/юриспруденция, социология, антропология, туризм/гостеприимство и т. д.)	• Социалдык илимдер (экономика, финансы/банк иштери, саясат, укук/юриспруденция, социология, антрополия, туризм ж.б. тармактар)
• Humanities and Art (Literature, Languages, Art, etc.)	• Гуманитарные науки и искусство (литература, языки, искусство и т. д.)	• Гуманитардык илимдер жана искусство (адабият, тилдер, искусство ж.б.)
• Not relevant question for me	• Данный вопрос не подходит к моей ситуации	• Бул суроо мага туура келбейт.
• Other	• Другой	• Башка
On the level between 1 (no knowledge) up to 5 (high level of knowledge) how do you assess your knowledge in the following subjects:	**По шкале от 1 (нет знаний) до 5 (наивысший уровень знаний) как Вы оцениваете свои знания по следующим предметам:**	**1ден (билим жок) 5ке (билимдин эң жогорку деңгээли) чейинки шкала боюнча төмөнкү предметтер боюнча өз билимиңизди кандай баалайсыз:**
Information Technology	Информационные технологии	IT /Информация жана технологиялар
Mathematics (average in Algebra, Geometry)	Математика (средняя оценка по алгебре и геометрии)	Математика (алгебра жана геометрия боюнча орточо баасы)
Physics	Физика	Физика

Chemistry	Химия	Химия
Languages	Языки	Тилдер
Literature	Литература	Адабият
Each of the questions above will be assessed using the scale below (from 1 to 5)		
1-No knowledge	1-Нет знаний	1-Билим жок
2-Poor	2-Плохо	2-Жаман
3-Satisfactory	3-Удовлетворительно	3-Канааттандырарлык
4-Good	4-Хорошо	4-Жакшы
5-Excellent	5-Отлично	5-Мыкты/абдан жакшы
Self-efficacy and confidence in STEM / Самоэффективность и уверенность в STEM / STEM боюнча өзүн-өзүнө ишеним		
What are your career aspirations?	**В какой из отраслей вы планируете построить свою карьеру?**	**Карьераңызды кайсы тармакта курууну пландап жатасыз?**
• I am more inclined towards jobs that require a substantial knowledge in exact sciences. For example, occupations that are close to data analysis, computer-related jobs and engineering.	• Я склоняюсь к работам, требующим значительных знаний в области точных наук. Например, профессии, близкие к анализу данных, связанная с компьютером, инженерия.	• Мен так илимдерди талап кылган жумуштарды каалайм. Мисалы, маалыматтарды анализдөө, IT жана компьютер менен байланышкан же инженердик иштер.
• I am more inclined toward jobs that require substantial knowledge in social sciences. For example: economics, finance/banking, politics, law/jurisprudence, sociology, anthropology, tourism/hospitality.	• Я склоняюсь к работам, которые требуют значительных знаний в области социальных наук. Например, экономика, финансы/ банковское дело, политика, право/ юриспруденция, социология, антропология, туризм.	• Мен социалдык илимдерди талап кылган жумуштарды каалайм. Мисалы, экономика, финансы/ банк иштери, саясат, укук/юриспруденция, социология, антрополия, туризм.
• I am more inclined towards jobs that require a substantial knowledge in humanity and art. For example, languages and literature, artists.	• Я склоняюсь к работам, которые требуют значительных знаний в области гуманитарных наук или искусства. Например, языки и литература, искусство.	• Мен гуманитардык же маданият тармагындагы илимдерди талап кылган жумуштарды каалайм. Мисалы, тил, адабият, маданият
• Don't know yet	• Я еще не определился	• Мен азырынча чече элекмин.
• Other	• Другое	• Башка
• Prefer not to answer	• Предпочитаю не отвечать	• Мен жооп бербегенден баш тартам
To what extent does your future dream job require a knowledge of these subjects?	**В какой степени Ваша работа мечты требует знаний каждого из этих предметов?**	**Сиздин кыялыңыздагы жумуш канчалык деңгээлде төмөнкү предметтерди билишин талап кылат?**

Mathematics	Математика	Математика
Physics	Физика	Физика
Information Technology	Информационные технологии	Информационные технологии
Chemistry	Химия	Химия
Engineering	Инженерия	Инженерия
Each of the questions above has the following answer options		
• Yes	• Да	• Ооба
• No	• Нет	• Жок
• Don't know	• Не знаю	• Билбейм
• Prefer not to answer	• Предпочитаю не отвечать	• Мен жооп бербегенден баш тартам
In future, if you would want to pursue/advance your career in STEM field, how confident are you in your abilities and knowledge in the subjects like IT, Math, Physics, Chemistry, Engineering?	**В будущем, если вы захотите продолжить/продвинуться по карьерной лестнице в области STEM, насколько Вы уверены в своих способностях и знаниях по таким предметам, как информационные технологии, математика, физика, химия, инженерия?**	**Келечекте, эгер сиз STEM тармагында карьераңызды улантууну/баштаганды кааласаңыз, IT/Информация технологиялар, математика, физика, химия, инженерия сыяктуу предметтер боюнча өз жөндөмүңүзгө жана билимиңизге канчалык ишенесиз?**
• I am fully confident in my IT, Mathematics, Physics, Chemistry or Engineering skills	• Я полностью уверен в своих знаниях в области информационных технологий, математики, физики, химии или инженерии	• Мен маалыматтык технологиялар, математика, физика, химия же инженерия боюнча билимиме толук ишенем
• If I wanted to, I can easily learn these subjects.	• Если бы я захотел/захотела, я бы легко выучил/а эти предметы.	• Кааласам, бул сабактарды оңой эле үйрөнүп алмакмын.
• I am confident in these subjects, but not to the extent to have a good job or study in the STEM field	• Я уверен в своих знаниях по этим предметам, но не до такой степени, чтобы получить хорошую работу или место в университете в области STEM.	• Мен бул предметтер боюнча өзүмдүн билимиме ишенем, бирок STEM боюнча жакшы жумушка же университетте орунга ээ боло албайм.
• IT, Mathematics, Physics, Chemistry and Engineering are difficult subjects for me.	• IT, Математика, Физика, Химия и Инженерия это сложные предметы для меня.	• IT, математика, физика, химия жана инженерия мен үчүн татаал сабактар.
• There is no way I can succeed in these subjects at all, STEM field is not for me.	• Я не смогу преуспеть в этих предметах, STEM область это не для меня.	• Мен бул предметтер боюнча мыкты боло албайм, STEM мен үчүн эмес.
• STEM is not my field, I never was interested in this field	• STEM не моя область, я никогда не интересовался этой областью	• STEM менин тармагым эмес, мен бул тармакка эч качан кызыккан эмесмин
• Other (specify)	• Другое (указать)	• Башка (көрсөтүңүз)

