

INTERNATIONAL CONFERENCE OF NATURAL AND SOCIAL-HUMANITARIAN SCIENCES

BRUSSELS

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INTERNATIONAL CONFERENCE OF NATURAL AND SOCIAL- HUMANITARIAN SCIENCES

Volume 03, Issue 04, 2026 (JULY)

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PREDICTIVE VALUE OF IMMUNE GENE POLYMORPHISMS FOR RECURRENT URINARY TRACT INFECTIONS IN CHILDREN

Zukhriddin Zokirov, Iroda Sa'dullayeva

Bukhara State Medical Institute named after Abu Ali ibn Sino

ORCID: <https://orcid.org/0009-0009-7959-9872>

ORCID: <https://orcid.org/0009-0002-2487-3693>

E-mail: zuxriddinzokirov08@gmail.com

E-mail: sq.iroda1985@gmail.com

Abstract

Recurrent urinary tract infections (rUTIs) remain a major pediatric health concern due to their association with renal scarring, hypertension, and chronic kidney disease. Traditional clinical risk factors alone are often insufficient to accurately predict recurrence. Recent advances in molecular genetics have demonstrated that immune gene polymorphisms may serve as valuable biomarkers for identifying children at increased risk of recurrent urinary tract infections. This review summarizes current evidence regarding the predictive significance of polymorphisms in innate and adaptive immune response genes and discusses their integration into personalized risk assessment models.

Keywords: recurrent urinary tract infection, immune genes, polymorphism, biomarkers, risk prediction, personalized medicine, children.

Introduction

Urinary tract infections are among the most common bacterial diseases affecting children worldwide. Although appropriate antimicrobial therapy successfully treats the majority of acute infections, approximately one-third of pediatric patients develop recurrent episodes. Recurrent infections considerably increase the probability of renal scarring, impaired kidney function, and long-term nephrological complications.

Current clinical assessment is mainly based on age, sex, urinary tract abnormalities, microbiological findings, and imaging studies. However, these parameters alone do not adequately explain why some children experience repeated infections despite normal urinary tract anatomy. Therefore, increasing attention has focused on host genetic susceptibility as an important determinant of disease recurrence.

Main Discussion

The innate immune system plays a central role in protecting the urinary tract against invading microorganisms. Recognition of bacterial pathogens depends on several immune receptors and signaling molecules encoded by highly polymorphic genes.

Variations within these genes may significantly influence the intensity and effectiveness of immune responses.

Recent genomic studies have identified several immune-related genes associated with recurrent urinary tract infections, including TLR2, TLR4, IL-6, IL-8, TNF- α , CXCR1, TGF- β 1, HSPA1B, VEGFA, and VDR. Functional polymorphisms within these genes may alter cytokine production, neutrophil recruitment, epithelial defense mechanisms, and bacterial clearance.

Among these biomarkers, polymorphisms of TLR4 reduce recognition of Gram-negative bacterial lipopolysaccharides, while CXCR1 variants impair neutrophil migration toward infected tissues. Similarly, polymorphisms within IL-6 and TNF- α influence inflammatory cytokine production, thereby affecting infection severity and recurrence.

Recent systematic reviews indicate that combining multiple immune gene polymorphisms provides substantially higher predictive accuracy than evaluating individual genetic variants separately. Multigene risk models have demonstrated improved identification of children susceptible to recurrent urinary tract infections and renal complications.

The incorporation of molecular biomarkers into routine pediatric practice offers several clinical advantages. Genetic profiling may facilitate early identification of high-risk patients, individualized follow-up schedules, optimized antimicrobial strategies, and targeted preventive interventions. Furthermore, advances in next-generation sequencing technologies have significantly reduced both the cost and turnaround time of genetic testing, making precision medicine increasingly feasible in pediatric nephrology.

Artificial intelligence and machine learning algorithms further enhance predictive performance by integrating genetic information with laboratory parameters, imaging findings, demographic characteristics, and clinical history. Such comprehensive predictive models may improve decision-making and reduce unnecessary diagnostic procedures.

Despite these advances, most available evidence originates from European and Asian populations outside Central Asia. Therefore, further molecular epidemiological studies involving Uzbek children are required to validate existing biomarkers and establish region-specific genetic prediction models.

Conclusion

Immune gene polymorphisms represent promising biomarkers for predicting recurrent urinary tract infections in pediatric patients. The combined analysis of multiple genetic variants provides greater predictive value than single-gene evaluation and supports the

development of precision medicine approaches. Future large-scale studies in Central Asian populations will contribute to establishing clinically applicable genetic risk prediction models capable of improving early diagnosis, individualized prevention, and long-term renal outcomes.

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**O‘ZBEKISTON RESPUBLIKASI OLIY TA’LIM, FAN VA
INNOVATSIYALAR VAZIRLIGI
O‘ZBEKISTON RESPUBLIKASI BANK-MOLIYA AKADEMIYASI**

**O‘ZBEKISTON RESPUBLIKASI BANK TIZIMIDA ISLOMIY MOLIYA
ASOSIDA BANK MAHSULOTLARINI JORIY ETISH ISTIQBOLLARI**

Magistratura talabasi: **Mardonova Gulnoza Kenjaboy qizi**

Elektron pochta: mardonovagulnoza88@gmail.com

ANNOTATSIYA / ABSTRACT

Ushbu ilmiy tadqiqot ishida (tezisida) O‘zbekiston Respublikasi bank tizimida islomiy moliya tamoyillari asosida bank mahsulotlarini tatbiq etish va rivojlantirishning bugungi holati, fundamental muammolari hamda amaliy istiqbollari chuqur tahlil qilingan. Tadqiqot davomida mamlakat aholisi va tadbirkorlik subyektlarining foizsiz moliya mahsulotlariga bo‘lgan real ehtiyoji hamda bozor sig‘imi o‘rganildi. Shuningdek, milliy soliq va bank qonunchiligini xalqaro andozalarga moslashtirish, islomiy darchalar (Islamic Windows) modelini yo‘lga qo‘yish va soliq neytralligi tamoyilini amaliyotga tatbiq etish yuzasidan aniq tavsiyalar, hisob-kitob modellar va huquqiy yechimlar ilgari surildi.

Kalit so‘zlar: Islomiy moliya, islom bankchiligi, Shariat standartlari, Murobaha, Musharaka, Sukuk, soliq neytralligi, AAOIFI, moliya darchalari, investitsiya jalb qilish.

1. KIRISH (MAVZUNING DOLZARBLIGI)

Zamonaviy dunyoda iqtisodiy barqarorlik va muqobil moliya tizimlarining rivojlanishi moliya institutlari raqobatbardoshligini oshirishning asosiy omillaridan biriga aylandi. Islomiy moliya tizimi o‘zining ijtimoiy adolatga asoslanganligi, real aktivlar bilan bog‘liqligi va inqirozlarga chidamliligi bilan jahon moliya bozorida eng jadal rivojlanayotgan yo‘nalish sifatida namoyon bo‘lmoqda. Global miqyosda islomiy moliya aktivlari hajmi joriy davrga kelib 4 trillion AQSh dollaridan oshdi va yillik o‘sish sur‘ati o‘rtacha 10-12 foizni tashkil etmoqda.

O‘zbekiston Respublikasining investitsiyaviy muhitini tubdan yaxshilash, iqtisodiyotni diversifikatsiya qilish va aholining barcha qatlamlari uchun moliyaviy xizmatlardan foydalanish imkoniyatlarini kengaytirish (moliyaviy inklyuzivlik) bugungi kunning eng dolzarb vazifalaridan biridir. Respublika aholisining 90 foizidan ortig‘ini musulmonlar tashkil etishi hamda diniy-axloqiy qarashlari sababli an‘anaviy banklarning foiz (ribo) asosidagi kreditlaridan foydalanmayotgan aholi va tadbirkorlik

subyektlarining salmoqli qismini iqtisodiy oborotga jalb qilish milliy iqtisodiyot uchun ulkan zaxira hisoblanadi.

Prezidentimiz tomonidan imzolangan iqtisodiy taraqqiyot strategiyalarida bank-moliya tizimini isloh qilish, xorijiy kapitalni faol jalb etish va muqobil moliyalashtirish instrumentlarini amaliyotga keng joriy etish vazifalari belgilangan. Bu esa O'zbekiston tijorat banklarida islomiy moliya xizmatlarini (xususan, "islom darchalari" modelini) huquqiy va iqtisodiy jihatdan tizimlashtirish zarurligini ko'rsatadi.

2. TADQIQOT METODOLOGIYASI VA ADABIYOTLAR TAHLILI

Tadqiqot ishini yoritish davomida islomiy moliya asoschilaridan hisoblangan M.T. Usmani, M.N. Siddiqi kabi xalqaro darajadagi olimlarning fundamental asarlari hamda mahalliy iqtisodchi olimlarning ilmiy izlanishlari o'rganildi. Shuningdek, tahlillar jarayonida tizimli tahlil, qiyosiy iqtisodiy tahlil, prognozlash, induksiya va deduksiya hamda statistik guruhlash metodlaridan keng foydalanildi.

Islomiy bank tizimining an'anaviy bankchilikdan farq qiluvchi eng asosiy jihati — pulni tovar sifatida ko'rib, undan foiz olishning (riboning) qat'iyan taqiqlanishidir. Islomiy moliyada pul faqatgina ayirboshlash vositasi bo'lib, u o'z-o'zidan qiymat yaratmaydi, faqat real aktivlar (tovar, mulk, xizmat) bilan bog'liq bo'lgandagina iqtisodiy foyda keltirishi mumkin. Ushbu tahlillar asosida an'anaviy va islomiy moliyaning solishtirma tavsifi tizimlashtirildi.

1-jadval. An'anaviy va islomiy bank tizimlarining fundamental solishtirma tahlili.

Tahlil mezonlari	An'anaviy bank tizimi	Islomiy bank tizimi
Faoliyat asosi	Dunyoviy qonunchilik va pul bozorining foiz stavkalari.	Shariat qonunlari va uning axloqiy me'yorlari (Fikh al-Muamalat).
Daromad manbai	Berilgan kreditlar uchun olinadigan foizlar (Ribo).	Savdo ustamasi, ijara haqi va sherikchilikdagi foydadan ulush.
Xavf-xatarlarni taqsimlash	Barcha xavf-xatarlar to'liqligicha qarz oluvchi zimmasiga yuklatiladi.	Xavf-xatarlar va foyda/zarar shartnoma shartlariga ko'ra o'zaro bo'linadi.
Moliyalashtirish obyekti	Pul mablag'lari bevosita (erkin foydalanish uchun) beriladi.	Faqat aniq moddiy aktiv yoki xizmat sotib olish moliyalashtiriladi.
Taqiqlangan sohalar	Moliyaviy foyda keltiruvchi istalgan soha (cheklovlarsiz).	Spiritli ichimliklar, qimor, tamaki va sudxorlik kabi harom sohalar taqiqlanadi.

