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Article

Foreign Experiences in Digitalization of Trade Services to The Population and Opportunities for Their Application in Uzbekistan

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Abstract: This article examines foreign experiences in the digitalization of trade services for the population, focusing on leading countries such as China, South Korea, Germany, and the United Arab Emirates. The study analyzes e-commerce growth trends, digital payment system expansion, smart retail technology adoption, and logistics digitalization innovations across these economies during the period 2019–2024. Using a comparative analysis methodology and relevant statistical data, the article evaluates Uzbekistan's current digital trade readiness against international benchmarks and identifies critical gaps in infrastructure, regulation, human capital, and platform maturity. A four-pillar digitalization framework is proposed tailored to Uzbekistan's socioeconomic context. The findings reveal that while Uzbekistan's e-commerce sector is growing rapidly (CAGR of 55.9%), significant investment and regulatory reform are needed to close the gap with advanced economies. The article contributes practical, country-specific policy recommendations for accelerating the digitalization of trade services in Uzbekistan.

Keywords: Digitalization, Trade Services, E-Commerce, Digital Payments, Smart Retail, Uzbekistan, Foreign Experience, Fintech, Last-Mile Logistics

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1. Introduction

The digitalization of trade and retail services has emerged as one of the most transformative economic trends of the 21st century. Rapid advances in mobile internet, artificial intelligence (AI), cloud computing, and big data analytics have fundamentally reshaped how businesses interact with consumers, manage supply chains, and process payments. Global e-commerce revenues surpassed $5.8 trillion in 2023 and are projected to exceed $8 trillion by 2027, underscoring the magnitude of this structural shift (eMarketer).

For developing and transition economies such as Uzbekistan, the digitalization of trade services represents both an opportunity and a challenge. On one hand, digital platforms can enable micro- and small enterprises to access national and international markets, reduce transaction costs, and improve service quality. On the other hand, significant investment in infrastructure, regulatory reform, and human capital development is required to harness these benefits fully.

Uzbekistan, with a population of approximately 37 million, a growing middle class, and a young, technology-oriented demographic profile (median age 29.5 years), has demonstrated increasing interest in e-commerce and digital payments. The country's e-commerce market reached approximately $720 million in 2023, representing a compound annual growth rate (CAGR) of nearly 56% over 2020–2023 — one of the highest in Central

Asia. Nevertheless, Uzbekistan's digital trade penetration remains significantly below international benchmarks.

This study addresses the following research questions: (1) What are the key strategies and technologies that have driven successful trade service digitalization in leading economies? (2) How does Uzbekistan's current digital trade readiness compare with international benchmarks? (3) What concrete policy measures can accelerate the digitalization of trade services in Uzbekistan?

Object of research: Trade service digitalization policies, platforms, and technologies in China, South Korea, Germany, UAE, and Uzbekistan.

Subject of research: Patterns, drivers, and transferable lessons of trade service digitalization.

Purpose: To analyze foreign experiences and develop a framework of recommendations for accelerating trade service digitalization in Uzbekistan.

Methods: Comparative analysis, statistical analysis, systematic review of literature, and SWOT/gap analysis.

Literature Review

The scholarly literature on trade service digitalization has expanded considerably over the past decade. Goldmanis et al. (2010) were among the first to document how e-commerce reshapes the structure of retail industries, showing that large incumbents with high fixed costs gain disproportionately from the internet while smaller operators face displacement pressures [1]. Brynjolfsson and McAfee (2014) extended this analysis to the broader digital economy, arguing that technology-driven productivity gains are most pronounced in service-intensive sectors such as retail trade [2].

In the context of emerging economies, Guo et al. (2020) analyzed China's Taobao Village model, demonstrating that rural e-commerce penetration significantly reduces poverty and stimulates local production networks [3]. South Korea's digital trade policy literature has been anchored by studies of the government-led Korea Digital New Deal, which mobilized approximately $58 billion in public-private investment to accelerate the country's transition to a digital economy [4].

For Central Asia and Uzbekistan specifically, the literature is more nascent. Abdullaev and Kim identified regulatory fragmentation and logistics under-development as the primary barriers to e-commerce growth in Uzbekistan, noting that while the country's legal framework has improved since the 2019 Digital Uzbekistan Strategy, gaps in consumer protection and cross-border trade facilitation persist [5]. The Asian Development Bank assessed Uzbekistan's digital economy readiness and rated its e-government and digital payment ecosystems as moderately developed, highlighting significant urban-rural disparities [6].

