

JOURNAL OF TRANSPORT



ISSUE 2, 2026 vol. 3

E-ISSN: 2181-2438

ISSN: 3060-5164



RESEARCH, INNOVATION, RESULTS



**TOSHKENT DAVLAT
TRANSPORT UNIVERSITETI**

Tashkent state
transport university



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E-ISSN: 2181-2438

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VOLUME 3, ISSUE 2

JUNE, 2026



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TASHKENT STATE TRANSPORT UNIVERSITY

JOURNAL OF TRANSPORT

SCIENTIFIC-TECHNICAL AND SCIENTIFIC INNOVATION JOURNAL

VOLUME 3, ISSUE 2 JUNE, 2026

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The journal benefits from its official recognition under Certificate No. 1150 issued by the Information and Mass Communications Agency, functioning under the Administration of the President of the Republic of Uzbekistan. With its E-ISSN 2181-2438, ISSN 3060-5164 the publication upholds international standards of quality and accessibility.

Articles are published in Uzbek, Russian, and English, ensuring a wide-reaching audience and fostering cross-cultural academic exchange. As a beacon of academic excellence, the "Journal of Transport" continues to serve as a vital conduit for knowledge dissemination, collaboration, and innovation in the transport sector and related fields.

The importance of foreign experience in the development of the metro transport system and recommendations for Uzbekistan

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Abstract: This article analyzes the development of the Tashkent metropolitan transport system based on advanced foreign experience. Effective models of urban transport infrastructure management are studied using the examples of London, Paris, and Tokyo metropolitan systems. The article develops scientifically grounded recommendations for modernizing the metropolitan system in Uzbekistan and ensuring its integration with other public transport modes. The research results include a set of practical measures aimed at improving the economic, environmental, and social efficiency of the metropolitan system.

Keywords: metropolitan, public transport, transport integration, digitalization, ecological efficiency, public-private partnership, tariff policy, Tashkent

Metropolitan transport tizimini rivojlantirishda xorijiy tajribaning ahamiyati va O'zbekiston uchun tavsiyalar

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Annotatsiya: Ushbu maqolada Toshkent shahrining metropoliten transport tizimini rivojlantirish masalalari xorijiy ilg'or tajribalar asosida tahlil qilinadi. London, Parij va Tokio metropoliten tizimlari misolida shahar transport infratuzilmasini boshqarishning samarali modellari o'rganiladi. Maqolada O'zbekiston sharoitida metropoliten tizimini modernizatsiya qilish va uning boshqa jamoat transport turlari bilan integratsiyasini ta'minlash bo'yicha ilmiy asoslangan tavsiyalar ishlab chiqilgan. Tadqiqot natijalari metropoliten tizimining iqtisodiy, ekologik va ijtimoiy samaradorligini oshirishga yo'naltirilgan amaliy chora-tadbirlar majmuasini o'z ichiga oladi.

Kalit so'zlar: metropoliten, jamoat transporti, transport integratsiyasi, raqamlashtirish, ekologik samaradorlik, davlat-xususiy sheriklik, tarif siyosati, Toshkent

1. Kirish

Zamonaviy shaharlarning barqaror rivojlanishi ko'p jihatdan samarali metropoliten transport tizimining mavjudligiga bog'liq. Dunyo tajribasi shuni ko'rsatadiki, transport infratuzilmasining rivojlanganligi nafaqat aholining harakatchanligini ta'minlaydi, balki shahar iqtisodiyotining o'sishiga, ish joylarining ko'payishiga va investitsiyalar jalb etilishiga muhim hissa qo'shadi [1]. Shu bilan birga, zamonaviy metropoliten tizimlari ekologik barqarorlikni ta'minlashda ham muhim vosita sifatida qaralmoqda.

O'zbekiston, xususan Toshkent shahri uchun metropoliten tizimini rivojlantirish masalasi dolzarb ahamiyat kasb etmoqda. Toshkent shahri aholisining tez sur'atlarda o'sishi, urbanizatsiya jarayonlari va iqtisodiy rivojlanish talablari zamonaviy, raqobatbardosh va samarali metropoliten transport tizimini shakllantirish zaruriyatini keltirib chiqarmoqda [2]. Mavjud muammolarni hal etishda xorijiy rivojlangan mamlakatlar tajribasini o'rganish va uni mahalliy sharoitga moslashtirish muhim metodologik ahamiyat kasb etadi.

Tadqiqotning maqsadi – rivojlangan mamlakatlar metropoliten transport tizimlari tajribasini qiyosiy tahlil qilish asosida O'zbekiston metropoliten tizimini modernizatsiya

qilishning ilmiy asoslangan yo'nalishlarini belgilashdan iborat.

ADABIYOTLAR SHARHI

Metropoliten transport tizimlari va ularning iqtisodiy rivojlanishiga ta'siri masalasi ko'plab xorijiy va mahalliy tadqiqotchilar tomonidan o'rganilgan. Cervero va Murakami (2009) o'tkazgan keng qamrovli tadqiqotlar transport infratuzilmasi va yer qiymatining o'zaro bog'liqligi mavjudligini ko'rsatadi [3]. Ular metropoliten tizimining kengayishi yer narxlarini, ayniqsa metro bekalariga yaqin hududlarda sezilarli darajada oshirishini tasdiqladilar.