• Prefer not to answer	• Предпочитаю не отвечать	• Мен жооп бербегенди жактырам
(skip logic, i.e if Other option is selected) Please write OTHER option here	Пожалуйста, напишите ДРУГОЙ вариант выбранный в предыдущем вопросе	Мурунку суроодо тандалган БАШКА вариантты жазыңыз
Family, peer and influence of other stakeholders / Влияние семьи, сверстников и других групп / Үй-бүлөнүн, теңтуштардын жана башка топтордун таасири		
Who influences your career and employment decisions and plans the most (please select all relevant options)?	**Кто больше всего влияет на решения и планы связанные с Вашей карьерой и трудоустройства (пожалуйста, выберите все подходящие варианты)?**	**Сиздин келечек карьераңызга жана жумушуңузга байланыштуу чечимдерге жана пландарга ким чоң таасир этет (тиешелүү болгон бардык топторду тандаңыз)?**
• Parents	• Родители	• Ата-энелер
• School/University teachers	• Преподаватели школы/университета	• Мектептин/университеттин мугалимдери
• Extracurricular activities: clubs, courses, tutoring	• Внеклассная деятельность: кружки, курсы, репетиторство	• Класстан тышкаркы иштер: кружоктор, курстар, репетиторлор
• Peers and friends	• Сверстники и друзья	• Курдаштар жана достор
• Class/group mates	• Одноклассники / одногрупники	• Классташтар/ Группалаштар
• Role-models / Famous people that I follow on social media	• Кумиры / Известные люди, на которых я подписан/а в социальных сетях	• Кумирлер / Социалдык тармактарда мен катталган атактуу адамдар
• Religious leaders	• Религиозные лидеры	• Диний лидерлер
• Government and its institutions	• Государственные органы	• Мамлекеттик органдар
• Other (specify)	• Другое (указать)	• Башка (көрсөтүңүз)
• I do not know/do not want to answer	• Не знаю/не хочу отвечать	• Билбейм/жооп бергим келбейт
(skip logic, i.e if Other option is selected) Please write OTHER group that influences your career and employment decisions.	Пожалуйста, напишите ДРУГУЮ группа, которая влияет на ваш выбор карьеры и решение о трудоустройстве	Сураныч, сиздин кесип же жумуш тандооңузга таасир эткен БАШКА топторду жазыңыз
On the range from 0 to 100, how much your __Parents__ influence your career and employment decisions and plans	**В диапазоне от 0 до 100 оцените, насколько сильно ваши __Родители__ влияют на решения и планы в отношении вашей карьеры и трудоустройства.**	**0-дөн 100гө чейинки шкала боюнча, __Ата-энеңиз__ сиздин карьераңызга жана жумушка орношуу чечимдериңизге жана пландарыңызга канчалык таасир эткендигин көрсөтүңүз.**

Scale from 0 to 100 is presented		
Do your parents support your work/study in STEM?	Поддерживают ли ваши родители вашу работу/учебу в области STEM?	Ата-энеңиз сиздин STEM ишиңизди/окууңузду колдойбу?
Note: other influencers (i.e. parents, School/University teachers, Peers and friends , Class/group mates , Role-models / Famous people that I follow on social media etc.) have the same answer options as the list below		
• 1) No, they do not support or encourage me studying in STEM	• 1) Нет, они не поддерживают и не поощряют мое изучение STEM.	• 1) Жок, алар менин STEMге киришими колдобойт же кубатташпайт.
• 2) More no, rather than yes	• 2) Скорее нет, чем да	• 2) Мен ооба деген варианты жок деген вариантка караганда көбүрөөк колдойм
• 3) Yes, but to a moderate extent	• 3) Да, но в умеренной степени	• 3) Ооба, бирок орточо деңгээлде
• 4) Yes, they support and encourage me studying in STEM	• 4) Да, они поддерживают и поощряют мое вовлечение в STEM	• 4) Ооба, алар мени STEMге кирүүнү толугу менен колдошот жана кубатташат
• Other (write)	• Другое (напишите)	• Башка (жазыныз)
On the range from 0 to 100, how much your __School/University teachers__ influence your career and employment decisions and plans	В диапазоне от 0 до 100 укажите, насколько ваши __ школьные/университетские учителя__ влияют на вашу карьеру и решения о трудоустройстве и планы.	0-дөн 100гө чейинки шкала боюнча, __мектептин/ колледждин мугалимдери__ сиздин карьераңызга жана жумушка орношуу чечимдериңизге жана пландарыңызга канчалык таасир этээрин көрсөтүңүз.
Do your School/University teachers support your work/ study in STEM?	Поддерживают ли преподаватели вашей школы/университета вашу работу/учебу в STEM?	Сиздин мектебиңиздеги/ университетиңиздеги мугалимдер STEM боюнча ишиңизди/окууңузду колдойбу?
On the range from 0 to 10, how much your __extracurricular activities: clubs, courses, tutoring__ influence your career and employment decisions and plans	В диапазоне от 0 до 10 укажите, насколько ваша __внеклассная деятельность: кружки, курсы, репетиторство__ влияют на вашу карьеру и решения о трудоустройстве и планы.	0-дөн 10го чейинки шкала боюнча, __класстан тышкаркы иштер: кружоктор, курстар, репетиторлор__ сиздин карьераңызга жана жумушка орношуу чечимдериңизге жана пландарыңызга канчалык таасир этээрин көрсөтүңүз.
Do your extracurricular activities: clubs, courses, tutoring support your work/study in STEM?	Поддерживает ли внеклассная деятельность: кружки, курсы, репетиторство вашу работу/ учебу в STEM?	Сиздин класстан тышкаркы иштериңиз: кружоктор, курстар, репетиторлор STEM боюнча ишиңизди/окууңузду колдойбу?