3. O‘ZBEKISTON BANK TIZIMIDA ISLOMIY MOLİYANI JORIY ETISHDAGI TIZIMLI MUAMMOLAR

O‘zbekistonda islomiy bankchilik xizmatlariga bo‘lgan talab o‘shib borayotganiga qaramay, amaliyotda ularni joriy etish sur‘ati pastligicha qolmoqda. O‘tkazilgan tahlillar natijasida sohada quyidagi tizimli muammolar mavjudligi aniqlandi:

3.1. Huquqiy va qonunchilik muammolari

Amaldagi "Banklar va bank faoliyati to‘g‘risida"gi hamda "Fuqarolik kodeksi"da islomiy moliya bitimlarining mohiyati hisobga olinmagan. Islomiy bank mahsulotlari (masalan, Murobaha) mohiyatan savdo bitimi bo‘lganligi sababli, bank mijozga mahsulotni muddatli to‘lov sharti bilan sotishdan oldin uni o‘z nomiga sotib olishi kerak. Biroq, amaldagi qonunlarda tijorat banklariga tijorat va savdo faoliyati bilan bevosita shug‘ullanish taqiqlanadi. Bu esa islomiy moliyani joriy etishga to‘g‘ridan-to‘g‘ri huquqiy to‘siq bo‘lmoqda.

3.2. Soliqqa tortish va ikki tomonlama soliq xavfi

Islomiy moliyadagi operatsiyalar real tovar aylanmasi orqali amalga oshirilgani sababli soliqqa tortish jarayonida muammolar tug‘iladi. Chunki Murobaha bitimida aktiv dastlab bank tomonidan sotib olinadi va keyinchalik ustama haqi evaziga mijozga rasmiylashtiriladi. Natijada ushbu aktiv ikki marta oldi-sotdi qilinadi, bu esa qo‘shilgan qiymat solig‘i (QQS) va davlat bojining ikki marta undirilishiga olib keladi. Bu holat islomiy mahsulotlarning narxini an‘anaviy kreditlarga nisbatan sezilarli darajada oshirib yuboradi va raqobatbardoshlikni yo‘qotadi.

3.3. Malakali kadrlar va infratuzilma yetishmovchiligi

Mamlakatimizda ham iqtisodiy, ham shariat huquqini (Fikh al-Muamalat) chuqur tushunadigan, xalqaro miqyosda tan olingan ekspertlar yetishmaydi. Shuningdek, islomiy darchalar va banklar faoliyatini Shariat nuqtai nazaridan nazorat qilib turuvchi mustaqil Shariat Kengashlarining yo‘qligi milliy banklarimizda xalqaro standartlarni joriy etishni qiyinlashtirmoqda.

4. ISLOMIY BANK MAHSULOTLARINING IQTISODIY MODELLARI VA TAHLILI

O‘zbekiston bank amaliyotiga dastlabki bosqichda joriy etish samarali deb topilgan Murobaha va Ijara bitimlarining iqtisodiy mexanizmlarini tahlil qilib chiqamiz.

Murobaha (Murabaha) modeli: Bu eng ko‘p qo‘llaniladigan savdo bitimi bo‘lib, unda bank mijozning buyurtmasiga ko‘ra tovar yoki asbob-uskunani ishlab chiqaruvchidan sotib oladi va uning ustiga o‘zining foyda marjasini (ustamasini) qo‘shib, mijozga muddatli to‘lov asosida sotadi.

Murobaha bitimi bo'yicha jami to'lov summasini (S_m) quyidagi formula orqali hisoblash taklif etiladi:

$$S_m = C \times (1 + p \times t)$$

Bu yerda: C — tovarning tannarxi (bank sotib olgan boshlang'ich bahosi); p — bankning yillik belgilangan foyda marjasi (foiz ko'rinishida); t — kelishilgan muddat (yillarda). Ushbu modelda foyda marjasi shartnoma imzolangan paytda aniq belgilanadi va keyinchalik muddatidan kechikkan taqdirda ham o'zgarmaydi, bu esa sudxorlik (ribo) elementlarini to'liq istisno qiladi.

Ijara (Ijarah) modeli: Lizingning islomiy muqobili hisoblangan ushbu operatsiyada aktiv bank mulkida qoladi va mijozga vaqtincha foydalanishga beriladi. Agar ijara muddati tugagandan so'ng mulk mijozga o'tishi ko'zda tutilgan bo'lsa, u "Ijara va Iqtina" (egallik huquqini topshirish bilan yakunlanuvchi ijara) deb ataladi. Bu an'anaviy lizingdan sug'urta va ekspluatatsiya xarajatlarining bank tomonidan qoplanishi bilan tubdan farq qiladi.

2-jadval. O'zbekiston tijorat banklarida joriy qilinishi kutilayotgan islomiy moliya mahsulotlarining iqtisodiy tahlili.

Mahsulot nomi	Moliyaviy oqim va mexanizmi	Qaysi sohalar uchun mosligi	Iqtisodiy samaradorligi
Murobaha	Bank aktivni sotib olib, ustama qo'shgan holda mijozga bo'lib-bo'lib to'lash sharti bilan sotadi.	Savdo, ishlab chiqarish, chakana savdo, ipoteka, avtokreditlar.	Past risk darajasi, barqaror daromad keltirish qobiliyati yuqori.
Ijara	Bank obyekti sotib oladi va mijozga ijaraga beradi. Sug'urta xarajatlari bank zimmasida bo'ladi.	Sanoat uskunalari, maxsus texnika, transport, ko'chmas mulk.	Amortizatsiya va soliq imtiyozlari mavjudligi bilan jozibador.
Musharaka	Bank va mijoz qo'shma loyihaga pul tikadi, foyda kelishuvga ko'ra, zarar esa kapital ulushiga ko'ra bo'linadi.	Yirik investitsiyalar, qurilish va infratuzilma loyihalari.	Yuqori risk va yuqori rentabellikka ega bo'lgan sherikchilik modeli.

Muzoraba	Bank sarmoyador (Rabb-ul-Mal), mijoz esa loyiha menejeri (Muzorib) bo'ladi.	Startaplar, kichik va innovatsion loyihalar, venchur kapitali.	Raqobat muhitida yangi innovatsion g'oyalarni qo'llab-quvvatlash imkoniyati.
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5. ISTIQBOLDAGI CHORA-TADBIRLAR VA HUQUQIY-IQTISODIY YECHIMLAR

O'zbekistonda islomiy moliya xizmatlarini muvaffaqiyatli joriy etish va milliy bank tizimining investitsiyaviy jozibadorligini oshirish maqsadida quyidagi tizimli chora-tadbirlar majmuasini amalga oshirish ilmiy jihatdan taklif etiladi:

5.1. Soliq qonunchiligida "Soliq neytralligi" tamoyilini o'rnatish

Soliq kodeksiga islomiy bank operatsiyalarini tartibga soluvchi maxsus normalarni kiritish talab etiladi. Xususan, Murobaha bitimi doirasida tovarning bank tomonidan sotib olinishi va mijozga sotilishi jarayonida uni "ikkilamchi oldi-sotdi" emas, balki yagona moliya operatsiyasi sifatida tan olish lozim. Shu orqali QQSning ikki marta undirilishini bekor qilish va an'anaviy foizli kreditlar soliqqa tortilishiga nisbatan teng, raqobatbardosh huquqiy sharoit yaratish mumkin.

5.2. An'anaviy banklarda "Islom darchalari" (Islamic Windows) modelini joriy etish

Dastlabki bosqichda to'liq islomiy bankni ochish katta miqdorda kapital va infratuzilma xarajatlarini talab etadi. Shuning uchun mavjud tijorat banklari tarkibida "Islom darchalari"ni tashkil etish eng optimal yo'ldir. Bu modelda quyidagi talablar qat'iy bajarilishi lozim:

- Islom darchasining moliyaviy resurslari va hisob-kitoblari an'anaviy bank aktivlaridan to'liq ajratilgan bo'lishi (alohida buxgalteriya balansi);
- Barcha jalb qilingan va joylashtirilgan mablag'lar alohida Shariat kengashi nazorati ostida o'tkazilishi;
- Tijorat bankida faqat ushbu tizim uchun xizmat qiladigan alohida dasturiy ta'minot platformasini joriy qilish.

5.3. Sukuk (Islomiy obligatsiyalar) bozorini shakllantirish

Yirik davlat va xususiy investitsion loyihalarni moliyalashtirish uchun Sukuk qimmatli qog'ozlarini muomalaga chiqarish mexanizmini yo'lga qo'yish lozim. Bu orqali Yaqin Sharq va Fors ko'rfazi davlatlaridan ulkan hajmdagi foizsiz xorijiy investitsiyalarni jalb qilish va davlat byudjeti taqchilligini qoplash imkoniyati yuzaga keladi.

Eslatma (Muhim ilmiy xulosa): Islomiy moliya bank tizimida shunchaki diniy ehtiyoj emas, balki iqtisodiy inqirozlarga qarshi immunitet hosil qiluvchi, real aktivlarga

tayanadigan va pulning asossiz inflyatsiyasini kamaytiruvchi eng barqaror iqtisodiy vositalardan biridir.

6. XULOSA VA ILMIY NATIJALAR

O'zbekiston Respublikasi bank tizimida islomiy moliya tamoyillarini joriy etish milliy moliya bozorini diversifikatsiya qilish va uning barqarorligini oshirishda tub burilish yasashi mumkin. O'tkazilgan tadqiqotlar asosida quyidagi yakuniy ilmiy xulosalar shakllantirildi:

1. O'zbekistonda islomiy moliya mahsulotlariga bo'lgan yashirin talab juda yuqori bo'lib, ushbu tizimning joriy qilinishi o'z mablag'larini banklarda saqlashni xohlamaydigan aholi sarmoyasini jalb qilish orqali milliy bank tizimining likvidligini kamida 15-20 foizga oshirish imkonini beradi.
2. "Soliq neytralligi" prinsipining amaliyotga tatbiq etilishi islomiy bank mahsulotlarining tannarxini arzonlashtiradi va an'anaviy moliya mahsulotlari bilan raqobatlasha olishini ta'minlaydi.
3. Dastlabki bosqichda "Islom darchalari" modelining joriy etilishi bank infratuzilmasi xarajatlarini kamaytirib, banklarga qisqa muddatlarda islomiy moliya bozoriga kirish imkonini beradi.

Xulosa qilib aytganda, tavsiya etilgan qonunchilik islohotlari va iqtisodiy modellarni hayotga tatbiq etish O'zbekistonni yaqin kelajakda butun Markaziy Osiyo mintaqasi uchun yirik islomiy moliya xabi (markazi)ga aylantirishga xizmat qiladi.

FOYDALANILGAN ADABIYOTLAR RO'YXATI

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BUXORO XONI ABULFAYZXON DAVRI, INQIROZI VA FOJIASI.

