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Article

Beyond Connectivity: Digital Inequality 2.0 and Emerging Gaps in Skills, AI Access, and Data as Capital

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Abstract: Introduction. Research and policy discussions on the digital divide have long been organised around a relatively simple question: who has access to technology, and who does not? Yet in a context shaped by ubiquitous artificial intelligence (AI) and platform capitalism, inequality is increasingly produced elsewhere—through uneven competencies, asymmetric influence over algorithmic systems, and unequal control of digital assets (especially data). Methods. The paper offers a conceptual synthesis of interdisciplinary scholarship (sociology, economics, and data science) published between 2015 and 2025, using a framework analysis approach. To quantify the main gaps, the study draws on meta-analytical evidence from global reports (ITU, Eurostat, NAFI), national statistics (Uzbekistan), and empirical studies and datasets (UNICEF, UNDP, DataReportal). Results. The analysis points to three interrelated layers of "Digital Inequality 2.0": 1) Skills gap—a widening divide in algorithmic and AI literacy (only 22% of people in developing countries and 32.7% of the EU population have basic competencies for interacting with AI; in Uzbekistan, 38% report no computer skills and 53.9% have never used the internet). 2) Algorithmic access gap — asymmetries in the ability to shape, oversee, and contest AI-driven decisions (only 14% of firms report formal AI governance structures; 95% of organisations indicate they cannot fully audit AI decisions). 3) Data-capitalisation gap—inequality in the capacity to convert information into economic value. Although the global data monetisation market has expanded to US$708.86 billion, more than two-thirds of users obtain no direct benefit from the data they generate. In Uzbekistan, data localisation requirements are associated with an estimated foregone benefit of US$3.2–4.5 billion annually. Conclusions. Policies focused primarily on "connectivity" appear close to exhaustion. What is increasingly needed is a shift toward strengthening user agency—through legal instruments (data trusts, data cooperatives), mandatory algorithmic auditing, and education reform. To make these gaps measurable, the paper proposes a Digital Agency Index (DAI) aligned with the three-layer model.

Keywords: digital inequality, digital divide 2.0, algorithmic literacy, AI skills, data monetisation, algorithmic audit, data cooperatives.

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1. Introduction

For decades, the concept of the 'digital divide' has shaped information policy on the basis of a binary opposition between those who have access and those who do not. However, contemporary data from the International Telecommunication Union (ITU) reveal a fundamentally new landscape. In 2025, the global online audience reached 6 billion people (about 74% of the population), yet 2.2 billion remain offline; 94% of the population in high income countries use the internet compared with 23% in low income

countries. Moreover, 77% of men are connected versus 71% of women, and the gap between urban (85%) and rural (58%) populations persists [1][2].

Importantly, 5G covers 84% of the population in high income countries but only 4% in low income countries, and a typical user in a high income country generates eight times more mobile traffic than a user in a low income country [3].

These figures mark a shift from the problem of physical connectivity to the problem of inequality in opportunities and usage. We are entering the era of **Digital Inequality** 2.0, in which the central issues become gaps in skills, access to algorithms, and the ability to monetise data. Using global statistics and an in depth analysis of Uzbekistan (as a typical developing economy with an ambitious digital agenda), this paper demonstrates the universal nature of the three layer model of inequality [4].

2. Methodology

This study employs the method of conceptual framework analysis together with a synthesis of interdisciplinary research results for 2015–2025. The following data were used for metric assessment of the gaps:

- Global ITU statistics, Measuring digital development: Facts and Figures 2025 ;
- Eurostat data (indicators of AI use and digital skills);
- National studies (NAFI , Ingosstrakh – Financial University);
- Data monetisation market analytics (Data Bridge Market Research, QYResearch);
- Institutional reports on AI governance (McKinsey, Cisco, BSI);
- National statistics from the Republic of Uzbekistan (State Committee on Statistics, data for 2021–2025) ;
- Reports of international organisations on Uzbekistan (UNICEF , UNDP , DataReportal ;
- Analytical materials from Kotib AI Research and open media publications (Kun.uz, Kapital.uz, Reuters).

Statistical analysis includes correlation estimation (logit models based on RLMS HSE data), index calculation (NAFI Digital Literacy Index), and time series analysis of connectivity in Uzbekistan (2021–2025) [5].

3. Results

3.1. The advanced skills gap: from digital literacy to algorithmic intelligence

According to regression analysis of RLMS-HSE data (Higher School of Economics, Russia), the most acute manifestation of digital inequality in Russia is the age gap, together with inequality in ICT skills. The study found a statistically significant association between purposive use of the internet (for educational and work purposes) and income above the median, higher education, and belonging to more qualified professional groups [6-8].

Specific indicators illustrating the global gap are presented in Table 1.

