

DOI: 10.5281/zenodo.22931651

Link: <https://zenodo.org/records/22931651>

## IMPROVING THE EFFICIENCY OF E-COMMERCE MANAGEMENT IN UZBEKISTAN THROUGH DIGITAL TRANSFORMATION AND INNOVATIVE MANAGEMENT MECHANISMS

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**Abstract** – The rapid growth of e-commerce in Uzbekistan has raised the question of whether public management of the sector is keeping pace with the digital transformation of the economy. This article aims to assess how digital transformation enablers and innovative management mechanisms contribute to the efficiency of e-commerce management and to propose a maturity-based model for improving it. The study combined a secondary analysis of official indicators for 2020–2025 (UN E-Government Survey indices, Central Bank payment statistics, National Statistics Committee e-commerce data), an inventory of nine innovative management mechanisms introduced in 2020–2025, and a qualitative maturity assessment of five management functions. The results show that the Telecommunication Infrastructure Index of Uzbekistan increased by 85.1% between 2020 and 2024, while the Online Service Index decreased by 2.2%, indicating that infrastructure has outpaced the digitalisation of public services. The share of terminal and mobile payments in trade and service receipts rose from 44% to 48% in 2024–2025, and the ratio of e-commerce to card inflows increased from 1.47% to 2.11%. The mechanisms inventory shows that most tools were introduced as separate sectoral initiatives: e-invoicing, digital product labelling, a fintech regulatory sandbox, a notification regime and registry for e-commerce operators, and online dispute resolution. The maturity assessment places taxation at the integrated level, while market monitoring and consumer trust remain at the digitised level. The article proposes a four-level maturity model and a platform-based integration roadmap that can help public authorities move e-commerce management from fragmented digital tools to data-driven governance.

**Keywords:** e-commerce management, digital transformation, digital government, innovative management mechanisms, regulatory sandbox, digital payments, e-invoicing, product traceability, maturity model, Uzbekistan.

### INTRODUCTION

Digital transformation is changing not only how firms trade but also how governments manage markets. Research in information systems describes digital transformation as a process in which digital technologies trigger strategic responses and change the way organisations create value [28]. For public administration, this means a shift from digitising existing procedures to redesigning governance around data and platforms [9; 14]. E-commerce is one of the sectors where this shift is most visible, because transactions, payments and deliveries already generate digital records that can, in principle, be used for registration, taxation, consumer protection and market monitoring [21].

Uzbekistan offers a relevant case for studying this process. The country adopted the "Digital Uzbekistan – 2030" Strategy [23], a new edition of the Law "On electronic commerce" [17] and, in December 2024, a government resolution that introduced a notification regime, a registry of e-commerce operators, separate bank accounts for e-commerce settlements and online dispute

resolution mechanisms [4]. In parallel, the Central Bank established a regulatory sandbox for financial services [5], and the tax authorities introduced mandatory e-invoicing and digital product labelling [3; 10]. According to official statistics, e-commerce turnover reached 31.55 trillion soums in 2025 [20].

Nevertheless, there is no evidence that these tools form a coherent management system. They were introduced by different agencies, at different times and for different purposes. Their contribution to the efficiency of e-commerce management has not been assessed, and there is no framework for deciding which mechanisms should be integrated first. The scientific problem of this study is therefore the lack of an analytical model that links the digital transformation of the economy and of public administration with the efficiency of e-commerce management in an emerging economy.

The aim of the study is to assess how digital transformation enablers and innovative management mechanisms contribute to the efficiency of e-commerce management in Uzbekistan and to propose a maturity model for improving it. The objectives are: (1) to measure the dynamics of digital infrastructure, digital public services and digital payments in 2020–2025; (2) to compare the dynamics of e-commerce with these enablers; (3) to compile an inventory of innovative management mechanisms and classify them by management function; and (4) to assess the maturity of each function and propose an integration roadmap.

The object of the research is the system of public management of e-commerce in Uzbekistan; the subject is the digital and innovative mechanisms used to register, tax, monitor and protect e-commerce participants. The hypothesis is that the efficiency of e-commerce management is constrained less by digital infrastructure than by the fragmentation of management mechanisms across agencies. The scientific novelty of the study lies in the use of a function-based maturity model that combines international digital government indicators, payment statistics and an inventory of national mechanisms to identify integration priorities for e-commerce management.

## **LITERATURE REVIEW**

Three streams of literature are relevant to this study: research on digital transformation and digital government, research on innovative regulatory mechanisms, and studies on e-commerce development in Uzbekistan.