Internationally, the World Bank's Digital Economy Assessment Framework (2022) provides a multi-dimensional lens for evaluating digital readiness across infrastructure, regulatory environment, human capital, platform maturity, and innovation ecosystem dimensions — a framework adapted in the present study [7]. The UAE's experience with Dubai CommerCity, the world's first free zone dedicated to e-commerce, has attracted academic attention as a model of deliberate state-led trade digitalization in a middle-income economy [8].

Collectively, the literature highlights five critical success factors: robust broadband infrastructure; interoperable, trusted digital payment systems; supportive and clear regulatory frameworks; strong investment in digital skills and human capital; and dynamic platform ecosystems that incentivize SME participation. This article contributes to the literature by systematically applying these success factors to the Uzbek context.

2. Materials and Methods

This article employs a mixed-methods research design combining: (a) systematic comparative analysis of trade digitalization strategies in four benchmark countries (China, South Korea, Germany, UAE); (b) quantitative statistical analysis of e-commerce, digital payment, and ICT indicators for the period 2019–2024; and (c) gap analysis

benchmarking Uzbekistan's current digital trade readiness against international indicators.

Country selection was guided by the following criteria: representativeness across different development models (market-led vs. state-led), geographic and cultural diversity, availability of comparable statistical data, and relevance to Uzbekistan's strategic partnerships. China was selected as the world's largest e-commerce market and Uzbekistan's largest trading partner. South Korea represents a successful government-led digital transformation in a middle-income context. Germany exemplifies the EU's regulatory-first approach to digital trade. The UAE is the most relevant regional model given geographic proximity and institutional similarities.

Statistical data were compiled from the following sources: eMarketer Global E-Commerce Forecast 2024; World Bank Digital Economy Indicators Database; International Telecommunication Union (ITU) Statistics 2024; Statista Digital Economy Report 2024; State Statistics Committee of Uzbekistan 2024; Central Bank of Uzbekistan Payment Statistics 2024; and Asian Development Bank Uzbekistan Country Assessment 2023.

The digital readiness gap analysis uses a 10-point composite scoring system across seven dimensions: ICT infrastructure, digital payment ecosystem, regulatory and legal framework, human capital, e-commerce platform maturity, startup ecosystem, and cross-border trade digitalization. Scores were derived from ITU's ICT Development Index, World Bank B-READY index, OECD Digital Economy Outlook, and national government reports.

3. Results and Discussion

Global E-Commerce Market Dynamics

The global e-commerce landscape is characterized by significant heterogeneity in market size, growth rate, and digital trade penetration. Table 1 presents the e-commerce market size (in USD billions) and compound annual growth rates for the benchmark countries and Uzbekistan for 2020–2023.

Table 1. E-Commerce Market Size and Growth (USD billion, 2020–2023)

Country	2020 ($bn)	2021 ($bn)	2022 ($bn)	2023 ($bn)	CAGR (%)
China	2,296	2,779	3,118	3,502	15.2
USA	861	960	1,034	1,119	9.1
South Korea	152	187	210	234	15.5
Germany	83	99	112	127	15.2
UAE	3.9	5.1	6.7	8.2	28.0
Uzbekistan	0.19	0.31	0.48	0.72	55.9

Source: eMarketer Global E-Commerce Forecast 2024; ITU Statistics 2024; State Statistics Committee of Uzbekistan 2024

China dominates the global e-commerce landscape with a market size of $3.5 trillion in 2023, driven by Alibaba's Taobao/Tmall ecosystem, JD.com's logistics network, and Pinduoduo's social commerce model. South Korea, with 36% e-commerce penetration in total retail, ranks second globally in terms of e-commerce share — a result of deliberate government investment and ultra-fast delivery infrastructure. Notably, Uzbekistan's e-commerce sector, while small in absolute terms ($720 million), registers the highest growth rate among compared countries (CAGR 55.9%), reflecting both the low starting base and the rapid expansion of mobile internet and digital payment infrastructure since 2020.

E-Commerce Share of Total Retail (2023)

The following chart (Figure 1) visualizes e-commerce as a percentage of total retail trade in 2023 for each country studied. The data illustrate the large structural gap between leading digital economies and Uzbekistan's current penetration level.