Andijon davlat universiteti
Tarix va ijtimoiy fanlar fakulteti
Tarix ta'lim yo'nalishi
3-bosqich 301-guruh talabasi:
Sotvoldiyev Sayfiddin Abduvohid o'g'li

Annotatsiya: Ushbu maqolada XVIII asrning birinchi yarmida Buxoro xonligida yuz bergan siyosiy boshboshdoqliklar, yirik o'zbek urug'larining o'zaro nizolari hamda ashtarxoniylar davlat boshqaruvidagi inqirozli holatlar tarixiy manbalar asosida tahlil qilinadi. Unda ashtarxoniylarning so'nggi hukmdorlaridan biri bo'lgan Abulfayzxon davridagi ichki parokandalik, mamlakatning harbiy-iqtisodiy zaiflashishi va Eron shohi Nodirshoh istilosiga zamin yaratgan omillar ko'rib chiqiladi. Shuningdek, xon shaxsiyatining siyosiy o'jizligi va uning fojiali taqdiri Buxoro xonligida ashtarxoniylar sulolasi inqirozi hamda mang'itlar hokimiyatining shakllanish jarayoni bilan bog'liq holda yoritiladi.

Kalit so'zlar: Abulfayzxon, qo'g'irchoq hukmdor, cho'l ko'chmanchilari, rutba, „Qizil gul“ bayrami, ashtarxoniylar inqirozi.

Abulfayzxon 1695-yilda Buxoroda dunyoga kelgan. Otasi Subxonqulixon, onasi Sitorai Mohi Xossa. Tarixiy manbalarda uning taxtga kelishi borasida turlicha qarashlar mavjud: tarixchi A. Jumanazarov Abu Abdurahmon Abdullohning „Tarixi Buxoro va tarjumat ul-ulamo“ asariga tayanib, uni 10 yoshida taxtga o'tirganini keltirsa, boshqa rasmiy ma'lumotlarda u 1711-yilda akasi Ubaydullaxon II saroy fitnasi oqibatida Piri Mirza chorbog'ida o'ldirilgach, hokimiyat tepasiga kelgani qayd etiladi. Ubaydullaxon Bahouddin Naqshband majmuasidagi Dahmai Shohonda dafn etilgach, taxtni fitna ishtirokchisi bo'lgan Abulfayzxon egallaydi.

Yangi xon o'zini qo'llagan fitnachilarni saxovat bilan mukofotlab, yirik lavozimlarga tayinladi; Ubaydullaxon II ning yaqinlari va amaldorlarining mol-mulki talanib, o'zlari qatl etildi. Ashtarxoniylar sulolasining sakkizinchi vakili sifatida qariyb 36 yil Buxoroni boshqargan Abulfayzxon davrida mamlakatda chuqur siyosiy va iqtisodiy beboshdoqlik avj oldi. Tarixda „qo'g'irchoq hukmdor“ nomi bilan tanilgan xon davlat ishlariga e'tiborsiz bo'lib: „Registon (ya'ni saroy oldi) tinch bo'lsa bo'lgani“, degan gapni takrorlashdan nariga o'tmasdi.

Ichki inqiroz, tarqoqlik va qozoqlar istilosi

Xonlikning muntazam qo'shinga ega emasligi va uni saqlashga mablag' yetishmasligi harbiy tizimni butkul falaj qilgan. Viloyat hokimlari xonning qo'shin yuborish

haqidagi buyruqlariga itoat etmay qo‘ygani ham buning isbotidir. Rossiya elchisi Florio Benevenining ta’kidlashicha, «Abulfayzxon faqat qalmiq va ruslardan iborat gvardiyasiga tayanib xotirjam yurardi».

Ushbu zaiflik oqibatida Buxoro xonligi parchalana boshladi. Qo‘qon xonligi mustaqil bo‘lib ajraldi (1709). Davlat boshqaruvi esa amalda mang‘it qabilasidan chiqqan otaliq Muhammad Hakimbiy qo‘liga o‘tdi. Bu holat boshqa o‘zbek qabilalarining keskin noroziligiga sabab bo‘ldi. Bir guruh amirlar Xiva xoni Sherg‘oziyxonni Buxoro taxtiga o‘tqazmoqchi bo‘lganida, Abulfayzxon fitnachilarni qatl ettirdi. Biroq xalq ahvoliga befarq qarab turolmagan boshqa bekliklar baribir bosh ko‘tardi. Shahrisabz hokimi Ibrohimbiy Kenagas Miyonqol beklari bilan til biriktirib, Samarqandda mustaqil hokimiyat tuzishga kirishdi va kuyovi — xivalik shahzoda Rajab Sultonni Samarqand taxtiga o‘tqazdi. Ibrohimbiyning o‘zi esa „amir al-umaro“ (amirlar amiri) unvonini oldi.

Xonning maishatga berilgani va Muhammad Hakimbiyning o‘zboshimchaligi norozilikni yanada kuchaytirdi. Rajab Sulton qo‘shin tortib kelganda, o‘zbek qabilalari Hakimbiyni qo‘llamadi va xon qo‘shinlari Karmana yaqinidagi jangda mag‘lub bo‘ldi. Buxoroni qamal qilish asnosida Ibrohimbiy qozoqlarga katta o‘lja va‘da qilib, ularni yordamga chaqirdi. Jung‘orlar siquvidan qochib yurgan qozoqlar butun o‘tovlari va chorvasi bilan Miyonqoldan Buxorogacha bo‘lgan hududlarni egallab oldi. Muhammad Hakimbiy va Abulfayzxon yashirinishga majbur bo‘ldi. Cho‘l ko‘chmanchilari Zarafshon havzasini yetti yil davomida talab, xarobazorga aylantirdi, mahalliy aholining ko‘p qismi asir ketdi. Shunday og‘ir vaziyatda Abulfayzxon Muhammad Hakimbiyni Buxorodan chetlatib, Qarshi hokimi etib tayinladi. Ammo uning o‘rniga kelgan ochko‘z amaldorlar bozorlarni markazlashtirib, talon-toroj qilishni kuchaytirdilar va xalq ahvolini battar og‘irlashtirdilar.

Tashqi siyosat va diplomatik aloqalar.

Abulfayzxon inqirozdan chiqish ilinjida Usmoniylar davlati bilan uch marta elchi almashgan:

1719-yilda qo‘rchiboshi Olloberdini;

1720-yilda Xo‘ja Muhammad boshchiligidagi elchilarni Istanbulga jo‘natadi. Ammo inqiroz yoqasidagi sulolaga hech bir tashqi kuch yordam qo‘lini cho‘za olmadi.

1721-yilda Abdusamiy Yasovulxon elchi qilib yuborilib, u orqali shialarga nisbatan adovati bildirilgan bo‘lsa-da, Usmonli sultoni Ahmad III amaliy yordam ko‘rsatmadi. Rossiya imperiyasi bilan munosabatlarda esa muvozanat saqlashga urinildi. 1716-yil fevralda Buxoro elchisi Xonquli to‘pchiboshi va savdogar Asan bobo Astraxanga boradi. Ushbu missiya doirasida Abulfayzxon Pyotr I ga xayrixohlik sifatida 36 nafar rus asirini ozod qilib yuborgan. 1717-yilda Rossiyaning Xiva ekspeditsiyasi rahbari

Aleksandr Bekovich-Cherkasskiy Sherg'oziyxon tomonidan makkorona o'ldirilgach, Xiva xoni uning kesilgan boshini Abulfayzxonga sovg'a sifatida yuboradi. Biroq Rossiya bilan munosabatlar buzilishini istamagan Buxoro xoni bu "sovg'ani" ortiga qaytaradi.

1721–1725-yillarda Buxoroda bo'lgan rus elchisi Florio Beneveni hududning ichki ahvoli, siyosiy kurashlari, xonlarning shaxsiyati va savdo aloqalari haqida muhim ma'lumotlarni o'z ichiga olgan kundalik asar yuritadi. Beneveni Buxoro bilan harbiy shartnoma tuzishning imkonsizligi haqida shunday xulosaga kelgan edi:

„...agar o'sha xon, uning butun saroyi va barcha o'zbeklar bunga to'liq moyil bo'lgan taqdirda ham, keyinchalik buni qaytarib bo'lmaydi. Bu odamlar tabiatan juda o'zgaruvchan va yolg'onchidir: birinchi soatda nima gapirishsa, keyingi soatda o'zlarini o'zlari inkor etadilar“.

Nodirshoh istilosi va madaniy merosning talanishi.

Buxoroning o'jizligi Eron shohi Nodirshohga qo'l keldi. U avvaliga o'g'li Rizoqulixon boshchiligidagi 12 mingtalik qo'shinni yubordi. Rizoqulixon artilleriya yordamida Buxoroning o'zidan to'rt barobar ko'p qo'shinini osongina tor-mor keltirib, Qarshini qamal qildi. Faqatgina Xiva xoni Elbarsxonning Xurosonga hujumi tufayli Rizoqulixon shoshilinch bitim tuzib, ortga qaytdi.

Biroq 1740-yil Nodirshohning o'zi katta qo'shin bilan kelganda, Muhammad Hakimbiyning o'g'li Muhammad Rahimbiy uning huzuriga borib, taslim bo'ldi. Abulfayzxon ham urushsiz taslim bo'lishini bildirib, maktub va sovg'alar yo'lladi. Qorako'ldagi uchrashuvda Nodirshoh Abulfayzxonga toj kiygizib, unga „shoh“ rutbasini berdi va uni o'z noibiga — qo'g'irchoq hukmdorga aylantirdi. Siyosiy ittifoqni mustahkamlash uchun Abulfayzshoh ikki qizini Nodirshoh va uning jiyani Odilshohga nikohladi. Muhammad Rahimbiyga esa "xon" rutbasi berilib, Nodirshoh qo'shini uchun 10 ming askar to'plash buyurildi.

Nodirshohning buyrug'i bilan Samarqanddan Amir Temurning nefrit qabr toshi hamda Bibixonim masjidining yetti xil metallardan quyilgan darvozalari Mashhadga olib ketildi (keyinchalik ular qaytarilgan). Shuningdek, Amir Temurning qilichi, zirhlari hamda Boysung'ur Mirzo tomonidan ko'chirtirilgan ulkan Qur'on nusxasi ham Eron safarida olib ketilgan bo'lib, bugungi kunda ularning qismlari Tehrondagi „Sadobod“ va Mashhaddagi "Imom Rizo" muzeylarida saqlanmoqda.

Sulolaning tugatilishi va mang'itlar hukmronligi

Nodirshoh ketgach, qo'zg'olonlar to'xtamadi. Muhammad Hakimbiy vafotidan keyin, 1745-yilda xalq Bahouddin Naqshband ziyoratgohida an'anaviy „Qizil gul“ bayramini nishonlayotgan paytda, Xitoy-qipchoqlar yetakchisi Ibodulla xitoy Buxoroga bostirib kirib, shaharni taladi. Nodirshoh xonlikni himoya qilish uchun Muhammad

Rahimbiyni yubordi. Muhammad Rahimbiy isyonlarni shafqatsizlik bilan bostirib, amalda davlat boshqaruvini qo‘lga kiritdi hamda „amir ul-umaro“ unvonini oldi.