Digital transformation and digital government. G. Vial defines digital transformation as a process that improves an entity by triggering significant changes to its properties through combinations of information, computing, communication and connectivity technologies [28]. A. Bharadwaj and co-authors argue that digital strategy should be treated as an organisational strategy rather than a functional IT strategy [2]. In public administration, P. Dunleavy and co-authors described the move from New Public Management to "digital-era governance", in which reintegration of fragmented agencies and needs-based holism are central [9]. T. Janowski proposed an evolutionary model of digital government that moves from digitisation through transformation and engagement to contextualisation [14], and I. Mergel, N. Edelman and N. Haug showed that practitioners understand digital transformation as a change in processes, services and relationships with citizens rather than merely the adoption of technology [19]. T. O'Reilly's concept of "government as a platform" suggests that the state should provide shared infrastructure and data on which other actors build services [22]. Common to these works is the conclusion that fragmentation is the main obstacle to the benefits of digital government; however, they do not address specific markets such as e-commerce.

Innovative regulatory mechanisms. D. Zetsche, R. Buckley, J. Barberis and D. Arner analysed regulatory sandboxes as a way to test innovations under supervision, but warned that sandboxes are only one step towards "smart regulation" and may create competition distortions if poorly designed [30]. D. Arner, J. Barberis and R. Buckley introduced the concept of RegTech, in which regulators use technology for data-driven supervision [1]. Evidence from payment systems shows the potential of such approaches in emerging economies: T. Suri and W. Jack found that access to mobile money in Kenya reduced poverty, especially among female-headed households [25]. At the level of trade, A. Lendle and co-authors demonstrated that online platforms reduce the effect of

distance on trade by lowering information frictions [18], and A. Goldfarb and C. Tucker explained such effects through lower search, transportation, tracking and verification costs [12]. The OECD emphasises that e-commerce policy requires coordination across trust, infrastructure, skills, competition and measurement [21]. These studies suggest that digital mechanisms can increase efficiency, but they rarely examine how several mechanisms interact within one national system.

E-commerce in Uzbekistan. I. Kerimova and Z. Ataniyazova identified information technology and human resources as critical success factors and recommended revisiting policies on counterfeit products [15]. A. Toshpulatov proposed a comprehensive approach to assessing the country's readiness for e-commerce [26], and N. Daminova analysed market trends for 2023–2025, recommending greater comparability of e-commerce statistics, standardisation of logistics and support for platform competition [7]. The World Bank noted that the e-commerce strategy for 2023–2027 aims to simplify VAT, encourage digital payments and ease compliance for small businesses [29]. The UN E-Government Survey placed Uzbekistan in the very high EGDI group for the first time in 2024 [27].

The review shows a gap between two bodies of knowledge. International literature explains why integrated digital governance and innovative regulation increase efficiency but does not examine e-commerce management in emerging economies. National studies describe the e-commerce market and its success factors but treat public management as a background condition. None of the studies reviewed assesses the maturity of individual management functions or the degree of integration of the mechanisms introduced in Uzbekistan in 2020–2025. This study addresses this gap.

## METHODOLOGY

The study used a mixed-methods explanatory design that combined quantitative secondary data analysis with qualitative document analysis. This design was chosen because the object of the study, a national management system, cannot be observed experimentally, while both its outcomes (indicators) and its instruments (legal and regulatory acts) are documented in public sources.

Data. Three groups of official data were collected. First, the values of the E-Government Development Index (EGDI) and its components, the Online Service Index (OSI) and the Telecommunication Infrastructure Index (TII), for Uzbekistan for 2016–2024 were taken from the UN E-Government Knowledgebase [27]. Second, payment indicators for 2023–2025 (card inflows, share of terminal and mobile receipts in bank receipts and in trade and services, instant payment system turnover) were taken from Central Bank of Uzbekistan publications [6; 11]. Third, the annual e-commerce turnover for 2023–2025 was taken from the National Statistics Committee [20]. Card inflows for 2023 were derived from the 2024 value and the reported growth rate of 31%.

Quantitative analysis. Relative changes were calculated as  $\Delta = (X_t / X_0 - 1) \times 100\%$ . The ratio of e-commerce turnover to card inflows ( $R = E / C \times 100\%$ ) was used as an indicator of how much of the growing digital payment flow is captured by formal e-commerce. The arc elasticity of e-commerce with respect to card inflows was calculated as  $\varepsilon = \% \Delta E / \% \Delta C$  for each year. Because only three annual observations were available, no regression analysis was performed, and the elasticities were interpreted descriptively.