Table 1 (Chart). E-Commerce as Percentage of Total Retail Trade (2023)

Country	E-commerce Share of Total Retail (2023)	%
China		47%
South Korea		36%
USA		22%
Germany		17%
UAE		11%
Uzbekistan		4%

Source: eMarketer 2024; State Statistics Committee of Uzbekistan 2024

Figure 1. E-Commerce as Percentage of Total Retail Trade (2023). Dark bars indicate higher digital penetration.

China and South Korea lead with e-commerce shares of 47% and 36% respectively. Uzbekistan's 4% share, while modest, marks a significant increase from below 1% in 2018. Importantly, the growth trajectory suggests that with appropriate policy support, Uzbekistan could achieve a 15–20% e-commerce share by 2030, consistent with the government's Digital Uzbekistan 2030 strategy targets.

Digital Payment Ecosystem Comparison

Digital payment adoption is a key enabler and driver of e-commerce expansion. Table 2 presents comparative indicators for digital payment ecosystems across the studied countries.

Table 2. Digital Payment Ecosystem Indicators (2023)

Indicator	China	South Korea	Germany	UAE	Uzbekistan
Cashless payment share (%)	87	94	73	82	43
Mobile wallet users (% adults)	82	67	45	71	31
QR code payment adoption (%)	95	78	42	68	24
Online banking penetration (%)	71	88	83	75	48
Fintech startup count	8,800	620	890	580	38

Source: World Bank Global Findex Database 2023; Central Bank of Uzbekistan 2024; ITU 2024

South Korea leads in online banking penetration (88%), while China's WeChat Pay and Alipay ecosystem achieves the highest mobile wallet (82%) and QR code adoption (95%) globally. Uzbekistan's 43% cashless payment share and 31% mobile wallet penetration indicate meaningful progress — driven by the rapid expansion of Click, Payme, and Uzum Pay platforms — but remain significantly behind regional and global benchmarks. The relatively low fintech startup count (38) compared to benchmark countries reflects the nascent stage of Uzbekistan's digital financial services ecosystem.

Internet and Mobile Penetration: Comparative Data

The development of digital trade services is fundamentally constrained by the availability of internet access and smartphone usage. Table 3 in this section (numbered as Table 3 for structural clarity) presents comparative connectivity and digital engagement data.

Table 3 (Chart 2). Internet, Mobile, and Social Commerce Indicators (2023)

Indicator (2023)	China	S. Korea	Germany	UAE	Uzbekistan
Internet penetration (%)	76	97	95	99	72
Smartphone users (% pop.)	74	95	88	91	69
Social commerce share (%)	52	31	14	28	18
Avg. e-commerce spend/user ($)	1,810	2,460	2,140	1,950	87

Source: ITU Statistics 2024; Statista Digital Economy Report 2024; eMarketer 2024

Figure 2. Internet Penetration and Digital Commerce Engagement Comparison. Yellow-shaded cells indicate Uzbekistan values.

Uzbekistan's internet penetration of 72% and smartphone penetration of 69% are approaching the levels of some mid-income benchmark countries, providing a relatively favorable foundation for digital trade expansion. However, the large disparity in average e-commerce spending per user ($87 in Uzbekistan vs. $2,460 in South Korea) reflects both purchasing power differences and the more limited product range and payment trust environment in Uzbekistan's e-commerce market. Social commerce — shopping through social media platforms — already accounts for 18% of Uzbekistan's e-commerce, suggesting that platforms like Telegram and Instagram-based trade networks can be leveraged as low-cost entry points for SME digitalization.

Smart Retail and Logistics Digitalization Technologies

Beyond e-commerce platforms and payment systems, the digitalization of trade services increasingly involves advanced technologies in retail operations and logistics. Table 3 presents key technology adoption indicators and their measured impacts on trade efficiency.