1747-yil 14-iyunda Nodirshoh suiqasd qurboni bo‘lgach, Buxoroda mutloq hokimga aylangan Muhammad Rahimbiy o o‘sha yili Abulfayzxonni Mir Arab madrasasi hujrasida o‘ldirtirdi. Taxtga dastlab xonning o‘g‘li Abdulmo‘minni (o‘z kuyovini), so‘ngra uning ukasi Abdullani va boshqa qo‘g‘irchoq xonlarni o‘tqazib, tez orada ularni ham mahv etdi. 1753-yilda hokimiyatni to‘liq egallab, Buxoroda mang‘itlar sulolasi hukmronligini rasman boshladi.

Ushbu fojiaiy davr keyinchalik adib Abdurauf Fitrat tomonidan yuksak mahorat bilan qalamga olinib, 1924-yilda „Abulfayzxon“ dramasi yaratilgan. Unda xonning xalq boshiga keltirgan musibatlari, elning ayovsiz talangani va ijtimoiy tengsizlikka qarshi ommaning bosh ko‘targani haqqoniy ochib berilgan.

Xulosa

Xulosa qilib aytganda, XVIII asrning birinchi yarmi Buxoro xonligida ashtarxoniylar sulolasi inqirozining eng cho‘qqisi bo‘ldi. Abulfayzxon davrida davlat boshqaruvidagi unvon va mansablar – “rutbalarning” qadrsizlanishi hamda xonning yirik o‘zbek urug‘lari qo‘lida “qo‘g‘irchoq hukmdor”ga aylanishi markaziy hokimiyatni butunlay izdan chiqardi. Umuman olganda, Abulfayzxonning fojiali qismati ashtarxoniylar sulolasi inqirozini yakunlab, Movarounnahrda mang‘itlar hukmronligining boshlanishiga zamin yaratdi.

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**KAMBAG‘ALLIKKA QARSHI KURASHISH VA AHOLINING FAROVON
HAYOT KECHIRISHIGA IMKONIYATLAR YARATISHDA XITOIY
TAJIRIBASINI QO‘LLASH IMKONIYATLARI**

Isroilova Munajat

O‘zbekiston Respublikasi Bank-moliya akademiyasi magistranti

munajatnuriddinovna@gmail.com

Annotatsiya: Mazkur tezis kambag‘allikka qarshi kurashishda Xitoy tajribasini O‘zbekiston sharoitiga qo‘llash imkoniyatlarini tadqiq etadi. 1978-2021-yillarda Xitoyning 800 milliondan ortiq kishini mutlaq kambag‘allikdan olib chiqish tajribasi sistematik tahlil qilingan. To‘rtta asosiy mexanizm - maqsadli ro‘yxatga olish, subsidiyalangan mikrocredit, qishloq infratuzilmasiga investitsiyalar va natijaga asoslangan ma‘muriy javobgarlik - o‘rganilgan hamda O‘zbekiston sharoitiga moslashuvchanlik matritsasi ishlab chiqilgan. Mahalla tizimining Xitoy hamjamiyat kafolati mexanizmi bilan funksional o‘xshashligi ilmiy asoslangan. Tadqiqot natijasida selektiv adaptatsiya modeli taklif etilgan: mahalla tizimi, raqamli platforma va davlat-xususiy sheriklik mexanizmlari orqali kambag‘allikni qisqartirishga qaratilgan beshta tavsiya ishlab chiqilgan.

Kalit so‘zlar: *kambag‘allik, aniq kambag‘allikni qisqartirish, Xitoy tajribasi, mahalla tizimi, ijtimoiy himoya, mikrocredit, qishloq infratuzilmasi, moliyaviy inklyuzivlik, selektiv adaptatsiya, ijtimoiy pasport.*

KIRISH

Kambag‘allik muammosi bugungi kunda global miqyosda eng dolzarb ijtimoiy-iqtisodiy muammolardan biri bo‘lib qolmoqda. BMTning Barqaror rivojlanish maqsadlari doirasida 2030-yilga qadar barcha shakllardagi qashshoqlikni tugatish birinchi maqsad sifatida belgilangan (United Nations, 2015). Shu kontekstda Xitoy Xalq Respublikasining tajribasi alohida ahamiyat kasb etadi: 1978-yilgi islohotlardan 2021-yilga qadar Xitoy 800 milliondan ortiq kishini mutlaq kambag‘allikdan olib chiqdi - bu insoniyat tarixidagi eng yirik ijtimoiy-iqtisodiy o‘garish hisoblanadi (World Bank, 2022).

O‘zbekistonda kambag‘allik darajasi 2021-yildagi 17 foizdan 2024-yilga kelib 8,9 foizga tushgan bo‘lsa-da (CERR, 2025), qishloq hududlarida qashshoqlik ko‘rsatkichi shaharlarnikidan 2-3 barobar yuqori bo‘lib qolmoqda (Statistika agentligi, 2023). Bundan tashqari, aholining 49 foizi qishloqda yashashi va ijtimoiy himoya tizimining qamrovi cheklanganligi mavjud siyosatning takomillashtirilishini taqozo etadi. Shu sababli Xitoyning kambag‘allikka qarshi kurashish tajribasini o‘ganib, uni O‘zbekiston

sharoitiga moslashtirilgan holda qo‘llash imkoniyatlarini tadqiq etish bugungi kunda ilmiy va amaliy ahamiyat kasb etadi.

Tadqiqotning asosiy maqsadi - Xitoyning kambag‘allikka qarshi kurashish tajribasini sistematik tahlil qilish va uning O‘zbekistonga moslashtirilgan shaklda qo‘llanilishi bo‘yicha ilmiy-amaliy tavsiyalar ishlab chiqishdan iborat.

Ushbu maqsadga erishish uchun quyidagi vazifalar belgilangan:

- kambag‘allikka qarshi kurashishning nazariy asoslarini va xalqaro tajribasini o‘rganish;
- Xitoyning “Aniq kambag‘allikni qisqartirish” (精准扶贫) dasturi va boshqa siyosat vositalarini tahlil qilish;
- O‘zbekistondagi kambag‘allikning tarkibiy xususiyatlarini va mavjud ijtimoiy siyosatni baholash;
- Xitoy tajribasini O‘zbekistonga moslashtirishning institutsional imkoniyatlari va to‘siqlarini aniqlash;
- kambag‘allikni qisqartirishga qaratilgan ilmiy asoslangan siyosiy tavsiyalar ishlab chiqish.

Tadqiqot jarayonida quyidagi asosiy natijalar olindi:

Birinchidan, Xitoyning “Aniq kambag‘allikni qisqartirish dasturi tahlili shuni ko‘rsatdiki, maqsadli yondashuv - har bir kambag‘al oila uchun individual yordam rejasi tuzish kambag‘allikni qisqartirishda umumiy dasturlardan 2-3 barobar samaraliroq bo‘lingan.

2014-2021-yillarda ushbu dastur doirasida 15,4 million mikrokreditlar berildi, qaytarish ko‘rsatkichi 96,4 foizni tashkil etdi (State Council of China, 2021).

Ikkinchidan, O‘zbekistondagi ijtimoiy yordam tizimining tahlili shuni ko‘rsatdiki, yordam olishga muhtoj oilalarning 30-40 foizi hali ham tizim tomonidan qamrab olinmayapti (Fayzieva va Mirzayev, 2022). Mavjud mahalla tizimi esa Xitoyning ro‘yxatga olish va monitoring mexanizmini joriy etish uchun tayyor institutsional asos bo‘la oladi.

Uchinchidan, qiyosiy tahlil asosida O‘zbekiston uchun eng yuqori moslashuvchanlikka ega Xitoy tajribasi elementlari aniqlandi:

- 1) mahalla tizimi orqali aniq ro‘yxatga olish - yuqori moslashuvchanlik;
- 2) qishloq infratuzilmasiga investitsiyalar - o‘ta yuqori;
- 3) natijaga asoslangan ma‘muriy javobgarlik - o‘ta;
- 4) subsidiyalangan mikrokredit - o‘ta.

To‘rtinchidan, O‘zbekistonda kambag‘allikning asosiy omillari sifatida qishloq-shahar daromad tafovuti (2-3 barobar), mehnat bozorida ishsizlik (qishloq hududlarida

10,4%), moliyaviy inklyuzivlikning pastligi (qishloq aholisining 47% qamrovi) va ta'lim darajasining past ekanligi aniqlandi (Statistika agentligi, 2023; Markaziy bank, 2024).

Tadqiqot natijalari asosida quyidagi tavsiyalar ishlab chiqildi:

1. *Mahalla tizimi asosida aniq ro'yxatga olish mexanizmini joriy etish* - har bir kambag'al oila uchun besh mezonga (turar-joy, ta'lim, sog'liqni saqlash, mehnat imkoniyati, daromad) asoslangan individual ijtimoiy passport tuzish.
2. *Kambag'allik ro'yxatidagi oilalar uchun yiliga 10-12 foiz stavkada garovsiz subsidiyalangan mikrokredit dasturini joriy etish* - subsidiyaning 60 foizini markaziy byudjet, 40 foizini mahalliy byudjet qoplashi tavsiya etiladi.
3. *Qishloq infratuzilmasiga davlat investitsiyalarini YaIMning kamida 2,5 foiziga yetkazish*, "Obod qishloq" va "Yashil makon" dasturlarining qamrovini kengaytirish.
4. *Mahalla va tuman hokimiyatlarini ijtimoiy ko'rsatkichlar* - kambag'allik darajasi, ijtimoiy yordam qamrovi, ish o'rinalari yaratish - bo'yicha baholash tizimini joriy etish. Beshinchidan, *Raqamli moliyaviy texnologiyalar orqali kambag'al aholining bank tizimiga kirishini ta'minlash* - mobil to'lovlar tarixi asosida kredit skoringi tizimini joriy etish.

XULOSA

Xitoyning kambag'allikka qarshi kurashish tajribasi - maqsadli yondashuv, infratuzilmaga investitsiya, insoniy kapital rivojlanishi va ma'muriy javobgarlik - O'zbekiston uchun muhim darslar beradi. Tadqiqot natijalari shuni ko'rsatadiki, Xitoy modelini to'liq ko'chirish mumkin emas va maqsadga muvofiq emas - institutsional farqlar, bozor hajmi va siyosiy tizim farqlari bunga to'siqlik qiladi. Biroq selektiv adaptatsiya - ya'ni O'zbekiston sharoitiga mos elementlarni tanlab, mahalla tizimi, raqamli platforma va davlat-xususiy sheriklik mexanizmlari orqali amalga oshirish - kambag'allikni qisqartirishda sezilarli natija berishi mumkin. Ushbu tadqiqot O'zbekistonda kambag'allikka qarshi kurashishning ilmiy asoslangan kompleks yondashuvini shakllantirish uchun metodologik asos yaratadi va davlat siyosati ishlab chiquvchilar uchun amaliy manba bo'lib xizmat qilishi mumkin.