Mechanisms inventory. Legal and regulatory acts adopted in 2020–2025 were searched in the national legislation database (lex.uz) and in official publications. A mechanism was included if it (a) used digital technology, (b) was new to the Uzbek management system, and (c) directly or indirectly affected e-commerce participants. Nine mechanisms met these criteria [3; 4; 5; 10; 16; 24]. Each mechanism was coded by year, responsible agency and main management function: market entry and registration, taxation, consumer trust, market monitoring, or experimentation.

Maturity assessment. A four-level maturity scale was constructed on the basis of the digital government evolution model [14] and the digital-era governance concept [9]: Level 1 – paper-based; Level 2 – digitised (electronic procedures within one agency); Level 3 – integrated (data exchange between agencies and platforms); Level 4 – data-driven (real-time analytics used for decisions). Each of the five functions was assigned a level according to documented evidence from the inventory. The

assessment was carried out by the author and is therefore qualitative. Calculations were performed in Python and checked manually.

### ANALYSIS AND RESULTS

Digital transformation enablers. The dynamics of Uzbekistan’s e-government indices are shown in Figure 1 and Table 1.

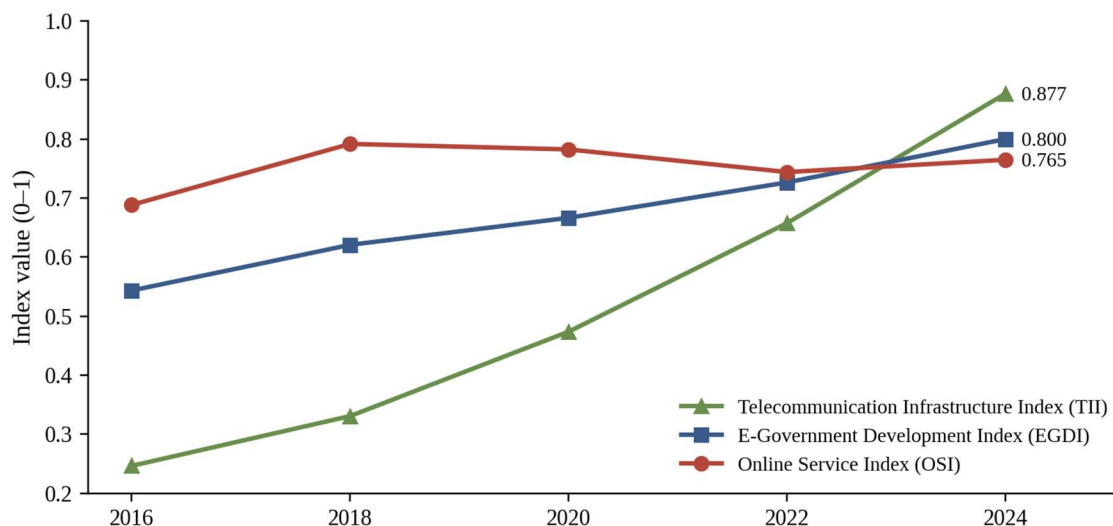


Figure 1. UN e-government indices for Uzbekistan, 2016–2024

Between 2020 and 2024 the EGDI value increased by 20.0% and Uzbekistan moved from 87th to 63rd place. This growth came almost entirely from telecommunications infrastructure, which increased by 85.1%, whereas the Online Service Index, which measures the provision of government services online, decreased by 2.2%.

Table 1.

#### Indicators of digital transformation in Uzbekistan

| Indicator                                    | 2020       | 2022       | 2024       | Change |
|----------------------------------------------|------------|------------|------------|--------|
| EGDI (rank of 193)                           | 0.667 (87) | 0.727 (69) | 0.800 (63) | +20.0% |
| Online Service Index (OSI)                   | 0.782      | 0.744      | 0.765      | –2.2%  |
| Telecommunication Infrastructure Index (TII) | 0.474      | 0.658      | 0.877      | +85.1% |
| OSI / TII ratio                              | 1.65       | 1.13       | 0.87       | –0.78  |

The ratio of OSI to TII fell from 1.65 to 0.87, meaning that since 2022 infrastructure has been more developed than online public services.

Digital payments and e-commerce. Table 2 compares payment indicators with e-commerce turnover.

Table 2.

