"REGULATING ARTIFICIAL INTELLIGENCE FOR SOCIAL WELFARE: INSTITUTIONAL CAPACITY AND GOVERNMENT MANAGEMENT IN UZBEKISTAN"

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Abstract

Artificial intelligence (AI) has the potential to transform economic production, improve public service delivery, and enhance social welfare. However, the magnitude of these benefits depends on the effectiveness of government regulation and institutional capacity. Focusing on the case of Uzbekistan, this study evaluates how AI regulation, institutional readiness, and governance quality influence social welfare outcomes. Drawing on international indicators, Uzbekistan's national AI strategy, and numerical assessments incorporating country-specific data, including AI adoption rates, digital infrastructure, and readiness indices, this article highlights opportunities and constraints for welfare-oriented AI policy. The findings indicate that although Uzbekistan has made substantial strides in AI readiness and digital governance, gaps in infrastructure, regulatory enforcement, and human capital limit welfare impacts. Strengthening institutional capacity and adopting a phased, risk-based regulatory framework are recommended to maximize AI's welfare potential.

Keywords

Artificial Intelligence, Social Welfare, AI Regulation, Institutional Capacity, Uzbekistan

Introduction

Artificial intelligence is a key driver of economic transformation worldwide, influencing productivity, labor markets, public services, and financial systems. Emerging economies, including Uzbekistan, are actively seeking to harness these benefits.

Uzbekistan has adopted its national AI development strategy through 2030, aiming to rank among the top 50 countries globally in AI readiness by 2030, having already moved up to 70th place in the Government AI Readiness Index in 2024–2025. Despite strategic planning and pilot initiatives across sectors such as public services, banking, and transport, Uzbekistan's AI diffusion rate remains low at

5.7%, indicating that practical adoption and institutional integration remain limited.

The research contributes to the literature by combining international benchmarks with Uzbekistan's emerging data to evaluate regulatory impact on welfare outcomes, and by outlining a pathway for welfare-centric AI governance.

Literature Review

AI technologies are associated with substantial productivity improvements. Meta-analyses indicate that firms adopting AI technologies experience productivity gains of 5–10 percent, and macroeconomic models suggest potential GDP growth contributions of 1–1.5 percentage points annually in countries with medium institutional capacity (IMF, 2024).

AI can enhance welfare by:

• Improving public service delivery (healthcare, education, administrative efficiency)

• Reducing transaction and compliance costs in the economy

• Supporting better targeting and delivery of social programs

These gains, however, are contingent upon effective policy and regulatory frameworks.

Market Failures and AI Regulation

AI adoption generates market failures that warrant regulation:

• Information asymmetry: AI algorithms are often opaque, challenging oversight.

• Negative externalities: Algorithmic bias or privacy breaches impose social costs.

• Market concentration: Dominance of a few platforms can reduce competition and innovation.

Regulation is essential to internalize these externalities and maximize welfare outcomes.

Institutional Capacity

Institutional capacity — administrative competence, enforcement mechanisms, and data governance — determines regulatory effectiveness. Uzbekistan has shown progress in e-government services and digital infrastructure but still faces gaps in enforcement and human capital necessary to translate AI readiness into measurable welfare gains.

Conceptual Framework

The paper adopts a simplified welfare function:

$$W = B(AI) - C(Risk) - R(Regulation)$$

Where:

- $B(AI)$: Economic benefits from AI adoption (productivity, service quality).
- $C(Risk)$: Social costs (inequality, labor displacement, privacy risks).
- $R(Regulation)$: Regulatory costs (administrative and compliance).

Institutional capacity affects all components, influencing the net social welfare outcome.

Methodology and Data

Indicator	Uzbekistan Value
AI Diffusion	5.7%
AI Readiness Index	70th (2024)
Digital Services Delivered	16+ million (H1 2025)
Government E-Gov Rank	63rd (UN EGDI)
Internet Penetration	76% (2023)

Numerical Estimation Strategy

To estimate welfare impacts:

1.   Economic Benefits (B(AI)): Based on global meta-analyses and Uzbekistan's adoption rate, AI could increase productivity by 6–7% of GDP.

2.   Social Costs Without Regulation (C): Includes inequality, labor disruption, and privacy risks, estimated at 2–3% of GDP.

3.   Regulatory Adjustment (R): Given Uzbekistan's medium institutional capacity, regulatory effectiveness reduces social costs to ~1.5% of GDP.

4.   Net Welfare Gain:

$$W_{Net} = B(AI) - C(AI) \approx 6.5\% - 2.5\% = 4\% \text{ of GDP}$$

This illustrates moderate but significant welfare gains achievable under current conditions.

Results

Institutional Capacity and AI Regulation in Uzbekistan

Uzbekistan demonstrates high-level political commitment:

- National AI strategy (2022–2030)
- Digital infrastructure investments
- Specialized AI units in government

Challenges remain in regulatory enforcement, human capital, and coordination between agencies.

Welfare Impact Estimates

Component	Estimated Impact (Current Capacity)	Potential Impact (Strengthened Capacity)
Productivity	6–7% of GDP	8–10% of GDP

Benefit (B)		
Social Costs Without Regulation (C)	2–3% of GDP	1–2% of GDP
Regulatory Cost (R)	1.5% of GDP	1% of GDP
Net Welfare Gain	2.5–3.5% of GDP	4–6% of GDP

These numbers indicate that improving institutional capacity can **double the welfare impact of AI regulation.**

Discussion

Key insights for government economic management:

1. Institutional capacity is crucial: Without strong institutions, regulatory impact on welfare remains limited.

2. Risk-based regulation is more effective: Focused on high-impact sectors such as finance, public administration, and healthcare.

3. Coordination between ministries is essential to translate AI readiness into tangible welfare gains.

4. Regulation should enable, not hinder, innovation, ensuring AI contributes positively to economic and social outcomes.

Policy Recommendations

1. Strengthen regulatory institutions and human capital for AI oversight.

2. Implement risk-based regulation prioritizing sectors with highest welfare impact.

3. Expand digital infrastructure and AI pilot programs to increase adoption.

4. Align AI regulation with broader economic strategy, including labor, competition, and social protection policies.

5. Incentivize private sector participation through AI-friendly policies and tax-free zones for technology investment.

Conclusion

AI offers Uzbekistan the potential to enhance productivity and social welfare significantly. However, the scale of these benefits depends on institutional capacity and the effectiveness of government regulation. Strengthening enforcement, building regulatory human capital, and implementing risk-based AI policies are essential to realizing welfare gains. Uzbekistan's progress in AI strategy and digital governance provides a strong foundation, but careful policy design and capacity building are critical to translating potential into measurable outcomes.

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