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THE ROLE OF DIGITAL INNOVATIONS IN IMPROVING ISLAMIC BANKING SERVICES

Mirzaraxmatova Munisaxon Rustamjon qizi

munisakamolova858@gmail.com

*Master's Student, Faculty of Finance, the Banking and Finance Academy of the
Republic of Uzbekistan*

RAQAMLI INNOVATSIYALARNING ISLOMIY BANK XIZMATLARINI YAXSHILASHDAGI O‘RNI

Annotatsiya. Mazkur tezis raqamli innovatsiyalarning — mobil banking, fintech platformalari, blokcheynga asoslangan aqlli shartnomalar, sun‘iy intellekt, ochiq banking va raqamli identifikatsiyaning — islomiy bank xizmatlarini yaxshilashdagi o‘rnini kontseptual tahlil qilishga bag‘ishlangan, xususan O‘zbekiston misolida. 2026-yil 27-martda O‘zbekistonda islomiy bank faoliyatini joriy etuvchi birinchi qonun (O‘RQ-1126-son) qabul qilindi, bu esa an‘anaviy banklar bilan bir qatorda islomiy banklar, islomiy “oynalar” va islomiy mikromoliya tashkilotlari faoliyat yuritishiga imkon beruvchi ikki bosqichli bank tizimini yaratdi. Tadqiqot natijalari shuni ko‘rsatadiki, raqamli vositalar foyda-zararni taqsimlash shartnomalaridagi nazorat xarajatlarini kamaytirish, aktivga asoslangan bitimlar shaffofligini oshirish hamda diniy sabablarga ko‘ra bank xizmatlaridan foydalanmagan aholini moliyaviy inklyuzivlikka jalb etish imkonini beradi. Tezisda O‘zbekiston uchun asosiy imkoniyatlar va xavflar aniqlanib, amaliy tavsiyalar taklif etiladi.

Kalit so‘zlar: islomiy banking, raqamli innovatsiyalar, fintech, moliyaviy inklyuzivlik, shariatga muvofiqlik, raqamli transformatsiya, blokcheyn, O‘zbekiston.

Abstract. This thesis offers a conceptual analysis of the role of digital innovations — mobile banking, fintech platforms, blockchain-based smart contracts, artificial intelligence, open banking and digital identification — in improving Islamic banking services, with particular reference to Uzbekistan. On 27 March 2026, Uzbekistan adopted its first law introducing Islamic banking activity (Law No.O‘RQ-1126), creating a dual banking system in which Islamic banks, Islamic windows and Islamic microfinance institutions may operate alongside conventional banks. The findings show that digital tools reduce the monitoring costs of profit-and-loss sharing contracts, enhance the transparency of asset-backed transactions, and extend financial inclusion to population segments that have avoided interest-based banking for religious reasons.

The thesis identifies key opportunities and risks for Uzbekistan and proposes practical recommendations.

Keywords: Islamic banking, digital innovation, fintech, financial inclusion, Sharia compliance, digital transformation, blockchain, Uzbekistan.

Relevance of the topic. The global banking sector is undergoing a profound digital transformation, and Islamic banking — grounded in the prohibition of interest (riba), excessive uncertainty (gharar) and speculation (maysir) — is increasingly part of this shift. The relevance of this topic for Uzbekistan has grown sharply since 27 March 2026, when the President signed Law No. O‘RQ-1126, establishing a dual banking system in which Islamic banks, Islamic “windows” within conventional banks, and Islamic microfinance institutions may operate legally for the first time. This reform coincides with rapid growth in digital financial services: the share of the population making at least one digital payment rose from 39% in 2021 to 71.17% in 2025 (Central Bank of Uzbekistan, 2026). The convergence of these two processes — the legal introduction of Islamic banking and the accelerated digitalization of finance — makes it both timely and practically necessary to examine how digital innovation can support the development of a Sharia-compliant financial sector in the country.

Aim of the research. The paper aims to conceptually analyze the role of digital innovations — mobile and internet banking, fintech platforms, blockchain-based smart contracts, artificial intelligence, open banking, and digital identification — in improving the efficiency, transparency, accessibility and Sharia-compliance of Islamic banking services, with specific reference to the emerging institutional and regulatory environment in Uzbekistan.

Research methods. Given that Uzbekistan's Islamic banking sector is only now transitioning from legislation to licensed operation, the study adopts a qualitative, conceptual and comparative method, based on a desk review of Islamic finance theory (Chapra, 2000; Iqbal & Mirakhor, 2011), the text of Law No. O‘RQ-1126 and related Central Bank regulations, and industry data on digital financial services, supplemented by comparative reference to more mature Islamic banking markets such as Malaysia, Turkey and the UAE.

Main result. The analysis shows that digital tools are structurally well suited to Islamic finance because they directly address the operational burdens created by Sharia-compliant contracting. Blockchain-based smart contracts can encode and automatically enforce the terms of profit-and-loss sharing (mudarabah, musharakah) and asset-backed sale (murabaha) contracts, reducing monitoring and Sharia-compliance verification costs. Artificial intelligence supports credit assessment using alternative

data rather than interest-rate-based risk pricing, which is particularly valuable given the limited formal credit history of many Uzbek SMEs. Digital and biometric identification extends formal financial access to population segments that have historically avoided interest-based banking for religious reasons. In Uzbekistan specifically, the simultaneous development of the Islamic Banking Law, the Central Bank's Council on Islamic Finance, and the forthcoming National Strategy for Financial Technology Development for 2026–2030 creates a rare opportunity to design Islamic finance regulation and fintech regulation coherently from the outset, allowing new Islamic banks and windows to build digitally native operations rather than digitizing legacy infrastructure.

Scientific conclusion. Digital innovation is not merely a convenience for Islamic banking but a structural enabler of its core contractual principles — transparency, asset-backing and genuine risk-sharing. For Uzbekistan, realizing this potential requires coordinated policy between Islamic finance and fintech regulators, a dedicated regulatory sandbox for Islamic fintech products, technical standardization of digitally encoded Sharia-compliant contracts, and investment in combined Sharia-and-technology expertise among bank staff and regulators. These findings provide a conceptual basis for subsequent empirical research once licensed Islamic banks in Uzbekistan become operational.

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TA'LIM TIZIMINI MOLIYALASHTIRISHDA DAVLAT VA XUSUSIY SEKTOR HAMKORLIGI

Zokirxo'jayeva Munisa Sherzot qizi

O'zbekiston Respublikasi Bank-moliya akademiyasi tinglovchisi

Annotatsiya. Ushbu tezisda ta'lim sohasini moliyalashtirishning muqobil manbalaridan biri sifatida davlat-xususiy sheriklik (DXSh) mexanizmi ko'rib chiqiladi. Davlat byudjeti resurslarining cheklanganligi, aholi sonining o'sishi va ta'lim infratuzilmasiga bo'lgan talabning yildan-yilga ortib borishi sharoitida ta'lim muassasalarini qurish, jihozlash va zamonaviy o'quv dasturlari bilan ta'minlash uchun xususiy kapitalni jalb qilish zarurati asoslab beriladi. Maqolada DXShning asosiy shakllari, xorijiy davlatlar tajribasi, O'zbekiston amaliyotidagi mavjud holat, shuningdek uni qo'llashda uchraydigan huquqiy, moliyaviy va institutsional muammolar tahlil qilinadi. Tadqiqot natijasida ta'lim sohasida davlat-xususiy sheriklikni rivojlantirish bo'yicha bir qator amaliy takliflar ishlab chiqilgan.

Kalit so'zlar. davlat-xususiy sheriklik, ta'lim moliyalashtirish, xususiy investitsiya, konsessiya, ta'lim infratuzilmasi, byudjetdan tashqari mablag'lar, ta'lim sifati, institutsional islohot.

Kirish

Ta'lim tizimi har qanday mamlakat iqtisodiy va ijtimoiy taraqqiyotining tayanch omili hisoblanadi. Malakali kadrlar tayyorlash, mehnat bozorining zamonaviy talablariga javob beruvchi bilim va ko'nikmalarni shakllantirish, aholining ijtimoiy farovonligini oshirish - bularning barchasi rivojlangan va barqaror ta'lim tizimisiz amalga oshmaydi. Biroq zamonaviy talablarga javob beradigan ta'lim infratuzilmasini yaratish - yangi maktab va bog'chalar qurish, laboratoriyalarni jihozlash, raqamli ta'lim vositalarini joriy etish, o'qituvchilarni qayta tayyorlash tizimini takomillashtirish - katta hajmdagi moliyaviy mablag' talab qiladi.

Ko'pchilik rivojlanayotgan davlatlarda, jumladan O'zbekistonda ham, aholi sonining tez o'sishi natijasida maktabgacha va umumiy o'rta ta'lim muassasalariga bo'lgan talab davlat byudjeti imkoniyatlaridan tezroq sur'atlarda ortmoqda. Bunday sharoitda faqat davlat mablag'lariga tayanish infratuzilma taqchilligini yanada chuqurlashtirishi mumkin. Aynan shu sabab ta'lim sohasida davlat va xususiy sektor o'rtasidagi sheriklikni rivojlantirish masalasini dolzarb qilib qo'yimoqda.

Davlat-xususiy sheriklik - bu davlat organlari va xususiy tadbirkorlik sub'ektlari o'rtasida uzoq muddatli shartnoma asosida amalga oshiriladigan hamkorlik shakli bo'lib, unda risklar, xarajatlar va daromadlar taraflar o'rtasida taqsimlanadi. Bunday

hamkorlik nafaqat qo‘shimcha moliyaviy manba jalb qilish, balki xususiy sektorning boshqaruv tajribasi, texnologik yangiliklari va samaradorlik madaniyatidan foydalanish imkonini ham beradi.

O‘zbekistonda so‘nggi yillarda ushbu yo‘nalishda muhim qadamlar qo‘yilgan. Xususan, "Davlat-xususiy sheriklik to‘g‘risida"gi qonun qabul qilingan, Moliya vazirligi huzurida tegishli agentlik faoliyat yuritmoqda, xalqaro moliya institutlari - Yevropa tiklanish va taraqqiyot banki kabi tashkilotlar bilan hamkorlik mexanizmlari ishlab chiqilmoqda. Shu bilan birga, ta‘lim sohasida bu mexanizmning qo‘llanilishi hozircha yo‘l-transport, energetika yoki sog‘liqni saqlash sohalariga nisbatan sust rivojlangan, bu esa mavzuni nazariy va amaliy jihatdan chuqurroq o‘rganishni taqozo etadi.

DXShning ta‘lim sohasidagi asosiy shakllari

Xalqaro tajribada ta‘lim muassasalarini moliyalashtirishning bir necha modeli qo‘llaniladi. Birinchisi - loyihalashtirish, qurish, moliyalashtirish va ekspluatatsiya (DBFO) modeli bo‘lib, unda xususiy kompaniya maktab binosini o‘z mablag‘i hisobiga quradi va uni davlatga uzoq muddatli ijaraga beradi, davlat esa belgilangan yillar davomida ijara to‘lovlarini amalga oshiradi. Ikkinchisi - konsessiya modeli, bunda xususiy investor ta‘lim infratuzilmasini qurish va undan foydalanish huquqini oladi, ammo mulk huquqi belgilangan muddat tugagach davlatga qaytadi. Uchinchisi - aralash moliyalashtirish, ya‘ni davlat va xususiy hamkorning birgalikda mablag‘ kiritishi, masalan zamonaviy texnika-texnologiya bilan jihozlangan kasb-hunar markazlarini yaratishda ko‘p uchraydi. To‘rtinchi shakl sifatida boshqaruv shartnomalarini ham keltirish mumkin, bunda bino davlat mulkida qoladi, biroq uning kundalik ekspluatatsiyasi va texnik xizmat ko‘rsatilishi xususiy kompaniyaga topshiriladi.