On the range from 0 to 100, how much your __peers and friends __ influence your career and employment decisions and plans	В диапазоне от 0 до 100 оцените, насколько сильно ваши __одноклассники и друзья __ влияют на вашу карьеру и решения и планы относительно трудоустройства.	0-дөн 100гө чейинки шкала боюнча __классташтарыңыз жана досторуңуз__ сиздин карьераңызга жана жумушка орношуу чечимдериңизге жана пландарыңызга канчалык таасир эткендигин көрсөтүңүз.
Do your peers and friends support your work/study in STEM?	Поддерживают ли ваши сверстники и друзья вашу работу/учебу в STEM?	Сиздин теңтуштарыңыз жана досторуңуз сиздин STEM ишиңизди/окууңузду колдоп жатышабы?
On the range from 0 to 100, how much your __class/group mates __ influence your career and employment decisions and plans	В диапазоне от 0 до 100 оцените, насколько ваши __ одноклассники / одногрупники__ влияют на вашу карьеру и решения о трудоустройстве и планы.	0-дөн 100гө чейинки шкала боюнча, сиздин __классташтарыңыз/ классташтарыңыз__ сиздин карьераңызга жана жумушка орношуу боюнча чечимдериңизге жана пландарыңызга канчалык таасир эткенин көрсөтүңүз.
Do your class/group mates support your work/study in STEM?	Поддерживают ли ваши одноклассники / одногрупники вашу работу/ учебу в STEM?	Сиздин класташтарыңыз/ класташтарыңыз сиздин STEMдеги ишиңизди/ окууңузду колдойбу?
On the range from 0 to 100, how much your __role-models / famous people that I follow on social media __ influence your career and employment decisions and plans	В диапазоне от 0 до 100 оцените, насколько ваши __модели для подражания/ известные люди, за которыми я следую в социальных сетях, __ влияют на ваши решения и планы в отношении карьеры и трудоустройства	0-дөн 100гө чейинки шкала боюнча, сиздин __ өрнөктүү адамдарыңыз/мен ээрчиген атактуу адамдарыңыз __ сиздин карьераңызга жана жумушка орношуу боюнча чечимдериңизге жана пландарыңызга канчалык таасир этээрин көрсөтүңүз.
Do your role-models / famous people that you follow on social media support your work/ study in STEM?	Поддерживают ли ваши ролевые модели/известные люди, за которыми вы следите в социальных сетях, вашу работу/учебу в STEM?	Социалдык тармактарда сиз ээрчиген үлгүлүү адамдар/белгилүү адамдар сиздин STEM тармагындагы ишиңизди/окууңузду колдойбу?

On the range from 0 to 100, how much your __Religious leaders __ influence your career and employment decisions and plans	В диапазоне от 0 до 100 оцените, насколько сильно ваши __религиозные лидеры __ влияют на вашу карьеру и решения и планы в отношении трудоустройства.	0-дөн 100гө чейинки шкала боюнча, __диний лидерлериңиз__ сиздин карьераңызга жана жумушка орношуу чечимдериңизге жана пландарыңызга канчалык таасир эткендигин көрсөтүңүз.
Do your Religious leaders support your work/study in STEM?	Поддерживают ли ваши религиозные лидеры вашу работу/учебу в STEM?	Диний лидерлериңиз сиздин STEM ишиңизди/окууңузду колдойбу?
On the range from 0 to 100, how much the __Government and its institutions__ influence your career and employment decisions and plans	В диапазоне от 0 до 100 оцените, насколько __правительство и его институты__ влияют на ваши карьерные и трудовые решения и планы.	0-дөн 100гө чейинки шкала боюнча, __өкмөт жана анын мекемелери__ сиздин карьераңызга жана жумушка орношуу боюнча чечимдериңизге жана пландарыңызга канчалык таасир этээрин көрсөтүңүз.
Do the government and its institutions support your work/study in STEM?	Поддерживает ли правительство и его учреждения вашу работу/учебу в области STEM?	Өкмөт жана анын институттары сиздин STEM ишиңизди/окууңузду колдойбу?
STEM Employment and Labour Market / STEM трудоустройство и рынок труда / STEM эмгек рыногу		
Are you currently employed (including self-employed)?	**Работаете ли вы в настоящее время (включая самозанятость)?**	**Сиз азыр иштейсизби (өз-өзүнө жеке ишмердикти да эске алганда)?**
• Yes	• Да	• Ооба
• No	• Нет	• Жок
If yes, does your job require considerable knowledge (more than 50% of your duties) in at least one of these subjects: Information Technology, Mathematics, Physics, Chemistry, or Engineering?	Если да, требует ли ваша работа значительных знаний (более 50% ваших обязанностей) по крайней мере в одном из следующих предметов: Информационные технологии, математика, физика, химия или инженерия?	Эгер ооба болсо, сиздин жумушуңуз төмөнкү предметтерден жок дегенде бирөөсү боюнча билимди (милдетиңиздин 50% ашыгы) талап кылабы: IT/ Информациялык технологиялар, математика, физика, химия же инженерия?
• Yes	• Да	• Ооба
• No	• Нет	• Жок
What sector you are employed in?	**В каком секторе вы работаете?**	**Кайсы тармакта иштейсиз?**
• Unemployed	• Безработная / ный	• Жумушсуз