Banister va Berechman (2001) transport investitsiyalari va iqtisodiy o'sish o'rtasidagi munosabatlarni tahlil qilib, metropoliten tizimiga qilingan investitsiyalarning iqtisodiy ko'paytkich effektini aniqlashdi [4]. Ularning xulosalariga ko'ra, shahar ichki yalpi mahsulotining o'sishida transport investitsiyalari muhim omil bo'lib xizmat qiladi. Shuningdek, Litman (2020) jamoat transportining ijtimoiy va ekologik afzalliklarini keng qamrovli tarzda tahlil qilib, metropoliten tizimlari CO₂ chiqindilarini kamaytirish va energiya tejashda tutgan o'rnini asoslab berdi [5].

Mahalliy tadqiqotchilar orasida Toshkent metropoliteni masalalari bo'yicha bir qator ishlar amalga oshirilgan bo'lsa-da, xorijiy tajribani qiyosiy tahlil qilish va zamonaviy raqamlashtirish texnologiyalarini joriy etish masalalariga



oid tadqiqotlar yetarli emas. Ushbu bo'shliqni bartaraf etish maqolaning ilmiy yangiligini tashkil etadi.

2. Tadqiqot metodologiyasi

Tadqiqotda qiyosiy tahlil, tizimli yondashuv va umumlashtirish metodlari qo'llanildi. London, Parij va Tokio metropoliten tizimlari asosiy taqqoslash ob'ekti sifatida tanlandi – bu shaharlar o'zlarining transport tizimi samaradorligi bo'yicha dunyo reytinglarida yetakchi o'rinlarni egallaydi va O'zbekiston uchun amaliy ahamiyatga ega tajribaga ega.

Tahlil quyidagi ko'rsatkichlar asosida amalga oshirildi: transport tizimining boshqaruv modeli, tarif siyosati, ekologik samaradorlik, raqamlashtirish darajasi, davlat-xususiy sheriklik shakllari va aholini qamrash ko'rsatkichlari. Shuningdek, O'zbekiston metropoliten tizimini rivojlantirish bo'yicha rasmiy hujjatlar va konsepsiyalar tahlil qilindi.

3. Natija va muhokamalar

London Transport for London (TfL) tizimi tajribasi.

London metropoliteni XIX asrning ikkinchi yarmidan boshlab shahar transportining asosiy tarkibiy qismiga aylangan va bugungi kunda Transport for London (TfL) nomi ostida faoliyat ko'rsatuvchi yirik integratsiyalashgan tizimga transformatsiya qilingan. TfL nafaqat metropoliteni, balki avtobus, tramvay va yengil metro tizimlari kabi turli transport turlarini birlashtirgan holda yagona boshqaruv ostida samarali xizmat ko'rsatmoqda [6].

London tajribasining O'zbekiston uchun amaliy ahamiyati quyidagilarda namoyon bo'ladi.

Birinchidan, transport turlarining integratsiyasi yagona chipta tizimi orqali yo'lovchilar uchun maksimal qulaylik yaratadi.

Ikkinchidan, ekologik toza texnologiyalar – elektr haydovchi transport vositalari va energiya tejovchi tizimlar joriy etilishi transport sektori uglerod izini sezilarli kamaytirdi.

Uchinchidan, shahar iqtisodiyotiga metropoliten tizimining ta'siri investitsiyalar jalb etilishi va yangi ish o'rinlari yaratilishi orqali isbotlangan [7].

Parij metropoliteni va RER tizimi. Parizdagi Réseau Express Régional (RER) tizimi – shahar ichki metropolitenini shahar atrofi hududlari bilan bog'lovchi mintaqaviy tez harakatlanuvchi temir yo'l tarmog'i – shahar transporti integratsiyasining namunalı modeli sifatida tan olingan. Bu tizim nafaqat shahar markazini, balki qo'shni viloyatlar va aeroportlarni ham qamrab oladi, bu esa Parij metropoliten agglomeratsiyasining iqtisodiy aloqadorligini mustahkamlashda hal qiluvchi rol o'ynaydi [8].

Parij tajribasining muhim jihati – transport tizimining ijtimoiy tenglikni ta'minlashdagi roli. Markaziy va chekka tumanlar o'rtasidagi transport aloqalari aholining barcha qatlamlari uchun teng fursatlar yaratadi. O'zbekiston uchun bu tajriba Toshkent va unga tutash hududlar o'rtasidagi transport aloqalarini rivojlantirish, shuningdek yangi tumanlar va sanoat zonalarini metropoliten tarmog'iga ulashda amaliy ahamiyat kasb etadi.

Tokio metropolitenining texnologik innovatsiyalari.