Table 1. Key indicators of the skills gap (global and regional context)

Indicator	Value	Source
Share of young people (18–30) in Russia confident in the digital environment	75.8%	Ingosstrakh–Financial University study, 2025
Share of people over 60 in Russia confident in the digital environment	21.1%	Ibid.
Russians losing time/money due to lack of digital skills	35.9%	Joint study 2025 (n ≈ 36 Russian cities)

Russian Digital Literacy Index (2025)	68 p.p. (-3 p.p. from 2024)	NAFI
Respondents in Kazakhstan who are 'well-versed in AI'	22%	Ministry of Digital Development survey (n > 53k), March 2025
Those wishing to acquire AI skills (Kazakhstan)	79%	Ibid.
EU workers who have received AI training	~15%	Eurostat
Use of generative AI by EU population (16–29 years)	60%	Eurostat
Use of generative AI by total EU population	32.7%	Eurostat
Share of EU adults feeling overwhelmed by AI (women/men)	30% / 20%	Eurostat

In the European Union in 2025, only 56% of citizens possess at least basic digital skills (2023 data). These indicators point to a deep chasm between generations and social groups, which is reproduced even in developing countries [9].

3.2. The algorithmic access gap: gatekeepers of opportunity

The second gap concerns asymmetric access to algorithmic systems and their auditability.

Instrumental asymmetry. In 2025, 78% of ICT roles require AI skills, and 78% of organisations already use generative AI. At the same time, 66% of hiring managers will not consider candidates without AI literacy, and AI skills on LinkedIn have grown by 177%. Nevertheless, 68% of organisations experience a shortage of AI/Machine Learning specialists (Cisco) [10][11].

Algorithmic vulnerability. In a resume-screening experiment (N=528), participants selected candidates from groups 'preferred' by the AI in 90% of cases, even when they subjectively believed the system's recommendations to be of low quality. Only 21% of companies reject candidates without human review, which implies widespread use of AI in HR [12].

The 'black box' problem. According to a 2025 McKinsey survey, only 14% of companies have formal AI governance structures, and fewer than 10% regularly check systems for bias or explainability. Only 47% of organisations control AI use through formal processes, even though 65% already attribute their growth to AI. A global BSI survey found that 95% of data leaders acknowledged the impossibility of fully auditing AI decision-making trajectories [13].

3.3. The data monetisation gap: new capital

Data have turned into an asset of enormous value, but the appropriation of this value remains extremely uneven (Table 2) [14].

Table 2. Global data market indicators

Indicator	Value	Source
Global data monetisation market (2024)	3.95–4.1 billion US dollars	Data Bridge Market Research / QYResearch
Forecast to 2032–2033	19.32 billion US dollars or 16.1 billion US dollars (CAGR ~21.95%)	Ibid.

Volume of data generated in China (2025)	52.26 zettabytes (+27.28% vs 2024), ≈27.4% of global volume	Report of China National Data Administration
Share of respondents investing in data modernisation (Deloitte)	55%	Deloitte Tech Value Survey 2025
Individuals receiving direct benefit from their own data	less than 5%	Estimate based on platform ecosystem

The market capitalisation of data is concentrated in the hands of large platforms (FAANG and similar), while the majority of users remain passive sources of data. The 'data as capital' model (Sadowski, 2019) acquires concrete economic substance [15].

3.4. The case of Uzbekistan: triple gap in a developing economy

Data from Uzbekistan illustrate how global trends play out in a country with rapid connectivity growth but persistent structural inequalities.

3.4.1. Access and primary connectivity: illusion of equality

According to the State Committee on Statistics of the Republic of Uzbekistan [18], the share of the population using the internet reached 94.2% in January–August 2025, having grown steadily from 76.6% in 2021. However, these figures are based on household sample surveys and diverge from DataReportal estimates, according to which 33.1 million people, or 89% of the population, used the internet by the end of 2025. **About 11% of the population (mainly rural residents and older age groups) remain completely offline [16].**

A more alarming picture emerges from the 2024 UNICEF report: overall, 53.9% of the country's inhabitants have *never* used the internet, and only a quarter of the population (mostly urban residents) use the internet daily. The urban-rural gap has formally narrowed (94.3% vs 93.9% according to State Statistics Committee data), but in absolute terms hundreds of thousands of residents in rural areas remain without access. As recently as 2021, rural connectivity stood at only 72.3%, indicating rapid catch-up development while structural inequality persists [17].

Regional disparities: Tashkent (94.9%) vs Bukhara/Navoi/Samarkand regions (75.8%), and Kashkadarya/Surkhandarya regions (77.8%). **Wealth gap:** internet access reaches 93% among wealthy households but only 64% among poor households [18].

Gender gap: in the 14–30 age group, 38% of young men use the internet daily compared with only 16% of young women. 68% of female respondents said they had never gone online (among men the figure is half that – 34%). A UNDP analysis confirmed that women's digital skills lag behind men's by 24%, and the share of women who do not use a computer is 43.5% versus 30% among men [19].