#### Digital payments and e-commerce in Uzbekistan, 2023–2025

| Indicator                                                      | 2023   | 2024    | 2025    |
|----------------------------------------------------------------|--------|---------|---------|
| Card inflows, trillion soums                                   | 789.3* | 1,034.0 | 1,496.0 |
| Share of terminal and mobile receipts in bank receipts, %      | 38     | 40      | 43      |
| Share of terminal and mobile payments in trade and services, % | –      | 44      | 48      |
| E-commerce turnover, trillion soums                            | 13.26  | 15.21   | 31.55   |
| E-commerce / card inflows, %                                   | 1.68   | 1.47    | 2.11    |
| Elasticity of e-commerce to card inflows                       | –      | 0.47    | 2.39    |

The digitalisation of payments progressed steadily: the share of terminal and mobile receipts

in bank receipts increased from 38% to 43% over two years, and in trade and services it reached 48% in 2025. The instant payment system processed 47.6 million transactions in 2024 [6]. However, the relationship between payments and e-commerce was not stable. In 2024 e-commerce grew more slowly than card inflows (elasticity 0.47), and its ratio to card inflows fell to 1.47%. In 2025 e-commerce grew more than twice as fast as card inflows (elasticity 2.39), and the ratio rose to 2.11%.

Innovative management mechanisms. Table 3 presents the inventory of mechanisms that meet the inclusion criteria.

**Table 3.**

**Innovative management mechanisms affecting e-commerce, 2020–2025**

| Mechanism                                         | Year | Responsible body                          | Main function        | Link to other systems                             |
|---------------------------------------------------|------|-------------------------------------------|----------------------|---------------------------------------------------|
| Mandatory e-invoicing (Soliq platform)            | 2020 | Tax Committee                             | Taxation             | Tax information systems                           |
| Digital product labelling ("Asl belgisi")         | 2021 | Tax Committee, system operator            | Trust, monitoring    | Tax and customs systems                           |
| Regulatory sandbox for financial services         | 2022 | Central Bank                              | Experimentation      | Not linked to e-commerce registry                 |
| Designation of an authorised e-commerce body      | 2023 | National Agency of Perspective Projects   | Entry, monitoring    | –                                                 |
| Notification regime and operator registry         | 2025 | National Agency of Perspective Projects   | Entry, registration  | Planned                                           |
| Separate bank accounts for e-commerce settlements | 2025 | Central Bank, commercial banks            | Taxation, monitoring | Banking system                                    |
| Platform export without contract registration     | 2025 | Tax and Customs Committees                | Taxation, trade      | Required integration with tax and customs systems |
| Online dispute resolution                         | –    | Authorised body, Competition Committee    | Consumer trust       | –                                                 |
| Expanded fintech mandate of the Central Bank      | 2025 | Central Bank, national fintech commission | Experimentation      | Inter-agency commission                           |

Of the nine mechanisms, five were introduced in 2024–2025, and seven are managed by different bodies or combinations of bodies. Only three mechanisms (e-invoicing, digital labelling and platform export) have documented links to other information systems. The regulatory sandbox is limited to financial services and has no formal connection to the e-commerce registry. The online dispute resolution mechanism was still under development at the time of the study.

Maturity of management functions. The results of the maturity assessment are summarised in Table 4.

**Table 4.**

**Maturity of e-commerce management functions in Uzbekistan**

| Function                      | Level (1–4) | Evidence                                                                                         | Next step                                                 |
|-------------------------------|-------------|--------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| Market entry and registration | 2           | Notification regime and registry introduced in 2025; registry data not published                 | Open registry linked to tax ID and platform data          |
| Taxation                      | 3           | E-invoicing since 2020; separate accounts; integration of platforms with tax and customs systems | Automated reconciliation of platform, bank and tax data   |
| Consumer trust                | 2           | Digital labelling covers selected product groups; online dispute resolution under development    | Unified complaint and ODR platform with public statistics |
| Market monitoring             | 2           | Official and regulator estimates of e-commerce differ; no public dashboard                       | Single measurement methodology and real-time dashboard    |
| Experimentation               | 2           | Sandbox limited to financial services                                                            | Cross-sector sandbox including e-commerce and logistics   |

Only one of the five functions, taxation, reached the integrated level. None of the functions

reached the data-driven level. The average maturity score was 2.2 out of 4.