Xorijiy davlatlar tajribasi

Buyuk Britaniyada 1990-yillarning boshida joriy etilgan “Xususiy moliya tashabbusi” (Private Finance Initiative) dasturi doirasida yuzlab maktab binolari xususiy kompaniyalar mablag‘i hisobiga qurilgan va keyinchalik davlatga uzoq muddatli ijara shartnomalari asosida topshirilgan. Turkiyada ham shunga o‘xshash modellar orqali o‘nlab maktab kompleksi barpo etilgan, bunda davlat yer uchastkasi va kafolatlangan to‘lov jadvalini taqdim etadi, xususiy sektor esa qurilish va texnik xizmat ko‘rsatishni o‘z zimmasiga oladi. Janubi-Sharqiy Osiyo mamlakatlarida esa DXSh ko‘proq kasb-hunar ta‘limi va oliy ta‘lim infratuzilmasini rivojlantirishga qaratilgan bo‘lib, xususiy sektor ko‘pincha zamonaviy laboratoriya va texnika bilan ta‘minlash vazifasini bajaradi. Bu tajribalar shuni ko‘rsatadiki, DXShning muvaffaqiyati ko‘p jihatdan aniq

va barqaror huquqiy asos, shuningdek shartnoma majburiyatlarining izchil bajarilishini nazorat qiluvchi mustaqil institutlar mavjudligiga bog'liq.

O'zbekiston tajribasi

So'nggi yillarda mamlakatimizda xususiy maktablar va bog'chalar tarmog'ini kengaytirish bo'yicha davlat tomonidan turli imtiyozlar - yer uchastkalarini arzon narxda ajratish, soliq va bojxona imtiyozlari, subsidiyalashtirilgan kreditlar - taqdim etilmoqda. Bu chora-tadbirlar natijasida xususiy ta'lim muassasalari soni sezilarli darajada oshdi. Biroq bu asosan yangi muassasa ochishni rag'batlantirishga qaratilgan bo'lib, klassik ma'nodagi DXSh loyihalari, ya'ni davlat maktablarini xususiy sektor ishtirokida qurish va boshqarish amaliyoti hali keng tarqalmagan.

O'zbekiston Respublikasi Vazirlar Mahkamasining 2024-yil 30-oktabrdagi 720-sonli qarori bilan DXSh loyihalarini byudjet mablag'lari, subsidiyalar, byudjet ssudalari va kredit liniyalari hisobidan moliyalashtirish tartibi belgilangan bo'lib, bu ta'lim sohasi uchun ham amaliy asos yaratadi. Shunga qaramay, bunday loyihalarni ta'lim tarmog'ida hali keng joriy etilmaganligiga sabab sifatida quyidagilarni ko'rsatish mumkin: uzoq muddatli loyihalarda risklarni taqsimlash mexanizmining yetarlicha ishlab chiqilmaganligi, xususiy investorlar uchun daromadlilikni kafolatlaydigan barqaror shartnoma amaliyotining yo'qligi, hamda mahalliy hokimiyat organlarining bunday murakkab loyihalarni tayyorlash va boshqarish tajribasi cheklanganligi.

Afzalliklari

Ta'lim sohasida DXShni qo'llash bir qator ijobiy natijalarga olib kelishi mumkin:

- Davlat byudjetiga bir martalik yuk tushirmasdan, xarajatlarni bir necha yil davomida bo'lib to'lash imkoniyati yaratiladi.
- Xususiy sektor odatda qurilish va ekspluatatsiya jarayonlarini davlat tashkilotlariga nisbatan tezroq va samaraliroq boshqaradi, bu esa loyiha muddatlari va sifatiga ijobiy ta'sir ko'rsatadi.
- Shartnomada belgilangan aniq sifat ko'rsatkichlari xususiy hamkorni bino va jihozlarni doimiy holatda saqlashga undaydi, chunki uning daromadi aynan shu ko'rsatkichlarga bog'liq bo'ladi.
- Xususiy sektorning ishtiroki zamonaviy texnologiya va innovatsion boshqaruv usullarini ta'lim tizimiga tezroq olib kirish imkonini beradi.

Muammoli jihatlar

Shu bilan birga, bu yo'nalishni rivojlantirishda ma'lum xavf-xatarlar ham mavjud. Birinchi muammo - uzoq muddatli shartnoma majburiyatlarining davlat byudjetiga potentsial yuk bo'lib qolish ehtimoli, chunki ijara yoki xizmat to'lovlari bir necha o'n yillik davrni qamrab olishi mumkin va bu shartli (kelajakdagi) majburiyatlarni oshirib yuborishi mumkin. Ikkinchi muammo - ta'lim xizmati sifatini nazorat qilish

murakkabligi, negaki ta'limning natijasi qurilish sifati kabi oson o'lganadigan ko'rsatkich emas, balki uzoq muddatli va ko'p omilli jarayon hisoblanadi. Uchinchi muammo - ta'lim bepul va barcha uchun ochiq bo'lishi kerak degan ijtimoiy tamoyil bilan xususiy sektorning daromad olishga yo'naltirilganligi o'rtasidagi nomutanosiblik bo'lib, bu masalani hal qilish uchun aniq huquqiy chegaralar belgilanishi zarur. To'rtinchi muammo - loyihalarni tayyorlashda malakali mutaxassislar yetishmasligi, natijada shartnomalar xususiy hamkor foydasiga noqulay shartlarda tuzilishi xavfi mavjud.

Xulosa. O'tkazilgan tahlil shuni ko'rsatadiki, davlat-xususiy sheriklik ta'lim tizimini moliyalashtirishning istiqbolli, ammo hozircha to'liq amalga oshirilmagan resursi hisoblanadi. Xorijiy davlatlar tajribasi DXShning ta'lim infratuzilmasini yangilashda samarali vosita bo'lishi mumkinligini tasdiqlaydi, biroq bu faqat aniq huquqiy asos, shaffof shartnoma amaliyoti va kuchli institutsional nazorat mavjud bo'lgandagina samara beradi. O'zbekistonda mavjud qonunchilik bazasi umumiy DXSh tamoyillarini belgilagan bo'lsa-da, uni aynan ta'lim sohasiga moslashtirish, risklarni taqsimlash mexanizmlarini takomillashtirish va sifat nazorati tizimini yaratish talab etiladi. Ushbu yo'nalishlarda izchil ishlar olib borilishi ta'lim infratuzilmasini yangilash sur'atlarini oshirish, davlat byudjetiga tushadigan yukni kamaytirish va, oxir-oqibat, ta'lim sifatini yaxshilashga xizmat qiladi.

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CHARACTERISTICS OF THE EFFECTIVENESS OF PLASTIC CLOSURE OF SOFT TISSUE DEFECTS IN PATIENTS WITH PRESSURES IN THE SACRAL REGION

Rajabov Doston Uktamovich dastanrajabov584@gmail.com

<https://orcid.org/0009-0002-4533-025X>

Bukhara Medical Institute

Resume. Preoperatively, especially in patients with recurrent disease, it is advisable to include an MRI of the sacrococcygeal region in the diagnostic algorithm. This will allow for accurate determination of the absence of bone damage, the extent of the pilonidal cyst, and an informed decision on the use of a plastic method for wound closure.

Key words: bedsore, plastic surgery, soft tissue defects

Relevance. The problem of unsatisfactory results following plastic closure of soft tissue defects remains far from definitively resolved and retains a significant number of unresolved issues of both theoretical and practical nature [1,3,5]. The presence of a deep defect, a cavitary component, and soft tissue structural abnormalities form the structural and functional basis for wound failure, which manifests itself in the postoperative period as unsatisfactory results and recurrence [1,4,13],

Unfortunately, according to domestic and international studies, the recurrence rate of the disease after radical surgical interventions, according to surgeons, reaches values above 50% [1,7,12], while the incidence of postoperative wound complications can reach up to 30% [2,8]. With median tight suturing of the postoperative wound defect of the sacrococcygeal region, the incidence of postoperative wound complications is 14-74%, and relapses occur in 4-45% of cases [94]. At the same time, some researchers notice postoperative wound complications and recurrent cases of the disease (relapses) when using plastic methods of wound closure after excision complications were observed in 11% of patients, and the relapse rate was 2.7% [2,11]. Using the method developed by Bascom, the recurrence rate was reduced to less than 10 percent, and postoperative complications were recorded in 6.7% to 27.5% of patients [3, 10]. The method of plastic closure of the sacrococcygeal wound defect after PC removal using a Limberg flap reduced the recurrence rate to less than 8 percent, and the wound complication rate ranged from 11.5% to 19.6% [2,9,13], although, in our opinion, even these results are far from ideal.

Studying the combination of these factors is fundamental for the development of objective risk assessment criteria and the improvement of reconstructive and plastic surgical treatment methods for patients with sacral pressure ulcers.

The aim of the study was to evaluate the effectiveness of plastic closure of soft tissue defects in patients with sacral pressure ulcers.

Material and methods. In the preoperative period, statistically significant differences in the morphometric characteristics of wound defects were identified in 53 patients depending on the chosen method of plastic closure.

Results and discussion. The results of the correlation analysis showed that the wound defect depth has the strongest association with worsening outcomes, with a correlation coefficient of $r=0.881$. Moreover, in clinical observations, wound depth was almost always associated with the presence of a cavity, which was recorded in a significant proportion of patients and also demonstrated a high correlation with the outcome ($r=0.724$). We observed a clinical case where patients with stage III-IV sacral pressure ulcers developed a wound greater than 3 cm deep with undermined pockets in the lateral sections after staged necrectomy. Despite the externally satisfactory condition of the granulation, a cavity still remained, spreading laterally. We also established a direct high correlation with unfavorable outcomes for microbial contamination of the wound ($r=0.748$; $p < 0.001$).

When analyzing the cytological parameters, we identified a correlation pattern in which an increase in the proportion of neutrophils to 57.1% and degenerative forms to 66.4% was accompanied by an increase in the frequency of unsatisfactory outcomes, with the correlation coefficients being $r=0.571$ and $r=0.664$, respectively ($p < 0.001$). We also noted a decrease in the content of macrophages and fibroblasts, for which an inverse correlation was found with an increase in unsatisfactory treatment results ($r=-0.516$ and $r=-0.603$, respectively).

The conducted correlation analysis allows us to identify a set of local factors that determine the nature of the course of the wound process and the postoperative results of plastic closure of soft tissue defects in patients with pressure ulcers in the sacral region.

Tirsch- assisted wound closure, we found the strongest correlation with worsening outcomes for wound defect area ($r=0.682$). An increase in area was accompanied by an increased incidence of partial and complete graft failure, indicating the importance of the extent of the skin coverage zone and the wound surface volume. In patients with a defect area greater than 120-140 cm², ^{despite} a relatively shallow depth, extensive graft zones developed, where uneven skin flap engraftment was observed even with uniform granulation. On days 4-6 postoperatively, areas of epidermal lysis appeared along the

periphery, gradually transitioning to secondary healing, despite the absence of a pronounced cystic component affecting the healing process.

