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THE GENDER GAP IN THE DIGITAL ECONOMY: THE ECONOMIC IMPACT

Mirhamidova Zakhinabonu Mirhamid kizi

Urolova Shahzoda Anvarjon kizi

Gulistan State University

ORCID: 0009-0007-6640-8876

zakhinabonu.mirkhamidova@inbox.ru

shahzodauralova00@gmail.com

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Abstract. This paper examines the economic impact of the gender gap in the digital economy. It demonstrates that, despite the high innovative potential of digital sectors, women remain under-represented in high-productivity IT roles, venture entrepreneurship and the management of platform-based employment (see Table 1). The paper hypothesises that this asymmetry leads to measurable macroeconomic losses — reduced productivity, underproduction of digital products and a hindrance to innovation. A methodology for cross-country regression analysis using OECD and World Bank data is proposed. Additionally, the case of Uzbekistan is examined, where between 2018 and 2024 the number of female students in ICT programmes increased by 430%, yet a significant gap in digital skills persists (women lagging behind by 24% according to UNDP estimates, 2022). The expected results suggest that reducing the gender digital divide is not only a social measure but also a factor in economic growth. The scope of the work corresponds to the format of academic abstracts (1–2 pages).

Keywords: gender gap, digital economy, economic impact, labour productivity, venture capital investment, cross-country analysis, GDP underproduction, Uzbekistan.

The digital economy is increasingly seen as a driver of global growth: it creates new markets, reduces transaction costs and opens up access to employment regardless of geographical location. However, the widespread perception of the digital environment as ‘equal for all’ is not borne out by the statistics. Women hold only around 22% of positions in the field of artificial intelligence, receive 30–40% less venture capital funding compared to male-led start-ups, and are more often involved in routine digital roles (data entry, moderation) than in highly skilled development [1–3].

The problem of the gender gap in the digital economy has not only a social but also an economic dimension. Excluding half the population from the most productive segments of the digital market leads to losses in total factor productivity, a reduction in the diversity of innovative solutions and, ultimately, to a shortfall in GDP. At the same time, there is a lack of quantitative estimates of this effect in the academic literature. Most studies focus on internet access or digital skills, but not on the direct economic consequences of gender asymmetry in employment and entrepreneurship.

The aim of this paper is to formulate and substantiate a hypothesis regarding the macroeconomic costs of the gender gap in the digital sector, to propose a methodology for their quantitative assessment, and to present the expected results in the form of research abstracts.

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The digital economy is traditionally positioned as more flexible and meritocratic than traditional sectors. However, empirical data show a persistent gender gap: women are less likely to hold technical and managerial positions in IT, are under-represented on digital platforms (freelancing, ride-hailing, delivery) and are more often relegated to routine 'digital support' roles. This gap is not only unfair but also economically inefficient.

It is posited that gender asymmetry in digital employment leads to measurable macroeconomic losses: underproduction of digital products, a decline in total factor productivity, and a slowdown in innovation activity. This effect is mediated by two mechanisms: a) direct – the exclusion of women from high-productivity digital roles; b) indirect – the restriction of digital entrepreneurship and investment in women-led start-ups.

To test the hypothesis, we propose a cross-country analysis of data (OECD, Eurostat, World Bank) covering 30 countries over the last 10 years. Key variables: the share of women in IT employment, the gender digital divide index (internet access, digital skills), and the share of female-led start-ups in venture capital portfolios. The dependent variable is the share of the digital sector in GDP and productivity growth rates. Method: fixed-effects regression.

Empirical data confirm the systemic nature of the problem (see Table 1). According to the latest OECD data (2025), the average proportion of women among IT engineers in OECD countries is only 20.6%, ranging from 9% in the Czech Republic to 29.5% in Israel. In the EU, women hold only 19.5% of jobs in the ICT sector, whilst globally the proportion of women among software developers does not exceed 20% (Statista, 2024). The situation is even more concerning at the educational level: women account for only 28% of engineering graduates and 40% of computer science graduates. These figures indicate that the gender gap persists at every stage of a career path — from choosing a degree programme to employment and funding for entrepreneurial projects (the share of venture capital for female-led start-ups in Europe does not exceed 21%).

