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INTEGRATING GREEN ECONOMY PRINCIPLES INTO DIGITAL ECONOMIC SYSTEMS IN UZBEKISTAN: THE ROLE OF ACCOUNTING INNOVATION AND ARTIFICIAL INTELLIGENCE IN PUBLIC SECTOR TRANSFORMATION

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Abstract: Uzbekistan is pursuing parallel reforms in digital transformation and green economic transition, creating an opportunity to align public-sector digitalisation with sustainability goals. This article examines how accounting innovation and artificial intelligence (AI) can operationalize green economy principles within emerging digital economic systems. Using recent national strategies and international indices, we present current digitalisation conditions and propose an implementation logic centered on data governance, green public financial management (PFM), and AI-enabled accountability.
Keywords: green economy, digital economy, artificial intelligence, public sector transformation, accounting innovation, sustainable development, Uzbekistan

Introduction

Global experience indicates that "digital-first" reforms can accelerate climate and green-transition outcomes when they improve measurement, reporting, and verification of environmental performance, especially in public spending and procurement [1–4]. Uzbekistan's policy agenda reflects this convergence: the "Digital Uzbekistan–2030" strategy prioritizes digital infrastructure, e-government, digital economy development, and skills, while the national Green Economy strategy (2019–2030) targets energy efficiency, renewable energy, and greener governance mechanisms [5–7]. At the same time, Uzbekistan has formalized an AI development strategy through presidential and governmental acts, with pilot and priority applications spanning agriculture, finance, taxation, transport, energy, healthcare, and e-government—sectors that are also central to the green transition [8–10]. However, achieving "green digital government" requires more than platforms and connectivity; it demands accounting innovations that can convert digital data into decision-grade sustainability information—e.g., carbon- and energy-tagged expenditures, green budget classification, lifecycle-cost accounting in procurement, and real-time performance dashboards [11–13]. This study therefore evaluates the current digitalisation condition using cross-source indicators and proposes a practical integration framework linking green economy priorities, digital public services, and AI-enabled accounting controls.

Materials and Methods

This is a policy-analytical and quantitative descriptive study using secondary data. We triangulated (i) international benchmarking indicators for Uzbekistan's digital government (UN EGDI) and GovTech maturity, (ii) sectoral digital-economy penetration rates, and (iii) official strategy documents on "Digital Uzbekistan–2030," AI development to 2030, and the Green Economy strategy (2019–2030). We computed percentage-point changes and relative growth rates where comparable time points were available.

Results

Uzbekistan's digitalisation trajectory shows strong progress in digital government benchmarks, but uneven diffusion into the real economy and across institutions. In the UN E-Government

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Development Index (EGDI), Uzbekistan improved from 0.7265 (rank 69) in 2022 to 0.7999 (rank 63) in 2024, representing a +0.0734 absolute increase (approximately +10.1% relative growth) and entry into the "Very High EGDI" group. World Bank evidence also shows strengthened public-sector digital capability: the GovTech Maturity Index (GTMI) 2022 places Uzbekistan among "Group A" (highest maturity), highlighting the role of the integrated service portal and digitized tax services.

At the sectoral level, 2023 estimates of digital economy penetration indicate the largest integration in the tertiary economy (services and public sector), with relatively low penetration in primary (agriculture) and secondary (industry) sectors. Specifically, penetration rates were 1.13% (primary), 3.71% (secondary), and 11.94% (tertiary), implying a ~10.6× gap between tertiary and primary sectors (11.94/1.13).

This sectoral imbalance is material for green transition execution because many green outcomes depend on digitizing measurement and control in agriculture, industry, and energy-intensive production.

Evidence also indicates constraints in organizational connectivity. A digital transformation scoreboard summarizing national statistics reports that the percentage of entities with internet access was 18.8% (with strong regional disparity), suggesting institutional-level bottlenecks for digital reporting and AI scaling in public and quasi-public organizations.

Table 1

Comparative indicators of Uzbekistan's digitalisation relevant to green public-sector transformation

Indicator	2020	2022	2023	2024	Direction/Key statistic
UN EGDI (value; rank)	—	0.7265; 69	—	0.7999; 63	+0.0734 points (+10.1% vs 2022)
World Bank GovTech maturity	—	Group A (highest)	—	—	Omnichannel services, digital tax/payment features noted
Digital economy penetration, primary sector (%)	—	—	1.13	—	Low diffusion to agriculture (green monitoring needs scaling)
Digital economy penetration, secondary sector (%)	—	—	3.71	—	Moderate diffusion; industrial decarbonization depends on deeper digitization
Digital economy penetration, tertiary sector (%)	—	—	11.94	—	Highest diffusion; strongest base for green PFM digitization
Entities with internet access (%)	—	—	—	—	18.8% reported (constraint for institutional reporting)

Sources: UN EGDI country data; UN E-Government Survey 2024; World Bank GovTech Maturity Index 2022; CAICT digital economy overview; Digital Transformation Scoreboard.