• Business, consultancy or management	• Бизнес, консультирование или управление	• Бизнес, консалтинг же башкаруу
• Charity and voluntary work	• Благотворительность и волонтерство	• Кайрымдуулук жана волонтерлук
• Accountancy, banking or finance	• Бухгалтерия, банковское дело или финансы	• Бухгалтердик эсеп, банк иши же финансы
• Hospitality or events	• Гостеприимство, проведение мероприятий	• Меймандостук, маареке өкөрүү
• Public services or administration	• Государственные услуги или администрация	• Мамлекеттик кызмат же башкаруу
• Healthcare	• Здравоохранение	• Саламаттык сактоо
• Engineering	• Инжиниринг	• Инженерия
• Computing or IT	• Компьютеры или информационные технологии	• Компьютерлер же IT/маалымат технологиялары
• Marketing, advertising or PR	• Маркетинг, реклама или PR	• Маркетинг, жарнама же PR
• Property or construction	• Недвижимость или строительство	• Кыймылсыз мүлк же курулуш
• Education	• Образование	• Билим берүү
• Environment or agriculture	• Окружающая среда или сельское хозяйство	• Айлана-чөйрө же айыл чарбасы
• Leisure, sport or tourism	• Отдых, спорт или туризм	• Эс алуу, спорт же туризм
• Law enforcement and security	• Правоохранительные органы и безопасность	• Укук коргоо жана коопсуздук
• Recruitment or HR	• Рекрутмент или HR	• Жумушка алуу же HR
• Social care	• Социальная защита	• Социалдык коргоо
• Social media	• Социальные сети	• Социалдык тармак
• Student	• Студент / ка	• Студент
• Creative arts or design	• Творчество или дизайн	• Чыгармачылык же дизайн
• Retail	• Торговля	• Соода
• Transport or logistics	• Транспорт или логистика	• Транспорт же логистика
• Pharmaceuticals	• Фармацевтика	• Фармацевтика
• Energy and utilities	• Энергетика и коммунальные услуги	• Энергетика жана коммуналдык кызматтар
• Law	• Юриспруденция	• Юриспруденция
• Other (write)	• Другое (напишите)	• Башка (жазыңыз)
What is your job title?	**Как называется ваша должность?**	**Кызматыңыздын аталышы эмне?**

Public perception of women in STEM / Общественное мнение о женщинах в STEM /STEMдеги аялдар тууралуу коомдук пикир		
In your opinion, how do people in the country perceive girls and women who pursue careers and education that require strong knowledge in Mathematics, Physics, Chemistry, engineering, and Information Technology	**На ваш взгляд, как жители нашей страны воспринимают девушек и женщин, которые делают карьеру или обучаются профессиям, требующих глубоких знаний в области математики, физики, химии, инженерии и информационных технологий?**	**Сиздин оюңузча, математика, физика, химия, инженерия жана IT предметтер боюнча терең билимди талап кылган кесиптерде карьера жасаган (же ошол тармакта окуган) кыз-келиндер жөнүндө эмне деп ойлошот?**
• I think, they are looked down at, as this is not normal or not widely accepted in society as these subjects are not for women/girls	• Я думаю что люди смотрят свысока, так как это ненормально или не принято в обществе, поскольку это не для женщин/девушек.	• Менимче, бул аялдар/кыздар үчүн эмес, бул нормалдуу эмес жана коом тарабынан колдолбойт.
• I think that nobody cares, as this is down to women/girls themselves to choose what they will do with their lives	• Мне кажется, что это никого это не волнует, так как женщины/девушки сами выбирают, что им делать со своей жизнью.	• Менимче, аялдар/кыздар өздөрүнүн жашоосу менен эмне кылууну өздөрү гана бишилет, башка адамдардын ага кызыгы жок.
• I think they are admired with, as they are strong and independent women/girls	• Мне кажется, что ими восхищаются, так как это сильные и независимые женщины/девушки	• Менимче, андай аялдар/кыздар коомчулукта күчтүү жана көз карандысыз болуп каралат.
• Other (write)	• Другое (напишите)	• Башка (жазыңыз)
• Do not know / Prefer not to answer	• Не знаю / Предпочитаю не отвечать	• Билбейм / Жооп бербегенден баш тартам
(skip logic, i.e if Other option is selected) Please write OTHER option here	Пожалуйста, распишите Ваш/ДРУГОЙ вариант:	Сураныч, сиздин БАШКА опцияңызды бул жерге тактап жазыңыз:
Root causes of why fewer women/girls choose STEM / Причины того, почему меньше женщин/девочек выбирают STEM /Эмне үчүн аз аялдар/кыздар STEMди тандашат		
In your opinion, what prevents women/girls from building a career in the fields that require strong skills in mathematics, physics, information technology, engineering, and chemistry?	**На ваш взгляд, что мешает женщинам/девушкам строить карьеру в областях, требующих сильных навыков в математике, физике, информационных технологиях, технике и химии?**	**Сиздин оюңузча, аялдарга/кыздарга математика, физика, IT, инженерия жана химия боюнча күчтүү билимди талап кылган тармактарда карьера курууга эмне тоскоол болууда?**
• I do not see any barriers at all	• Вообще не вижу никаких препятствий	• Мен эч кандай тоскоолдуктарды көрбөй турам

