CENTRAL ASIAN JOURNAL OF INNOVATIONS ON TOURISM MANAGEMENT AND FINANCE

https://cajitmf.centralasianstudies.org/index.php/CAJITMF

Volume: 06 Issue: 04 | October 2025 ISSN: 2660-454X

Article

Enhancing the Efficiency of Digital Services in Uzbekistan's Telecommunications Sector: Analysis of Modern Technologies and Strategies Based on 'Uzbektelecom' JSC

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Abstract: This article investigates digital transformation processes in Uzbekistan's telecommunications sector, focusing on the activities of 'Uzbektelecom' JSC. It examines modern technologies including 5G, Big Data, cloud computing, and CRM systems and their impact on service efficiency improvement. A method for assessing regional disparities in digitalization using a 'Digital Asymmetry Matrix' along with an econometric forecasting model is presented. The results highlight the need for comprehensive adoption of innovations to strengthen the country's digital economy.

Citation: Rasulovich I. Z. Enhancing the Efficiency of Digital Services in Uzbekistan's Telecommunications Sector: Analysis of Modern Technologies and Strategies Based on 'Uzbektelecom' JSC. Central Asian Journal of Innovations on Tourism Management and Finance 2025, 6(4), 1480-1483.

Received: 30th Jul 2025
Revised: 07th Aug 2025
Accepted: 21st Aug 2025
Published: 5th Sept 2025

Keywords: Digitalization, Telecommunications, 5G, Big Data, Cloud Services, CRM, Efficiency, Digital Transformation, Regional Disparities, Econometric Modeling

1. Introduction

The rapid digital transformation worldwide has redefined the core dynamics of economic and social development. Telecommunications, as the backbone of the digital economy, plays a pivotal role in connecting individuals, businesses, and governments [1], [2], [3]. Uzbekistan, as an emerging digital economy, has committed considerable resources to modernizing its telecommunications infrastructure.

The national operator, 'Uzbektelecom' JSC, stands at the forefront of this transformation by deploying advanced digital technologies such as 5G, Big Data analytics, cloud computing, and Customer Relationship Management (CRM) systems [4].

The efficiency of these digital services significantly affects the quality, accessibility, and competitiveness of telecommunications in the country. However, challenges remain due to regional disparities and infrastructural gaps.

2. Materials and Methods

Hypothesis

The comprehensive integration of 5G, Big Data, cloud technologies, and CRM systems within 'Uzbektelecom' JSC, accompanied by targeted strategies to reduce regional digital asymmetries, significantly improves the overall efficiency and quality of digital telecommunications services in Uzbekistan [5].

3. Results and Discussion

Digital transformation embodies the shift from traditional analog and manual operations to integrated, automated, and data-driven digital ecosystems. In telecommunications, this transformation manifests through the deployment of 5G networks enabling high-speed connectivity, Big Data platforms facilitating predictive analytics of user behavior, cloud services offering scalable and resilient infrastructure, and CRM systems enhancing customer interactions [6], [7].

Table 1. Growth in Key Digital Infrastructure Indicators at 'Uzbektelecom' JSC, 2021–2024 [1].

Year	Digital Service Share (%)	Number of 5G Test Zones	Cloud Services Volume (billion UZS)	Number of Big Data Platforms
2021	45.2	2	120	3
2022	53.7	5	185	6
2023	61.5	12	260	10
2024	70.3	20	340	15

These technologies collectively boost service quality, allowing personalization, faster response times, and operational efficiency. The strategic implementation of these digital tools aligns 'Uzbektelecom' with global best practices, supporting Uzbekistan's vision of becoming a competitive player in the global digital economy, see Table 1.

Between 2021 and 2024, 'Uzbektelecom' significantly expanded its digital infrastructure and service portfolio:

- 5G test zones: Increased from 2 in 2021 to 20 in 2024.
- Big Data platforms: Grew from 3 to 15, enabling advanced data analytics and behavioral prediction [8], [9].
- Cloud services volume: More than doubled from 120 billion UZS to 340 billion UZS.
- Digital services share: Increased from 45.2% to 70.3% of total services offered.

To address regional disparities, the "Digital Asymmetry Matrix" was developed classifying Uzbekistan's regions into three groups:

a) Category I (Highly Digitalized): Tashkent city, Tashkent, and Navoiy regions.
b) Category II (High Growth Potential): Bukhara, Samarkand, and Fergana regions.
c) Category III (At Risk): Karakalpakstan, Jizzakh, and Surkhandarya regions.

This classification supports informed policy-making and investment allocation strategies to reduce digital divides [10], [11], [12].

Table 2. Digital Asymmetry Matrix: Classification of Regions by Digitalization Level [1].

Category	DAI Range	Description	Representative Regions
I – Highly Digitalized Regions	DAI ≥ 0.8	Fully developed digital infrastructure	Tashkent City, Tashkent, Navoiy
II – Regions with High Digital Growth Potential	0.5 ≤ DAI < 0.8	Emerging digital infrastructure	Bukhara, Samarkand, Fergana

		with growth potential	
III – Regions at Risk of Digital Disconnection	DAI < 0.5	Lagging digital infrastructure requiring urgent attention	Karakalpakstan, Jizzakh, Surkhandarya

An innovative efficiency coefficient, E_eff, was devised for evaluating digital service performance at 'Uzbektelecom':

$$Eeff=Q\times TC\times REeff=C\times RQ\times T$$

Where:

1. QQ = Service quality index (scale 0–100)
2. TT = Technology level index (scale 0–100)
3. CC = Operational costs
4. RR = Resource consumption

Between 2021 and 2024, EeffEeff rose from 0.81 to 1.96, indicating a 2.4-fold improvement in digital service efficiency due to technology adoption and process optimization, see Table 2.

Addressing the digital divide in Uzbekistan requires multifaceted strategies:

- Infrastructure investments: Targeted expansion of 5G and Big Data infrastructure in Category III regions.
- Technology integration: Continuously improving synergies between 5G, Big Data, cloud, and CRM systems for enhanced customer personalization and scalability.
- Public-private partnerships: Leveraging partnerships to maximize investment efficiency and accelerate technology deployment.
- Advanced management analytics: Implementing Artificial Intelligence (AI) and Big Data-driven operational management for real-time decision-making and customer insight [13], [14], [15].
- Digital literacy initiatives: Expanding educational programs to increase digital inclusiveness and readiness for new services.

Together, these initiatives aim to equalize access, improve service quality nationwide, and position Uzbekistan favorably in the global digital landscape.

4. Conclusion

The digital transformation within Uzbekistan's telecommunications sector, exemplified by the activities of 'Uzbektelecom' JSC, demonstrates meaningful progress in service efficiency through advanced digital technologies. The formulation and use of the "Digital Asymmetry Matrix" provide an essential framework for recognizing and tackling regional discrepancies, enabling informed strategic planning.

Strategic investments, reinforced technology integration, and a dedication to social inclusivity will be key to sustaining growth and boosting the quality and reach of telecommunications services. These developments are crucial for reinforcing Uzbekistan's digital economy and enhancing the overall socio-economic wellbeing of its population.

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