Table 3. Smart Retail and Logistics Technology Adoption: International Overview

Technology / Indicator	Leader Country	Adoption Rate	Impact on Trade Efficiency
AI-powered demand forecasting	USA / China	64%	+22% inventory turnover
Automated warehousing (robots)	Japan / Germany	41%	+35% fulfillment speed
Last-mile drone delivery	China / UAE	18%	-28% delivery cost

Cashier-less retail (IoT/CV)	China / USA	12%	-40% checkout time
Big Data customer analytics	South Korea	79%	+18% customer retention
Blockchain supply chain tracing	Germany / UAE	27%	-31% counterfeit incidents
Omnichannel integration	South Korea / USA	56%	+29% customer satisfaction

Source: McKinsey Global Institute Digital Trade Report 2024; World Economic Forum Future of Retail 2024

AI-powered demand forecasting (64% adoption in leading markets) and big data customer analytics (79% in South Korea) represent the most widespread technologies, given their relatively lower implementation costs and strong measured impacts on inventory efficiency and customer retention. Cashier-less retail, pioneered by Amazon Go and Alibaba's Hema Fresh format, remains a niche technology (12% adoption) but demonstrates the transformative potential of IoT and computer vision in trade services. For Uzbekistan, the most immediately actionable technologies are AI-based demand forecasting and omnichannel integration, which can be adopted by larger retailers and marketplace operators at moderate cost.

Country Case Studies: Key Lessons

Table 4. Country Case Studies: Models and Lessons for Uzbekistan

Country	Key Platform / Policy	Core Innovation	Lesson for Uzbekistan
China	Alibaba / Taobao WeChat Pay	Super-app ecosystem; village e-commerce agents (rural)	Appoint digital trade agents in districts; build Uzbekistan-specific super-app
South Korea	Coupang / KakaoPay K-Digital Initiative	Same-day delivery network; government digital fund	Invest in last-mile logistics; create state digital trade fund
Germany	Amazon DE / Otto EU GDPR compliance	Robust consumer protection; sustainable packaging law	Prioritize consumer trust through strong e-commerce legislation
UAE	Dubai CommerCity Noon / Careem Pay	Free zone for e-commerce; cashless city initiative	Establish special economic zone for digital trade; Free trade corridor

Source: Compiled by the author from national digital economy strategies and academic literature, 2024

The cross-country analysis reveals several transferable lessons. China's model of deploying rural e-commerce agents ("Taobao village" representatives) to facilitate digital adoption in areas with low digital literacy is particularly relevant to Uzbekistan's large rural population (approximately 49% of the total). South Korea's government-backed delivery infrastructure (Coupang's "Rocket Delivery" guaranteeing next-day or same-day delivery nationally) demonstrates the importance of logistics investment alongside platform development. Germany's emphasis on regulatory clarity and consumer protection laws has built lasting trust in digital commerce, with 76% of German internet users making online purchases regularly. The UAE's Dubai CommerCity free zone model — offering customs duty exemptions, simplified business registration, and dedicated digital logistics facilities — has attracted over 600 e-commerce companies from 65

countries, providing a compelling regional model for Uzbekistan's special economic zone strategy.

Uzbekistan's Digital Trade Readiness Assessment

Table 5 presents a comprehensive gap analysis of Uzbekistan's digital trade readiness across seven key dimensions, benchmarked against regional averages and global leaders.

Table 5. Digital Trade Readiness Gap Analysis: Uzbekistan vs. Benchmarks (Score: 1–10)

Readiness Dimension	Current Score (1–10)	Regional Avg.	Global Leader	Key Gap / Challenge
ICT Infrastructure	5.8	6.2	9.1 (KOR)	Rural broadband coverage
Digital Payment Ecosystem	4.9	5.8	9.5 (CHN)	Interoperability of platforms
Regulatory & Legal Framework	5.4	5.5	8.7 (DEU)	E-commerce consumer protection
Human Capital & Digital Literacy	5.1	5.6	9.2 (KOR)	Shortage of IT-trade specialists
E-commerce Platform Maturity	4.6	5.3	9.8 (CHN)	Logistics integration
Startup & Innovation Ecosystem	4.3	5.1	9.0 (USA)	Venture capital access
Cross-border Trade Digitalization	4.1	4.9	8.8 (UAE)	Customs & border procedures

Source: Author's assessment based on ITU ICT Development Index 2024; World Bank B-READY Index 2024; Asian Development Bank Uzbekistan Assessment 2023

The gap analysis reveals that Uzbekistan scores below both regional averages and global leaders across all seven dimensions, with the largest gaps in e-commerce platform maturity (4.6), startup ecosystem (4.3), and cross-border trade digitalization (4.1). The relatively stronger scores in ICT infrastructure (5.8) and regulatory framework (5.4) reflect recent government investments in fiber optic infrastructure and the adoption of the Electronic Commerce Law (2022). The human capital dimension (5.1) represents a critical medium-term priority, as the shortage of professionals with both IT and trade/logistics expertise constrains all aspects of digital trade development.