• I think that these subjects/fields are difficult for women/girls	• Я думаю, что эти предметы/области сложны для женщин/девочек	• Менимче, бул предметтер/аймактар аялдар/кыздар үчүн кыйын
• I think that men intellectually superior to women in these subjects	• Я думаю, что мужчины интеллектуально превосходят женщин в этих предметах	• Бул предметтерден эркектер аялдардан интеллектуалдык жактан жогору деп ойлойм.
• I think that parents do not allow their daughters to pursue employment in these fields because there are male dominated field	• Я думаю, что родители не позволяют своим дочерям работать в этих областях, потому что там преобладают мужчины	• Менимче, ата-энелер кыздарды эркектер үстөмдүк кылган аймактарда иштөөгө жөнөтпөйт
• I think that boys get more support and encouragement from parents/teachers on these subjects than girls	• Мне кажется, что мальчики получают больше поддержки и поощрения от родителей/учителей по этим предметам, чем девочки	• Менин оюмча, бул предметтерден балдар кыздарга караганда ата-энелерден/мугалимдерден көбүрөөк колдоо жана дем-күч алышат
• I think that schools do not provide enough support to girls to advance in STEM subjects	• Мне кажется, что школы не оказывают достаточной поддержки девочкам для их продвижения STEM предметам	• Менимче, мектептерде STEM предметтерден кыздарга жетиштүү колдоо көрсөтүлбөйт
• I believe that these fields take too much of time and energy and will interfere to build a family	• Мне кажется, что эта сфера отнимают слишком много сил и времени у женщин/девушек и мешает построить семью	• Менимче, бул тармак аялдардан/кыздардан өтө көп убакытты жана күч-аракетти талап кылгандыктан, үй-бүлө курууга тоскоол болот
• I think that females do not need hard jobs as earning money is their husband's responsibility	• Я думаю, что женщинам не нужна тяжелая работа, так как зарабатывание денег — это обязанность их мужа	• Менимче, акча табуу бул күйөөсүнүн милдети болгондуктан аялдарга оор жумуштун кереги жок
• I think women are not capable to take leading positions in STEM	• Я считаю, что женщины не способны занимать лидирующие позиции в STEM	• Менимче, аялдар STEM чөйрөсүндө лидерлик позицияларды алалбайт
• Other (specify)	• Другое (напишите)	• Башка (жазыңыз)
• Do not want to answer	• Предпочитаю не отвечать	• Жооп бербегенден баш тартам
(skip logic, i.e if Other option is selected) Please write OTHER option here	Пожалуйста, распишите Ваш/ДРУГОЙ вариант:	Сураныч, сиздин БАШКА опцияңызды бул жерге тактап жазыңыз:

What key challenges do you face in your work/study?	С какими ключевыми проблемами вы сталкиваетесь в своей работе/учебе?	Сиздин жумушуңузда/ окууңузда кандай негизги кыйынчылыктарыңыз бар?
• My opinions are not taken seriously among my male colleagues/group mates	• Мои коллеги-мужчины/ одногруппники не воспринимают мое мнение всерьез	• Менин эркек кесиптештерим/ группалаштарым менин пикириме олуттуу (не воспринимают всерьез) мамиле кылышпайт
• I am mostly given administrative tasks rather than technical tasks	• В основном мне дают административные работы, а не технические задачи	• Көбүнчө мага техникалык тапшырмаларды эмес, административдик жумуштарды гана беришет
• I am paid less than my male colleagues for the same job / I am given a lower grade than my male group mates for the same level of study	• Мне платят меньше, чем моим коллегам-мужчинам за ту же работу / мне дают более низкую оценку, чем моим одногруппникам-мужчинам за тот же уровень обучения	• Мен ошол эле жумуш үчүн эркек кесиптештериме караганда аз айлык алам/ мага бирдей деңгээлдеги окуу үчүн группалаштарымдан төмөн баа берилет
• My household/family responsibilities is a considerable obstacle to do my work/study well	• Мои домашние/ семейные обязанности являются значительным препятствием для хорошей работы/учебы	• Менин үй-бүлөлүк милдеттерим менин жакшы жумуш/окуу алып барышыма чоң тоскоолдук кылат
• My family/parents do not approve of me working/ studying in the STEM field as they see it to be hard for women	• Моя семья/родители не одобряют мою работу/ учебу в STEM сфере, так как считают, что это слишком тяжело для женщин	• Менин үй-бүлөм/ата-энем STEM тармагында иштөөмө/окуума макулдук бербейт, анткени бул аялдар үчүн өтө оор деп эсептешет
• My work/study place has poor conditions for women (too short or no maternity leave, non-gender friendly environment, lack of social security measures, poor child-friendly culture, lack of facilities for breast-feeding mathers etc.)	• На мой работе/ учебе плохие условия для женщин (слишком короткий или отсутствие декретного отпуска, неблагоприятная гендерная среда, отсутствие мер социального обеспечения, неблагоприятная среда для матерей с детьми, нет условий для женщин с грудным ребенком и т. д.)	• Менин жумушумдагы/ окуумдагы чөйрө аялдар үчүн начар (өтө кыска декреттик отпуск же анын жоктугу, жагымсыз гендердик чөйрө, бакубаттык чаралардын жоктугу, балалуу энелер үчүн жагымсыз чөйрө, эмгизип жаткан аялдарга шарттын жоктугу ж.б.)
• Other (specify)	• Другое (напишите)	• Башка (жазыңыз)
• Do not want to answer	• Предпочитаю не отвечать	• Жооп бербегенден баш тартам