A moderate positive correlation was found for wound microbial contamination ($r=0.556$; $p=0.002$), as well as for inflammatory and degenerative changes in the cytogram. An increase in the correlation coefficient for the proportion of neutrophils to $r=0.524$ and its degenerative forms to $r=0.548$ was accompanied by worsening outcomes, while the number of macrophages and fibroblasts demonstrated an inverse correlation ($r=-0.437$ and $r=-0.512$, respectively). This distribution reflects the dependence of the result on the maturity of the granulation tissue and the condition of the wound surface. When using autodermplasty according to the Thiersch method, the key factors in worsening the outcome are the area of the defect, microbial contamination, and the inflammatory nature of the wound process, while the depth of the wound and the presence of a cavity play a secondary role.

Limberg- approved closure of a persistent wound, the leading factors determining an unfavorable outcome were wound defect depth and the presence of a cavity. The correlation coefficients were $r=0.804$ and $r=0.821$, respectively, indicating the predominant role of the wound's volumetric component.

Cytological parameters in this group also had a significant correlation with outcomes, with an increase in the proportion of degenerative neutrophils ($r=0.671$) and a decrease in fibroblasts ($r=-0.617$) reflecting the persistence of the inflammatory component and the inadequacy of reparative processes. Macrophages demonstrated a negative correlation ($r=-0.498$, $p=0.013$), indicating their protective role in the formation of a mature wound bed.

Limberg repair, the geometric characteristics of the defect are crucial, primarily the depth, presence, and direction of the cavity, while the infection factor and wound area play a secondary role. These parameters determine the mechanical conditions in the reconstruction area and determine the risk of failure of the plastic closure of the pressure ulcer.

A comparison of the results of the correlation analysis in the overall group and in the separate evaluation of plastic closure methods revealed that the development of unsatisfactory surgical outcomes is determined by a combination of local clinical and morphological changes, among which the leading roles belong to the geometry of the wound defect and the condition of the wound bed. The most pronounced association with worsening outcomes was noted for wound depth and the presence of a cystic component, with a simultaneous increase in the influence of microbial contamination and inflammatory-degenerative changes in the cytogram, while the macrophage-fibroblast component demonstrated a protective effect.

With continued pressure over the bony prominence, a soft tissue deficiency develops that persists even after radical surgical debridement. Deep defects with a cavity are characterized by a minimal tissue layer remaining over the sacrum, unable to ensure uniform load distribution.

After plastic closure, this layer is exposed to maximum pressure, leading to repeated microcirculation impairment, tissue hypoxia, and the gradual development of ischemic changes. Furthermore, the condition of the wound bed, determined by the cytological picture, plays a key role. A predominance of neutrophils with a high proportion of degenerative forms reflects the ongoing inflammatory process and insufficient maturity of the granulation tissue. Microbial contamination exacerbates these changes, but its influence is realized primarily through the maintenance of the inflammatory environment. A high bacterial load contributes to persistent tissue infiltration, increased vascular permeability, and impaired regeneration processes. The species composition of the microflora is less important than the quantitative contamination, since even with a single infection and high bacterial load, the risk of suppuration and secondary repair failure remains. In clinical observations, this was manifested by the development of serous-fibrinous discharge and divergence of the wound edges in the early postoperative period.

The pathogenesis of unsatisfactory results of traditional methods of soft tissue closure for sacral pressure ulcers is determined by a combination of two key mechanisms. The first is due to the lack of sufficient soft tissue volume over the sacrum, which leads to persistent compression and ischemia in the reconstruction area. The second is due to the location of the suture line in the pressure zone and tissue tension, which disrupts the flap's blood supply and contributes to the development of marginal necrosis.

CONCLUSIONS.

1. A combination of morphometric and biological factors forms two key pathogenetic mechanisms that determine unsatisfactory results of plastic closure of soft tissue defects in patients with sacral pressure ulcers.

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**XROM (Cr) VA KOBALT (Co) ELEMENTLARINING MEVALI
DARAXTLAR ORGANLARIDA BIOAKKUMULYATSIYASI**

**БИОАККУМУЛЯЦИЯ ЭЛЕМЕНТОВ ХРОМА (Cr) И КОБАЛЬТА (Co) В
ОРГАНАХ ПЛОДОВЫХ ДЕРЕВЬЕВ**

**BIOACCUMULATION OF CHROMIUM (Cr) AND COBALT (Co) IN THE
ORGANS OF FRUIT TREES**

Jo ‘rayev Oxunjon Baxtiyor o‘g‘li, kichik ilmiy xodim

oxunjon_jurayev@mail.ru <https://orcid.org/0009-0002-9848-6434>

*Akademik M.Mirzayev nomidagi bog‘dorchilik, uzumchilik va vinochilik ilmiy-
tadqiqot instituti*

Xusniddin Karimov Nagimovich q.x.f.d., katta ilmiy xodim

xkarimov1976@gmail.ru, <https://orcid.org/0000-0003-1060-808X>

*Akademik Maxmud Mirzayev nomidagi bog‘dorchilik, uzumchilik va vinochilik ilmiy-
tadqiqot institute*

Annotatsiya: Maqolada mevali daraxtlarning organlarida xrom va kobalt elementlarining bioakkumulyatsiyasi o‘rganilgan bo‘lib, xromning eng yuqori akkumulyatsiyasi o‘rganilgan meva turlari ichida shaftolining Chempion navi bargida 0,82 mg/kg yoki REMdan 8,18 marta ko‘p, novdasida 0,50 mg/kg yoki REMdan 4,98 marta ko‘p, danagida 0,41 mg/kg yoki REMdan 4,09 marta ko‘p va mevasida 0,26 mg/kg yoki REMdan 2,63 marta ko‘p bo‘lishi aniqlanganligini ko‘rish mumkin. Toshkent viloyatning antropogen ifloslangan va ekologik toza hududlaridagi barcha mevali daraxtlar barg va novdalarida xrom miqdori REMdan 8 martagacha ko‘p, urug‘ida 2 martagacha ko‘p miqdorda akkumulyatsiyalanganligi aniqlangan. Kobalt elementi o‘rganilgan hamma mevali daraxtlarning vegetativ va generativ organlarida akkumulyatsiyasi REM chegarasidan past bo‘lishi kuzatildi.

Kalit so‘zlar: mevali daraxt, organ, Cr, Co, bioakkumulyatsiya, barg, novda, meva, urug‘, og‘ir metall.

Аннотация: В статье изучена биоаккумуляция элементов хрома (Cr) и кобальта (Co) в органах плодовых деревьев. Установлено, что среди исследованных плодовых культур наибольшее накопление хрома наблюдалось в листьях сорта персика Чемпион — 0,82 мг/кг, что в 8,18 раза превышает предельно допустимую концентрацию (ПДК). В побегах содержание хрома составило 0,50

мг/кг (в 4,98 раза выше ПДК), в косточках — 0,41 мг/кг (в 4,09 раза выше ПДК), а в плодах — 0,26 мг/кг (в 2,63 раза выше ПДК). Выявлено, что в антропогенно загрязнённых и экологически чистых районах Ташкентской области содержание хрома в листьях и побегах всех исследованных плодовых деревьев превышало ПДК до 8 раз, а в семенах его накопление превышало ПДК до 2 раз. Установлено, что аккумуляция кобальта во всех исследованных вегетативных и генеративных органах плодовых деревьев была ниже предельно допустимой концентрации.

Ключевые слова: Плодовые деревья, орган, Cr, Co, биоаккумуляция, лист, побег, плод, семя, тяжёлый металл.

Abstract: This study investigated the bioaccumulation of chromium (Cr) and cobalt (Co) in the organs of fruit trees. The highest chromium accumulation among the studied fruit species was recorded in the leaves of the Champion peach cultivar, reaching 0.82 mg/kg, which is 8.18 times higher than the maximum permissible concentration (MPC). Chromium concentrations in the shoots, stones, and fruits were 0.50 mg/kg (4.98 times above the MPC), 0.41 mg/kg (4.09 times above the MPC), and 0.26 mg/kg (2.63 times above the MPC), respectively. It was also determined that, in both anthropogenically polluted and ecologically clean areas of the Tashkent region, chromium concentrations in the leaves and shoots of all studied fruit trees exceeded the MPC by up to eightfold, while its accumulation in the seeds exceeded the MPC by up to twofold. In contrast, cobalt accumulation in all investigated vegetative and generative organs of the fruit trees remained below the maximum permissible concentration (MPC).

Keywords: Fruit trees, organ, Cr, Co, bioaccumulation, leaf, shoot, fruit, seed, heavy metal.

Kirish. O‘simliklarning kimyoviy tarkibi, tuproqning elementar tarkibi bilan o‘zaro bog‘liq. Shuning uchun o‘simliklarda og‘ir metallarning ortiqcha to‘planishi, birinchi navbatda, ularning tuproqdagi yuqori konsentratsiyasi bilan bog‘liq. O‘simliklar rivojlanish davrida og‘ir metallarning harakatchan shakllarini o‘zlashtiradi, ularning miqdori, organik moddalar mavjudligi va tuproqning bufer qobiliyati bilan chambarchas bog‘liq [9; 49-b.]. Mevali daraxtlarda og‘ir metallarning turli konsentratsiyada to‘planishi o‘simlik turlarining elementlarni o‘ziga o‘zlashtirish qobiliyati va turli organlarida farqli to‘planishiga bog‘liq [3; 306-310-b., 1; 157-168-b.].

Co tuproq tarkibidagi silikat va boshqa tuzlar tarkibiga birikkan holda uchraydi. Bo‘z tuproqlar tarkibida Co juda oz, umumiy miqdori 5 mg/kg bo‘lib, uning o‘zlashtiriladigan qismi 0,6-1,0 mg/kg atrofida bo‘ladi. Bu ko‘rsatkich o‘simliklar tarkibida o‘rtacha 0,00002 foizda yoki 0,02 mg/kg quruq massaga teng. Agar tuproq

tarkibidagi Co miqdori 2,5-4,5 mg/kg bo'lsa, bu ko'rsatkich o'simliklar uchun yetarli miqdor hisoblanadi [4; 73-80-b. 5; 346-b.].