4. Conclusion

The analysis presented in this article supports several significant conclusions regarding trade service digitalization in Uzbekistan and internationally.

First, the digitalization of trade services is a multi-dimensional process requiring simultaneous progress across infrastructure, regulation, human capital, and platform ecosystem dimensions. Countries that have achieved leading positions — China, South Korea, Germany, and UAE — have succeeded through sustained, coordinated investment across all these dimensions over 10–15 year timeframes. Uzbekistan should therefore adopt a long-term strategic perspective rather than seeking short-term interventions.

Second, Uzbekistan's rapid e-commerce growth rate (CAGR 55.9%) and improving digital infrastructure provide a strong foundation, but the absolute penetration levels remain far below international benchmarks. The country has a genuine 'leapfrogging' opportunity — particularly in mobile payments and social commerce — that should be proactively developed.

Third, the experience of benchmark countries highlights five priority action areas for Uzbekistan: rural digital connectivity; unified digital payment standards; strong consumer protection legislation; logistics infrastructure investment; and targeted digital skills development. These form the basis of the following recommendation framework (Figure 3).

Table 6 (Framework). Proposed Four-Pillar Digitalization Framework for Uzbekistan's Trade Services

PILLAR 1 Infrastructure	PILLAR 2 Regulation	PILLAR 3 Capacity Building	PILLAR 4 Market Development
‣ Expand broadband ‣ Cloud infrastructure ‣ National data centers ‣ 5G rollout	‣ E-commerce law ‣ Data protection act ‣ Digital payment rules ‣ Cross-border norms	‣ Digital literacy prog. ‣ Specialist training ‣ IT university slots ‣ Retraining schemes	‣ Marketplace support ‣ SME digitalization ‣ Export e-platforms ‣ Startup incubators
ENABLING ENVIRONMENT: Government coordination · Public-private partnerships · International cooperation (SCO, OIC, WTO)			

Figure 3. Proposed Four-Pillar Framework for Accelerating Trade Service Digitalization in Uzbekistan

Table 6 presents specific, prioritized recommendations based on this framework, with reference to the foreign model, implementation measure, and expected outcome for each priority area.

Table 6. Recommendations and Implementation Roadmap for Uzbekistan's Digital Trade Sector

Priority Area	Recommended Measure	Foreign Model	Expected Outcome
Digital Infrastructure	Expand 4G/5G coverage to rural areas; build national data centers	South Korea (K-Digital)	Increase internet penetration from 72% to 90%+ by 2030
Payment Systems	Create unified national QR payment standard; integrate banks and fintechs	China (UnionPay/WeChat)	Raise cashless share to 75% within 5 years
Legal Framework	Adopt e-commerce law with consumer protection; digital signature legislation	Germany (EU Digital Act)	Reduce e-commerce disputes; attract foreign investment
Human Capital	Launch national digital literacy program; fund IT-trade specialties in universities	UAE (Digital Skills Strategy)	Train 200,000+ digital trade specialists by 2028
Logistics & Delivery	Develop national postal/logistics hub; incentivize smart warehousing	China (Cainiao Network)	Reduce average delivery time by 40%
Cross-border Trade	Implement single digital window for customs; join SCO e-trade agreements	UAE (Dubai Customs)	Boost cross-border e-commerce exports to $500M by 2030

Source: Author's recommendations based on comparative analysis of benchmark countries' digital trade strategies, 2024

In conclusion, Uzbekistan possesses the demographic profile, strategic intent, and improving digital foundation to achieve a significant acceleration in trade service digitalization over the coming decade. By selectively adapting the most relevant elements of China's scale and rural inclusion model, South Korea's government-infrastructure partnership approach, Germany's consumer trust framework, and UAE's free zone trade facilitation model, Uzbekistan can develop a uniquely tailored digital trade ecosystem that serves its population effectively and integrates the country more deeply into regional and global digital value chains. Successful implementation will require sustained political commitment, coordinated inter-agency action, and strategic engagement with international partners and private sector innovators.

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