(skip logic, i.e if Other option is selected) Please write OTHER option here	Пожалуйста, распишите Ваш/ ДРУГОЙ вариант:	Сураныч, сиздин БАШКА опцияңызды бул жерге тактап жазыңыз:
What is needed the most for women/girls to advance in STEM professions?	**Что больше всего нужно для продвижения женщин/девочек в STEM-профессиях?**	**Аялдарды/кыздарды STEM кесиптеринде өнүктүрүү үчүн эмне керек?**
• Tackle gender stereotypes and social norms to encourage and promote women's/girls' participation in STEM	• Проведение работ по искоренению гендерных стереотипов и социальных нормам для продвижения и поощрения участия женщин/девочек в STEM	• Аялдардын/кыздардын STEMге катышуусун илгерилетүү жана стимулдаштыруу үчүн гендердик стереотиптерди жана социалдык нормаларды жоюу боюнча иштерди жүргүзүү
• Increase awareness of public about success stories of women in STEM	• Повысить осведомленность общественности об историях успеха женщин/девочек в STEM	• Аялдардын/кыздардын STEMдеги ийгиликтери тууралуу коомчулуктун маалымдуулугун жогорулатуу
• Train and educate parents to encourage girls to participate in STEM	• Обучение родителей о необходимости поощрение дочерей к активному участию в STEM	• Кыздарды STEMге көбүрөөк тартууга шыктандыруу зарылчылыгы жөнүндө ата-энелерди окутуу
• Advocate for government programmes and initiatives to promote women in STEM field	• Продвигать разработку государственных программ и инициатив по продвижению женщин/девочек в STEM	• STEM тармагында аялдарды алга жылдыруу үчүн мамлекеттик программаларды жана демилгелерди өнүктүрүү
• Create and promote extracurricular STEM education courses/activities at the local level	• Создание и продвижение внеклассных образовательных курсов/мероприятий для женщин/девочек в STEM на местном уровне	• Жергиликтүү деңгээлде STEM боюнча аялдар/ кыздар үчүн класстан тышкаркы билим берүү курстарын/иштерин түзүү жана жайылтуу
• Create and run STEM mentoring initiatives for women/girls	• Создание и реализация инициатив по наставничеству/ менторству STEM для женщин/девочек	• Аялдар/кыздар үчүн STEM насаатчылык демилгелерин түзүү жана ишке киргизүү
• Promote high quality teaching in STEM subjects at schools	• Способствовать повышению качества преподавания предметов STEM в школах	• Мектептерде STEM сабактарынын окутуунун сапатын көтөрүү боюнча иш-аракеттерди жүргүзүү
• Other (write)	• Другое (напишите)	• Башка (жазыныз)

Future trends of women's/girls' participation in STEM / Будущие тенденции участия женщин/девочек в STEM / STEMге аялдардын/кыздардын катышуусунун келеч		
To what extent do you agree or disagree with the following statements?	**На сколько Вы согласны или не согласны со следующими утверждениями?**	**Сиз төмөнкү билдирүүлөр менен канчалык деңгээлде макулсуз же макул эмессиз?**
More women/girls will enter STEM as we live in an open and democratic society, and things will improve naturally without the provision of any special support to women/girls.	Все больше женщин/девушек будет вовлекаться в STEM, поскольку мы живем в открытом и демократическом обществе, и все будет улучшаться естественным образом, без оказания какой-либо специальной поддержки женщинам/девушкам.	Биз ачык жана демократиялык коомдо жашап жаткандыктан, STEMге көбүрөөк аялдар/кыздар тартылат жана аялдарга/кыздарга өзгөчө колдоо көрсөтүлбөстөн өз алдынча (самостоятельно) түрдө жакшырат.
Women's/girls' participation in STEM can improve when adequate support and encouragement for girls/women are provided	Участие женщин/девушек в STEM может улучшиться, если женщины/девушки получат адекватную поддержку и поощрение.	Эгерде аялдарга/кыздарга адекваттуу колдоого жана кубат берилсе аялдардын/кыздардын STEMге катышуусу жакшырат.
The situation of limited participation of women/girls in STEM will not change until radical reforms are implemented in society and in the education system	Ситуация с ограниченным участием женщин/девушек в STEM не изменится, пока не будут проведены радикальные реформы в обществе и в системе образования.	Коомдо жана билим берүү системасында радикалдуу реформалар болмоюнча STEMге аялдардын/кыздардын чектелген катышуу абалы өзгөрбөйт.
The situation of limited participation of women/girls in STEM will get worse as our society becomes more traditional.	Из-за того что наше общество становится более традиционным, ситуация с ограниченным участием женщин/девочек в STEM будет ухудшаться.	Биздин коом салттуу (традиционный) болуп жаткандыктан, STEMге аялдардын/кыздардын чектелген катышуусу уланып мынданда начарлайт.
There is no need to do anything regarding women's/girls' participation in STEM as the current situation is absolutely fine.	Нет никакой необходимости что-либо делать для увеличения вовлеченности женщин/девушек в STEM, поскольку текущая ситуация абсолютно нормальная.	STEMге аялдарды/кыздарды катышуусун күчөтүү үчүн эч нерсе кылуунун кереги жок, анткени азыркы абал нормалдуу.
Each of the questions above is measured on the scale from 1 to 5 bel		
• 1 strongly disagree	• 1 категорически не согласен	• 1 такыр макул эмесмин
• 2 disagree	• 2 не согласен	• 2 макул эмесмин
• 3 neither agree or disagree	• 3 ни согласен, ни не согласен	• 3 макул да, каршы да эмесмин
• 4 agree	• 4 согласен	• 4 макулмун
• 5 strongly agree	• 5 полностью согласен	• 5 толугу менен макулмун
• Don't know / prefer not to answer	• Не знаю / предпочитаю не отвечать	• Билбейм / жооп бербегенден баш тартам