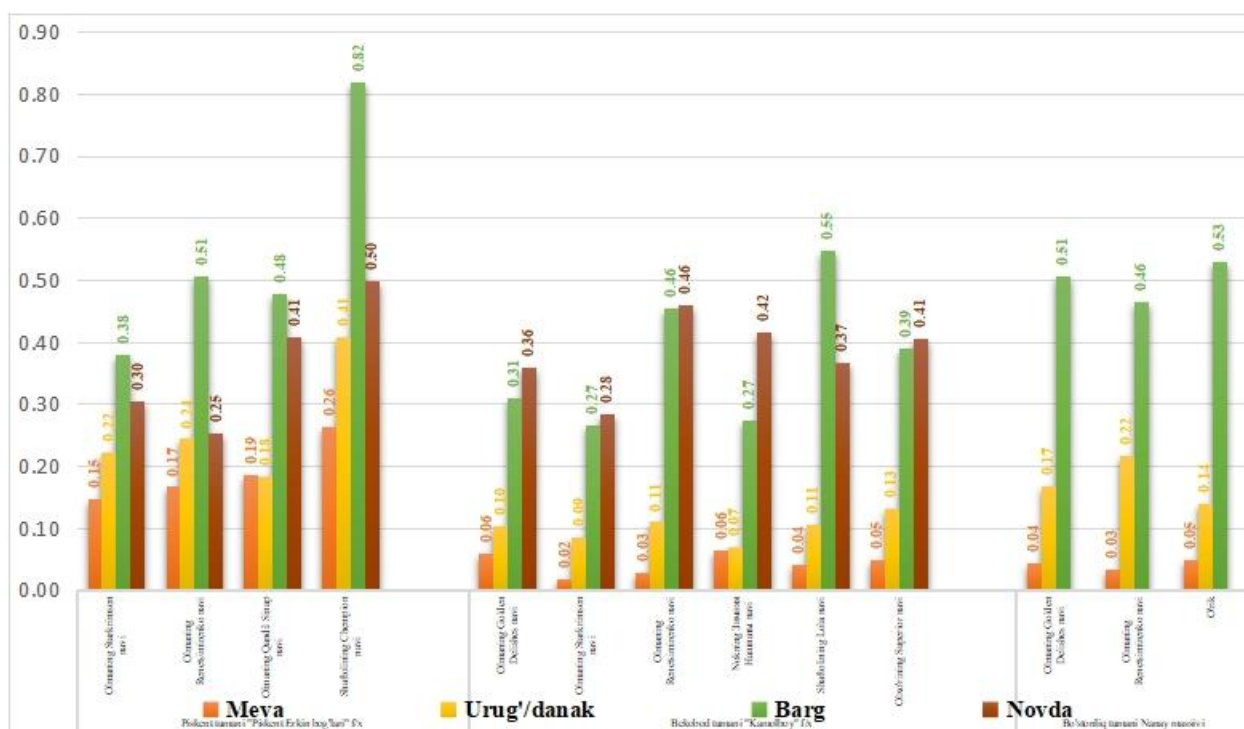
Ko'pgina olimlar o'simliklarda og'ir metall to'planishi tabiatidagi daraxt turlariga qarab farqlanishini qayd etganlar. Og'ir metall to'planishining daraxt turiga xosligi tajribalarda juda aniq namoyon bo'lishi mumkinligi aniqlangan. Chunki ba'zi o'simlik turlarida og'ir metallarning to'planishi ruxsat etilgan me'yorlardan yuzlab va minglab marta yuqori miqdorlarda ekanligi aniqlangan [7; 131-b.], [2; 246-254-b.].

Og'ir metallar fizik-kimyoviy yoki biologik degradasiyaga uchramasdan, tuproqning yuza qatlamida to'planib, xususiyatlarini o'zgartiradi va uzoq vaqt davomida o'simliklar ildizi tomonidan o'zlashtiriladigan, harakatchan shaklda to'planib boradi [8; 224-226-b.].

Materiallar va uslublar. Mevali daraxtlar organlarida Cr va Co elementlarining bioakkumulyatsiyasini aniqlashda Toshkent viloyatining sanoatlashgan xududlaridagi mevali daraxtlarda tadqiqotlar olib borilgan. O'simlik namunalari tarkibidagi og'ir metallar miqdori atom-absorbsion usuli bilan "Optical emission spectrometer AVIO-200" laboratoriya uskunasi "Методические указания по определению тяжелых металлов в почвах сельскохозяйственных и продукции растениеводства" [6] uslubi asosida, quruq modda hisobida o'rganilgan.

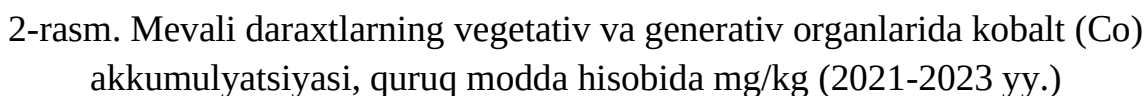
Natijalar va munozara. Tadqiqot natijalari mevali daraxtlarning vegetativ (barg va novda) hamda generativ (meva va urug'/danak) organlarida xrom (Cr)ning to'planish darajasi tur va navlarga qarab sezilarli farq qilishini ko'rsatdi. Barcha o'rganilgan daraxt turlarida xromning eng yuqori miqdori asosan barglarda, eng past miqdori esa meva etida aniqlandi. Xromning eng yuqori akkumulyatsiyasi "Piskent Erkin bog'lari" f/x bog'idagi shaftolining Chempion navi bargida 0,82 mg/kg yoki REMdan 8,18 marta ko'p, novdasida 0,50 mg/kg yoki REMdan 4,98 marta ko'p, danagida 0,41 mg/kg yoki REMdan 4,09 marta ko'p va mevasida 0,26 mg/kg yoki REMdan 2,63 marta ko'p bo'lishi aniqlanganligini ko'rish mumkin. Viloyatning antropogen ifloslangan va ekologik toza hududlaridagi barcha mevali daraxtlar barg va novdalarida xrom miqdori REMdan 8 barobargacha ko'p, urug'ida 2 martagacha ko'p miqdorda akkumulyatsiyalanganligi aniqlangan.

Viloyatning Bekobod tumanidagi olma, nok, shaftoli va olxo'ri hamda Bo'stonliq tumani Nanay massividagi olma va o'rik navlari mevalarida xrom miqdori REM chegarasidan past miqdorda bo'ldi. Bu ko'rsatkich Piskent tumanidagi olma va shaftoli mevalarida REMdan 2,5 martagacha yuqori bo'lishini aniqlandi (1-rasm).



1-rasm. Mevali daraxtlarning vegetativ va generativ organlarida xrom (Cr) akkumulyatsiyasi, quruq modda hisobida mg/kg (2021-2023 yy.)

Kobalt elementi o'rganilgan hamma mevali daraxtlarning vegetativ va generativ organlarida akkumulyatsiyasi REM chegarasidan past bo'lishi kuzatildi. Piskent tumanidagi shaftoli bargida 0,36 mg/kg, novdasida 0,29 mg/kg, mevasida 0,26 mg/kg, danagida 0,08 mg/kg, Bekobod tumanidagi shaftoli bargida 0,17 mg/kg, novda va danagida 0,09 mg/kg hamda mevasida 0,04 mg/kg miqdorlarda kobalt to'plandi. Kobaltning eng kam miqdorda to'planishi Bo'stonliq tumani Nanay massividagi olma va o'rik daraxtlariga to'g'ri keldi. Mevali daraxtlar generativ va vegetativ organlarida kobaltning akkumulyatsiyalanishi quyidagi kamayib boruvchi qatorni qayd etdi: barg→novda→urug'/danak→meva (2-rasm).



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DIGITAL SPIRITUALITY: A SOCIO-PHILOSOPHICAL PERSPECTIVE**Lutfullayev Abduvali Abdunabiyevich****Associate Professor of Karshi International University****ORCID ID 0009-0004-7685-2282****e-mail:abduvali_lutfullayev8@gmail.com**

Abstract. This article explores the philosophical foundations of digital spirituality within the context of digital transformation. It analyzes the impact of artificial intelligence, digital platforms, and algorithmic systems on individuals' values, worldview, and spiritual development. The study substantiates digital spirituality as a socio-philosophical concept and highlights the importance of integrating critical thinking, media literacy, and digital responsibility into the system of spiritual education.

Keywords: Digital spirituality; spiritual education; digital transformation; socio-philosophical paradigm; artificial intelligence; digital ethics; algorithmic governance; information culture; media literacy; digital responsibility; value system; critical thinking; moral development; digital society; philosophy of education.

In contemporary society, it is increasingly difficult to imagine everyday life without artificial intelligence, algorithms, mobile applications, and social media platforms. Printed books are gradually being perceived as elements of historical and cultural heritage, while everyday communication is increasingly conducted through voice messages, video conferencing, and instant messaging applications. Likewise, the educational process has shifted from conventional classroom settings to digital platforms, where online webinars, distance learning courses, artificial intelligence-assisted educational systems, and virtual learning environments have become integral components of contemporary education. This transformation has affected not only the methods through which individuals acquire knowledge but also their worldview, value system, ethical decision-making, and spiritual development. The emergence of new forms of social interaction within the digital environment has fundamentally reshaped individuals' spiritual identity, culture of information perception, and attitudes toward reality. Consequently, an individual's spiritual formation is no longer influenced solely by traditional institutions such as the family, school, or local community but is increasingly shaped by global information flows, digital platforms, recommendation algorithms, and artificial intelligence systems. This reality necessitates the reconsideration of spiritual education within the framework of a new socio-philosophical paradigm appropriate to the digital age. As algorithms continuously

analyze users' interests and recommend specific categories of information, they indirectly influence individuals' worldviews, value orientations, and ethical choices. Therefore, digital technologies should no longer be regarded merely as technical instruments but as influential factors that actively shape the moral and social environment. Under the conditions of the twenty-first century, the primary objective of spiritual education extends far beyond teaching individuals how to use digital technologies effectively. Rather, it involves cultivating critical thinking, information culture, digital responsibility, media literacy, ethical reflection, and commitment to both national and universal human values. Only such an integrated approach can ensure a sustainable balance between technological advancement and spiritual development in the digital society. In this context, the concept of *digital spirituality* should be recognized as one of the essential categories of contemporary philosophical thought, serving as a conceptual framework for harmonizing the relationships among human beings, society, and digital technologies on the basis of moral and spiritual values. At the same time, the worldview, psychological condition, and spiritual foundations that are being formed within the digital environment have emerged as one of the most pressing concerns of contemporary philosophical inquiry. Today's younger generation is confronted with an unprecedented volume of information. Compared with previous generations, they read more, watch more, and communicate more than ever before. However, the central issue lies not in the quantity of information but in its content, purpose, and axiological influence on human consciousness. Indeed, what shapes an individual's spiritual world is not the sheer volume of information but its value-oriented content. Millions of views generated by digital platforms through short videos, blogs, and algorithmically recommended content serve not only entertainment purposes but also actively participate in shaping individuals' worldviews, aesthetic preferences, ethical standards, and life ideals. In particular, the widespread consumption of short-form digital content has the potential to influence logical reasoning, sustained reflection, and the capacity for profound intellectual contemplation, while simultaneously reinforcing a culture of rapid information consumption. These developments underscore the necessity of re-examining the philosophical foundations of spiritual education within the context of digital transformation and of developing a comprehensive conceptual framework capable of ensuring the harmonious integration of technological innovation with moral and spiritual values.

Conclusion. Digital transformation has fundamentally reshaped the environment in which human values and spiritual development are formed. As digital technologies and artificial intelligence increasingly influence individuals' worldviews and ethical choices, digital spirituality emerges as an important socio-philosophical concept.

Promoting critical thinking, media literacy, and digital responsibility within spiritual education is essential for harmonizing technological progress with moral and spiritual values in the digital age.

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