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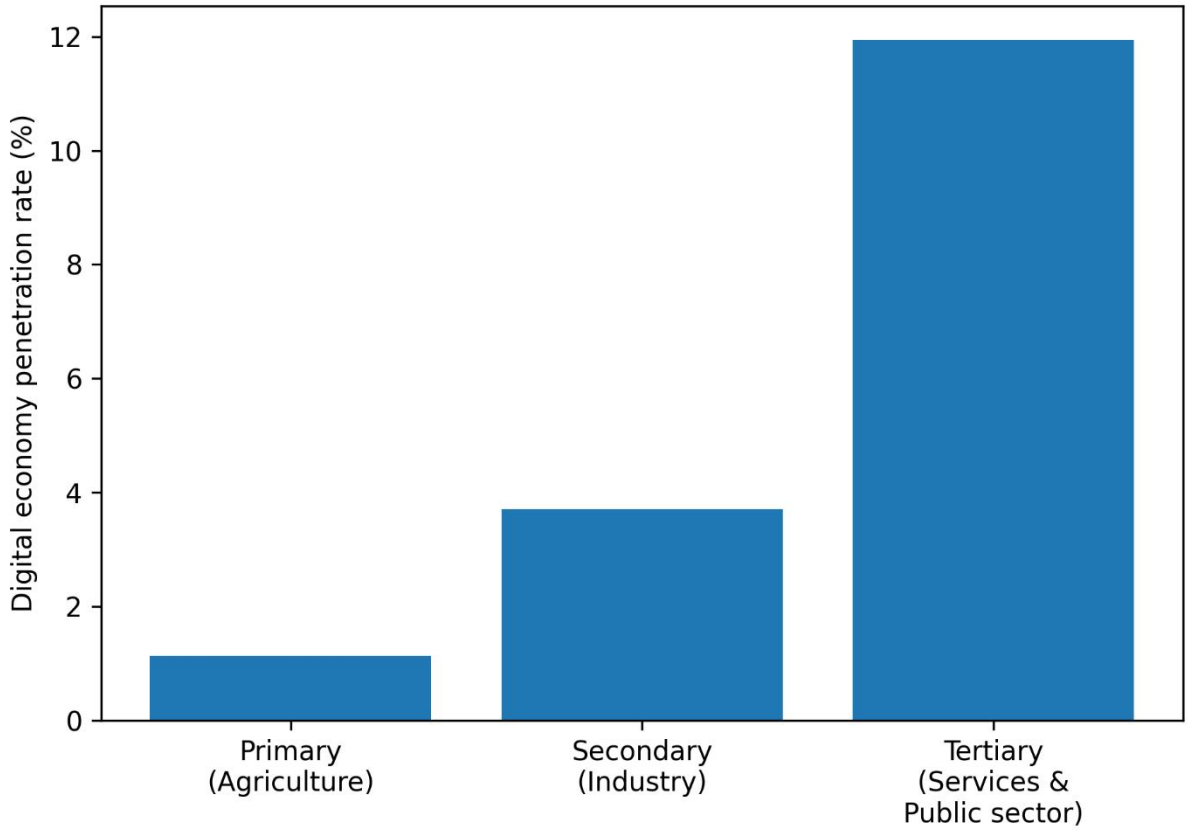

Figure 1. Sectoral digital-economy penetration (proxy for AI-enabled digitalisation), Uzbekistan (2023)

Interpretation: The bar chart highlights the concentration of digitalisation in services/public administration relative to agriculture and industry. Given Uzbekistan's AI strategy targets key economic and public-service domains, accelerating "data readiness" in primary and secondary sectors is essential for AI to support green economy priorities (e.g., precision irrigation, energy demand forecasting, industrial emissions accounting).

The results suggest that Uzbekistan's public-sector digital foundations (EGDI/ GovTech) are strengthening faster than economy-wide sectoral digital diffusion, creating a structural challenge for green transition management. Digital government maturity can enable rapid adoption of green PFM innovations—such as carbon-tagged budget programs, automated verification of green procurement criteria, and integrated reporting aligned with national climate commitments—provided that accounting systems are modernized to capture environmental attributes of transactions [14–16].

Uzbekistan's AI strategy and earlier AI pilot directions explicitly include agriculture, finance, taxation, transport, energy, healthcare, and e-government, which aligns well with green-economy levers (resource efficiency, emissions reduction, and service optimization).

Yet the low reported internet access among entities and the large sectoral penetration gap indicate that scaling AI will require foundational investments in connectivity, interoperable registries, and data quality assurance—especially outside Tashkent and in production sectors.

Based on these findings, an actionable integration model for Uzbekistan's public sector should prioritize: (1) green chart of accounts (budget and accounting codes with energy/emissions tags),

(2) digital procurement with lifecycle costing and automated compliance checks, (3) AI-assisted anomaly detection in green spending and energy subsidies, and (4) open-data-based transparency for green KPIs, enabling citizen oversight and investor confidence. This aligns with international development financing approaches emphasizing governance, green transition, and digital enablers.

Conclusion

Uzbekistan has achieved measurable progress in digital government readiness (EGDI and GovTech), creating a strong platform for embedding green economy principles into digital public management. However, sectoral digitalisation remains uneven, with tertiary-sector dominance and weaker diffusion into agriculture and industry—precisely where many green gains must be delivered. Accounting innovation, combined with AI-enabled controls and reporting, offers a practical pathway to convert digitalisation into verifiable green outcomes. Policy focus should therefore shift from digitizing services alone to digitizing green measurement, budgeting, and accountability across sectors and regions.

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