Can you elaborate on your answers to your responses above? Why have you agreed or disagreed with the statements around future trends of women's/girls' participation in STEM?	**Не могли бы ли Вы немного разьяснить Ваши ответы, почему Вы согласились или не согласились с данными утверждениями о будущих тенденциях участия женщин/девочек в STEM?**	**Жоопторуңузга кененирээк маалымат бере кетсеңиз, эмне үчүн аялдардын/кыздардын STEMге катышуусунун келечектеги тенденциялары жөнүндө билдирүүлөргө макул болдуңуз же макул болдуңуз жөнүндө?**
In your opinion, do you think the number of women/girls should be increased in IT, Physics, Chemistry, Engineering, and other natural/exact science-related employment?	**Как вы считаете, следует ли увеличить число женщин/девушек в сфере информационных технологий, физики, химии, инженерии и других специальностей, связанных с естественными/точными науками?**	**Сиздин оюңузча IT, физика, химия, инженерия жана башка табигый/так илимдерге тиешелүү адистиктерде аялдардын/кыздардын санын көбөйтүү керекпи?**
• Yes	• Да	• Ооба
• No	• Нет	• Жок
• Don't know / Prefer not to answer	• Не знаю / Предпочитаю не отвечать	• Билбейм / Жооп бербегенден баш тартам
If yes, what are your recommendations/solutions to increase the number of girls in STEM?	**Если да, то каковы Ваши рекомендации/решения по увеличению числа девушек в STEM?**	**Ооба болсо, STEM боюнча аялдардын/кыздардын санын көбөйтүү боюнча кандай сунуштарды берет элениз?**
If not, why do you think that there is no need to increase women's/girls' participation in STEM?	**Если нет, то почему Вы считаете, что нет необходимости увеличивать участие женщин/девочек в STEM?**	**Эгерде жок болсо, эмне үчүн аялдардын/кыздардын STEMге катышуусун көбөйтүүнүн кереги жок деп ойлойсуз?**
You can write any additional information relevant to the topic of this study:	**Вы можете написать любую дополнительную информацию, относящуюся к теме данного исследования:**	**Сиз бул изилдөө темасына байланыштуу болгон кошумча маалыматты бул жерге жаза аласыз:**
Demographic information / Демографическая информация / Демографиялык маалымат		
Your location:	**Ваше место жительства:**	**Сиздин жашаган жериңиз:**
• Bishkek city	• Бишкек	• Бишкек
• Osh city	• Ош	• Ош
• Batken oblast	• Баткенская область	• Баткен облусу
• Jalal-Abad oblast	• Жалал-Абадская область	• Жалал-Абад области
• Naryn oblast	• Нарынская область	• Нарын области
• Osh oblast	• Ошская область	• Ош области
• Talas oblast	• Таласская область	• Талас области
• Chui oblast	• Чуйская область	• Чүй облусу
• Other	• Другое (напишите)	• Башка (жазыңыз)

Please write the location you live in:	Пожалуйста укажите место вашего жительства:	Сураныч, сиздин жашаган жериңизди жазыңыз:
Respondent's name	**Имя респондента**	**Респонденттин аты**
Age (full number of years)	**Возраст (полных лет)**	**Толук жашы:**
Phone number on which we can contact you with for the clarification purposes:	**Номер телефона по которому мы сможем связаться с вами для возможного уточнения данных**	**Телефон номериңиз. Биз тактоо максатында сиз менен байланышыбыз мүмкүн.**
Ethnicity:	**Ваша этническая принадлежность?**	**Сиздин улутуңуз?**
• Kyrgyz	• Кыргыз	• Кыргыз
• Uzbeks	• Узбек	• Өзбек
• Russian	• Русский	• Орус
• Other (specify)	• Другой (указать)	• Башка (көрсөтүңүз)
(skip logic, i.e if Other option is selected) Write your ethnicity:	Напишите вашу этническую принадлежность:	Сиздин улутуңузду жазыңыз
Your marital status	**Каково Ваше семейное положение?**	**Сиздин үй-бүлөлүк статусуңуз?**
• Single / not married	• Холостой/незамужем	• Бойдок /Үйлөнгөн эмес
• I am in a relationship and we live together	• Я нахожусь в отношениях и мы живем вместе	• Мен мамиледемин, биз чогуу жашайбыз
• Married	• Женат / замужем	• Үй-бүлөлүү
• Divorced	• В разводе	• Ажырашкан
• Widow / Widower	• Вдова / вдовец	• Жесир / жесир
• Other (write)	• Другое (уточнить)	• Башка (жазыныз)
• Prefer not to answer	• Не хочу отвечать	• Жооп бергенден баш тартам
(skip logic, i.e if Other option is selected) What is your marital status, please write:	Напишите Ваше семейное положение:	Сиздин үй-бүлөлүк статусуңузду жазыңыз:
Do you have children?	**У Вас есть дети?**	**Сиздин балдарыңыз барбы?**
Yes	Да	Ооба
No	Нет	Жок
If yes, how many children do you have?	Если да, то сколько у Вас детей?	Ооба болсо, канча балаңыз бар?