## **DISCUSSION**

The results confirm the hypothesis of the study. Uzbekistan's digital infrastructure improved faster than almost any other component of digital government: the Telecommunication Infrastructure Index nearly doubled between 2020 and 2024, and about 89% of the population used the Internet in 2025 [8]. The Online Service Index, however, did not improve, and the inventory of mechanisms shows that most tools were introduced by separate agencies with limited data exchange. In terms of the digital-era governance framework [9], Uzbekistan has invested in digitisation but has not yet achieved reintegration. The bottleneck of e-commerce management is therefore organisational rather than technological.

The unstable elasticity of e-commerce to digital payments supports this interpretation. If e-commerce management were fully integrated with payment data, formal e-commerce turnover would be expected to follow the growth of digital payments more closely. Instead, e-commerce lagged behind payments in 2024 and then jumped in 2025. The 2025 jump coincided with the introduction of the notification regime and separate bank accounts on 1 July 2025 [4]. A plausible explanation is that part of the online trade that had already been paid for digitally was reclassified as formal e-commerce once the new rules came into force. This interpretation is consistent with N. Daminova's observation that official and regulator estimates of the market differ methodologically [7] and with the OECD's emphasis on measurement problems in e-commerce [21]. If this explanation is correct, the new mechanisms improved the visibility of the market rather than the market itself, which is itself an efficiency gain for management.

The comparison of functions shows that taxation is the most mature because it was the first to be digitised and has the strongest institutional owner. This pattern is consistent with international experience, in which tax administrations often lead digital government because of their direct fiscal incentives. By contrast, consumer trust and market monitoring remain at the digitised level, although I. Kerimova and Z. Ataniyazova identified trust-related issues, such as counterfeit products, as critical for the success of e-commerce in Uzbekistan [15]. Digital labelling could address this problem, but it currently covers only selected product groups [3; 16] and is not linked to e-commerce platforms or dispute resolution.

The regulatory sandbox illustrates both the potential and the limits of innovative mechanisms. The Central Bank's sandbox allows new financial services to be tested for up to three years [5], and the number of fintech companies increased from 24 in 2018 to 103 in September 2025 [13]. However, e-commerce innovations usually combine payments, logistics, data and consumer protection, while the sandbox covers only financial services. D. Zetzsche and co-authors warned that sandboxes should be part of a broader smart-regulation strategy [30]; the results of this study suggest that, in Uzbekistan, a cross-sector sandbox would be a logical next step.

On the basis of these findings, the proposed roadmap has three stages. In the first stage, the authorised body should publish the registry of e-commerce operators and agree a single measurement methodology with the National Statistics Committee, the Tax Committee and the Central Bank. In the second stage, the registry, e-invoicing, separate bank accounts and digital labelling data should be connected through the existing inter-agency integration platform, in line with the "government as a platform" approach [22], and an online dispute resolution platform with public statistics should be launched. In the third stage, a cross-sector sandbox and a real-time market dashboard should be introduced, moving monitoring and experimentation to the data-driven level. Progress can be measured by the average maturity score, which should increase from the current 2.2.

Limitations. First, the quantitative analysis covers only three years for payments and e-commerce, so the elasticities are descriptive and do not establish causality. Second, card inflows include non-commercial transfers and are only a proxy for digital purchasing. Third, the 2023 card inflow value was derived from reported growth rates. Fourth, the maturity assessment was carried out by one researcher on the basis of documents and would benefit from validation by experts and

officials. Fifth, the UN indices are updated every two years, and the 2026 values were not used in this study.

### CONCLUSION

The study shows that digital transformation in Uzbekistan has created strong infrastructure and payment foundations for e-commerce, but the efficiency of e-commerce management is limited by the fragmentation of management mechanisms. Between 2020 and 2024, the telecommunications infrastructure index increased by 85.1% while the online services index did not improve; the digital share of trade and service payments reached 48%, yet formal e-commerce followed payment growth unevenly. Nine innovative mechanisms were identified, most of them introduced in 2024–2025 by different agencies, and only taxation reached the integrated level of maturity.

The main contribution of the article is a function-based maturity model that links international digital government indicators, payment statistics and an inventory of national mechanisms, and a three-stage roadmap for moving e-commerce management towards data-driven governance. Practical recommendations include publishing the operator registry, adopting a single measurement methodology, integrating registry, invoice, payment and labelling data, launching a public online dispute resolution platform and extending the regulatory sandbox to e-commerce and logistics. Future research should validate the maturity assessment through expert surveys and test the relationship between digital payments and e-commerce with longer time series and regional data.

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