Table 1.

Key indicators of the gender gap in the digital economy

Indicator	Value	Source
Proportion of women among ICT professionals in the EU (2024)	19.5%	Eurostat
Proportion of women among ICT professionals in Russia (2024)	32%	Rosstat
Average proportion of women among IT engineers in OECD countries	20.6%	OECD / Human Resources(2025)
Range of the proportion of women among IT professionals in OECD countries	9% (Czech Republic) – 29.5% (Israel)	OECD Going Digital Toolkit

OECD countries with the highest proportion of women among IT engineers (2025)	Israel (29.5%), Ireland (26.3%), Estonia (24.5%), Sweden (23.9%)	Human Resocia (2025)
Proportion of women among all IT professionals worldwide (2025)	27.6%	StrongDM (2024)
Proportion of women among software developers worldwide (2025)	20% (5.74 million out of 28.7 million)	Statista (2024)
Proportion of women among AI specialists worldwide	22%	WEF / UNESCO
Proportion of women in STEM professions worldwide (2025)	28%	UNESCO
Proportion of women among engineering graduates worldwide	28%	UNESCO
Proportion of women among graduates in information and computer science	40%	UNESCO
Proportion of women among platform workers in the EU	38%	Eurofound
Proportion of venture capital received by companies co-founded by women in Europe (2024)	20.6%	PitchBook (2025)
Gender gap inmobile internet usage (low- and middle-income countries)	Women are 15% less likely than men to use mobile internet	World Bank

Note: The table is based on data from 2024–2025 from official sources (OECD, Eurostat, World Bank, PitchBook, UNESCO, Eurofound).

With regard to Uzbekistan, the analysis of the data illustrates both positive developments and persistent structural problems. On the one hand, the country is showing impressive growth: between 2018 and 2024, the number of female students in ICT programmes rose from ~3,400

to 18,240, representing a 430% increase**.** The proportion of women among all ICT students increased from 19% in 2018 to 23% in 2024. In 2024, 7,197 women graduated with degrees in ICT disciplines, compared to 3,116 in 2018, more than doubling the annual influx of female talent into the technology sector. Overall, women account for 51% of the total number of university students in Uzbekistan [7; 11].

However, despite this progress, Uzbekistan (27%) lags behind the global average (35%) in terms of the proportion of women among STEM graduates. According to a UNDP assessment (2022), the digital skills of women in Uzbekistan lag behind those of men by 24%, and according to UNICEF data (2024), 68% of women in the country have never used the internet (compared to 34% of men) [7; 8].

The Uzbekistan case is important for cross-country analysis for two reasons. Firstly, it shows that targeted government policy (the GAP Women IT Union programmes, the 'One Million Programmers' initiative, and the FoundHer project at IT Park) can accelerate women's participation in the digital economy. Secondly, it demonstrates that an increase in the number of female students in ICT does not automatically solve the problem of the digital divide in skills and internet access, which requires comprehensive measures.

Based on the hypothesis put forward and the proposed methodology, several quantitative estimates are expected to be obtained. Firstly, a 10-percentage-point increase in the proportion of women in digital professions is expected to correlate with a 3–5% rise in the digital sector's productivity (after controlling for the level of economic development). Furthermore, it is anticipated that countries with a low gender digital divide (such as Estonia and Finland) demonstrate greater resilience in digital exports and a higher number of IT patents. Finally**,** the costs associated with the exclusion of women from venture capital funding — that is, the capital lost to projects co-founded by women — may amount to 1–2% of total investment in the digital sector.

Conclusions. The gender gap in the digital economy is not only a social but also an economic problem. Policies aimed at engaging women in digital professions (mentoring, reskilling, quotas in venture programmes) can yield a positive macroeconomic effect comparable to infrastructure investment. The case of Uzbekistan confirms that targeted government efforts can achieve rapid growth in women's participation in ICT education; however, additional measures are needed to close the gap in digital skills and internet access. Further research is needed to clarify the causal relationships, particularly to determine to what extent the gap reduces productivity and to what extent productivity contributes to a more even distribution.

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