Thank you very much for completing the form. If you are interested in the results of this survey and/or want to follow up on further STEM initiatives, you can follow the social media of UNDP Kyrgyzstan or contact AccLab.kg@undp.org .	Большое спасибо за заполнение формы. Если Вы заинтересованы в результатах этого опроса и/или хотите следить за дальнейшими STEM инициативами, Вы можете подписаться на социальные сети ПРООН в Кыргызстане или связаться с нами по AccLab.kg@undp.org .	Анкетаны толтурганыңыз үчүн чоң рахмат. Эгерде сизди бул сурамжылоонун жыйынтыктары кызыктырса жана/же STEM боюнча мындан аркы демилгелер жөнүндө маалымат алгыңыз келсе, Кыргызстандагы ПРООНдун социалдык тармактарына жазылсаңыз же AccLab.kg@undp.org дареги боюнча биз менен байланышсаңыз болот.
Record your current location	**Record your current location GPS**	**Record your current location, GPS**
Enumerator name	**Имя Энумератора**	**Энумератордун аты**

ANNEX 5 – Interview questions with stakeholders

Purpose

We at Empirica International Research and Consultancy Institute are conducting a study on women's/girls' participation in STEM (Science, Technology, Engineering, and Mathematics). This study is being conducted for UNDP Kyrgyzstan. The goal is to understand the existing situation of women/girls in STEM or wanting to pursue a career in STEM in Kyrgyzstan, especially regarding challenges and barriers preventing women/girls from participating in STEM.

Voluntary Participation

Participation in this interview today is voluntary. You are free to decide if you want to take part or not. If you agree to participate now, you can also change your mind during the discussion without any implications.

Procedures

The interview will take around 60 minutes. If you do not understand a question, please let me know. There are no right or wrong answers, and we hope you will share your experiences/views on this subject with us.

Benefits

The information generated from the interview will help us understand the existing situation of women/girls in STEM or wanting to pursue a career in STEM in Kyrgyzstan. We will write a report for UNDP with recommendations to promote women's/girls' participation in STEM.

Confidentiality and Anonymity

All information will be kept confidential and will not be shared with anyone outside the research team. Your name will not be used in the report. Findings will be aggregated and summarised in the report. When using quotes from the transcripts, we will provide details such as the mode of data collection, the date of the interview, the gender of the interviewee, and the type of organisation the interviewee represents

We would like to use a recorder during the discussion if you agree. The recording will only be used to ensure the accuracy of the collected data. Your name will not be stated in the recordings and transcripts. They will be deleted once the report is finalised and approved by UNDP.

If you have any questions or comments, you can ask them from me or can call our office on 0771 494949.
Do you have any questions that you would like to ask? Do you give your consent to participate in the interview?

Introductory questions

1) **For women in STEM**, could you tell us about your work/study in STEM? What do you do/ study? How did you get into STEM? Can you tell us about your journey (key events/stages)?
2) **For organisations in STEM, Is there any activities your organisation implements to** to promote women in STEM, and why do you focus exactly on these priorities?

STEM Employment and LM

1) How would you assess participation of women/girls in STEM education/career?
2) What are the key factors that contribute to women's/girls' participation in STEM education and career?
3) What are the key factors that hinder women's/girls' participation in STEM education and career? What are the key challenges that you encounter or you heard about other STEM women in your work/study?
4) For you personally, was there social pressure to quit STEM? Please elaborate on your answer **(not asked if men and if organisation unless women is in STEM)**.
5) What has motivated you to pursue STEM **(not asked if men and if organisation unless women is in STEM)**?

STEM Education

6) From your experience/expertise, is there anything that needs to be improved in the school education system to encourage more participation of girls in STEM?
7) How about the attitude and approaches of teachers/ school educators on women/girls pursuing STEM? Should there be made any changes?

Family and peer influence

8) How would you assess the influence of family and peers on the decision of girls to pursue a career in STEM?
9) Do you agree or disagree that girls require additional support in STEM as there is societal bias encouraging boys and discouraging girls from studying and pursuing jobs in STEM? Please elaborate on your answer.

Self-efficacy and confidence

10) What can you say about the confidence and motivation of the girls to pursue an occupation in such a field?
11) To what extent do you think the prominent women role models could make a difference and encourage girls to engage in the STEM field? Will it boost confidence and attract more girls into the field? You can refer to your expereince if relevant.
12) Do you remember any story or a person that inspired you? Can you please share? **(not asked if men and if organisation unless women is in STEM)**?

Stakeholder mapping

13) Who are the key people or organisations in your community or in Kyrgyzstan in general

who influence either positively or negatively the involvement of women/girls in STEM education/labour market? (Probe to ask for specific institutions/organisations/individuals)?

14) (**For organisations**), who do you work with to promote women in STEM? How would you assess the strength of your partnership?

Future trends and recommendations

15) How do you see women's participation in STEM in the future? Are you positive or negative about future trends? Could you elaborate on your answer?

16) What should be done to support women so that they pursue a education and career in STEM? Can you share examples?

17) What recommendations would you give in order to improve women's/girls' participation in STEM in the future? What should be done and by who?

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#STEM4ALL #undpkg
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