Tokio metropoliteni dunyo standartlari bo'yicha eng katta va eng samarali tizimlardan biri hisoblanadi. Uning o'ziga xos xususiyatlari quyidagilardan iborat: yuqori aniqlikdagi

jadval (o'rtacha kechikish 1 daqiqadan kam), real vaqt rejimida yo'lovchilar oqimini boshqarish, raqamli chip-kartalar orqali to'lov tizimi va sun'iy intellekt asosida ishlovchi diagnostika tizimlari [9].

Tokio tajribasining muhim jihati – davlat va xususiy sektor hamkorligining (PPP modeli) muvaffaqiyatli qo'llanilishi. Xususiy operatorlar aniq belgilangan standartlar va nazorat mexanizmlari asosida metro liniyalarini boshqaradi, bu esa moliyaviy samaradorlikni oshiradi va davlat byudjetiga tushadigan yukni kamaytiradi. Bunday yondashuv O'zbekiston uchun alohida qiziqish uyg'otadi, chunki u metropoliten tizimini moliyaviy barqaror asosda rivojlantirish imkonini beradi [10].

O'ZBEKISTON METROPOLITEN TIZIMINI RIVOJLANTIRISH BO'YICHA TAVSIYALAR

Yuqoridagi ko'rib chiqilgan xorijiy tajribalar tahlili asosida O'zbekiston metropoliten tizimini rivojlantirish uchun quyidagi strategik yo'nalishlar taklif etiladi:

1. Transport turlarini integratsiyalash. London TfL modeli asosida metropoliten, avtobus, trolleybus va elektr transport turlarini yagona boshqaruv tizimi ostida birlashtirish, yagona elektron chipta tizimini joriy etish zarur. Bu yo'lovchilar uchun uzluksiz sayohat imkonini yaratadi va transport tizimining umumiy samaradorligini oshiradi.

2. Raqamlashtirish va intellektual boshqaruv tizimlarini joriy etish. Tokio tajribasiga tayanib, real vaqt rejimida yo'lovchilar oqimini kuzatish, sun'iy intellekt asosidagi jadval optimallashtirish va mobil ilovalar orqali yo'lovchilarga axborot berish tizimlarini ishlab chiqish maqsadga muvofiq.

3. Ekologik samaradorlikni oshirish. Parij va London tajribasida bo'lgani kabi, energiya tejovchi texnologiyalar, regenerativ tormozlash tizimlari va qayta tiklanuvchi energiya manbalari (quyosh panellari) metropoliten infratuzilmasiga tatbiq etilishi kerak.

4. Davlat-xususiy sheriklik (PPP) modelini kengaytirish. Tokio modeli asosida xususiy investorlarni metropoliten liniyalarini boshqarishga jalb etish, ularga aniq standartlar va imtiyozli shartlar asosida konsessiya shartnomalarini taqdim etish moliyaviy barqarorlikni ta'minlaydi.

5. Muvozanatli tarif siyosatini shakllantirish. Tarif darajasi yo'lovchilar xarid qobiliyati va metropoliten operatsion xarajatlarini qoplash zaruriyati o'rtasida muvozanatni ta'minlashi, shu bilan birga ijtimoiy himoyaga muhtoj toifalar uchun imtiyozli chiptalar tizimi saqlanib qolinishi lozim.

6. Harakatlanuvchi tarkibni yangilash va kengaytirish. Zamonaviy, yuqori sig'imli va energiya tejovchi vagonlar parkini bosqichma-bosqich yangilash, shu bilan birga yangi metro liniyalarini qurib, shahardagi qamrov geografiyasini kengaytirish zarur.

4. Xulosa

Amalga oshirilgan tadqiqot shuni ko'rsatdiki, samarali metropoliten transport tizimi faqat yo'lovchilarni tashish vositasi emas, balki shahar iqtisodiyotini rivojlantirishning strategik omili sifatida amal qiladi. London, Parij va Tokio tajribalari metropoliten tizimini boshqarishning turli, ammo o'zaro to'ldiruvchi modellari namoyish etadi: Londonda integratsiyalashgan multimodal boshqaruv, Parijda



mintaqaviy bog'lanish va ijtimoiy tenglik, Tokioda esa texnologik innovatsiyalar va PPP mexanizmlari.

O'zbekiston uchun ushbu tajribalarning eng maqbul jihatlari tahlil qilib, ularga mahalliy ijtimoiy-iqtisodiy sharoitni inobatga olgan holda moslashtirilgan yondashuv talab etiladi. Taklif etilgan strategik yo'nalishlar – transport integratsiyasi, raqamlashtirish, ekologik samaradorlik, PPP va muvozanatli tarif siyosati – Toshkent metropoliten tizimining raqobatbardoshligini oshirish va aholining transport xizmatlariga bo'lgan talablarini to'liq qondirishga xizmat qiladi.

Kelajakdagi tadqiqotlar uchun Toshkent metropolitenining iqtisodiy samarasini miqdoriy baholash, jumladan metro yo'nalishlari bo'yidagi yer qiymatining o'zgarishi va shahar iqtisodiyotiga ko'paytiruvchi ta'sirini empirik o'rganish dolzarb yo'nalish sifatida belgilanishi mumkin.

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