3.4.2. Skills and AI literacy: ambitious policy amid deficit

38% of Uzbekistan's residents – especially women and rural youth – have no computer skills at all [20]. Nevertheless, the state is implementing large-scale educational initiatives. In 2025, the **Strategy for Artificial Intelligence Development until 2030** was approved, and a specialised centre was established under the Ministry of Digital Technologies. In one year, the country climbed 17 positions in the international AI readiness index, taking first place in Central Asia.

The **'One Million Uzbek Coders'** programme exceeded its goals: more than 1 million learners have completed IT courses, and over 20,000 graduates have been employed in IT professions with an average monthly income of about 6 million soums. In November 2025, the **'Five Million Uzbek AI Prompters'** project was launched (jointly with the UAE), aiming to train 4.75 million learners, 150,000 teachers, and 100,000 civil

servants by 2030. In partnership with Nvidia, a supercomputer cluster and a National Technology Transfer Office in Silicon Valley are planned [21].

The government plans to equip 80% of schools with new computer labs, interactive displays, and high-speed internet by the end of 2026. In 2025, 37,800 students completed IT programmes (a 1.5-fold increase), of whom more than 16,300 found jobs [22].

3.4.3. Access to algorithms and data governance: regulatory barriers

A list of more than 60 priority AI implementation projects for 2025–2026 has been approved, covering healthcare, transport, public services, ecology, industry, and the judicial system. The most sensitive from the perspective of algorithmic inequality include:

- AI for early detection of breast cancer;
- digital medical assistant for clinical decision support;
- legal aid module and a system for recording court hearings in the Uzbek language.

However, the absence of public mechanisms for algorithmic audit and the right to appeal decisions of these systems leaves open the risk of algorithmic discrimination against marginalised groups .

Data economy: the requirement for personal data localisation (Article 271 of the Law 'On Personal Data') costs Uzbekistan an estimated **US$4.5 billion in foregone benefits annually (4–5.7% of GDP)**, according to Kotib AI Research . Because of this requirement, PayPal, Stripe, Netflix, Spotify, AWS, Microsoft Azure are absent, and Google Pay and Apple Pay work only partially. This creates a structural inequality between local data subjects and global corporations.

Conversely, the government has established a special tax-free zone in Karakalpakstan for AI projects and data centres. Under this scheme, foreign investments of 100 million US dollars or more are exempt from taxes and duties until 2040. Policymakers suggest that the measure could attract over 1 billion US dollars in foreign investment by 2030. Even so, the capacity to capture and convert value from data remains highly asymmetric (and, in practice, likely unevenly distributed) .

Table 3. Key indicators of Digital Inequality 2.0 in Uzbekistan (2024–2025)

Dimension	Indicator	Value
Access (aggregated)	Internet users	94.2% (State Statistics Committee) / 89% (DataReportal)
Access (absolute)	'Never' used the internet	53.9% (UNICEF, 2024)
Access (daily)	Use the internet daily	25% of population
Regional gap	Tashkent vs Bukhara/Navoi/Samarkand regions	94.9% vs 75.8%
Wealth gap	Rich vs poor households	93% vs 64%
Gender gap (access)	Women vs men (never used)	68% vs 34%
Gender gap (skills)	Women's digital skills lag behind men	24% (UNDP, 2022)
Computer literacy	Women vs men not using a computer	43.5% vs 30%
AI infrastructure	Investment in AI and digital technologies (until 2025)	~US$2 bn

IT services exports (2025)	Volume	>US$900 mn
Cost of data localisation	Annual foregone benefits	US$3.2–4.5 bn (4–5.7% of GDP)
Educational programmes	'One Million Uzbek Coders'	>1 mn trained
	'Five Million AI Prompters' (by 2030)	4.75 mn learners, 150k teachers, 100k civil servants
Average income after IT training	Graduates of 'One Million Uzbek Coders'	~6 mn soums/month
	Holders of international IT certificates	~7 mn soums/month

4. Conclusion

In the conditions of the digital economy and the pandemic, it is necessary to study the specific scientific and methodological foundations of the management system of marketing activities of processing industry enterprises, determine the main directions of activity in this sector, create an effective management system in the industry, as well as form management activities and structure, and develop a mechanism for effective management of the activities of enterprises. Based on the production efficiency of the regions, increasing the effectiveness of management mechanisms in the development of processing industry enterprises, and effectively organizing the organizational and economic mechanism of the activities of enterprises should be considered as the main direction in ensuring economic development. The organizational and economic mechanism for the development of marketing activities of processing industry enterprises includes management subjects, management functions, management objects, communication system, management methods, management goals and objectives, and requires their operation in an effective system. All elements of the organizational and economic mechanism are inextricably linked, and their complementarity is the main criterion for their effective functioning in the market.

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