

INNOVATION SCIENCE AND TECHNOLOGY

ISSUE 6, PART I / JUNE 2026

 Acceptance of papers



**Acceptance of
papers**

Published monthly



Topics

economics,
technology, social
sciences





EDITOR-IN-CHIEF:

Mirzaliyev Sanjar Makhmatjon ugli

DEPUTY EDITOR-IN-CHIEF:

Makhmudov Nosir Makhmudovich
DSc., Prof., Academician

DEPUTY EDITOR-IN-CHIEF:

Ochilov Bobur Bakhtiyor ugli – Senior
lecturer at TSUI

THE SCIENTIFIC-POPULAR ELECTRONIC
JOURNAL **"INNOVATION SCIENCE AND
TECHNOLOGY"** HAS BEEN REGISTERED
UNDER THE NUMBER **C-5669633** BY THE
AGENCY FOR INFORMATION AND MASS
COMMUNICATIONS (AOKA) OF THE
REPUBLIC OF UZBEKISTAN, EFFECTIVE
FROM OCTOBER 9, 2024.

CONTACTS

Phone: **+998 50 737 87 88**

Website: <https://ist-journal.uz>

Email: innovationist2025@gmail.com

The scientific electronic journal "Innovation Science and Technology" has been included in the list of scientific publications recommended for the publication of main scientific results of dissertations for the award of PhD and DSc degrees in economics and technical sciences, in accordance with the Resolution No. 370 of the Presidium of the Higher Attestation Commission of the Republic of Uzbekistan, dated May 8, 2025.

Editorial board:



Sharipov Kongiratbay Avezimbetovich,
Doctor of Technical Sciences (DSc), Professor



Abdurakhmanova Gulnora Kalandarovna, Doctor of
Economic Sciences (DSc), Professor



Cham Tat Huei,
Doctor of Philosophy (PhD), Professor (Malaysia)



Muhammad Imran Sadiq
Doctor of Philosophy in Economics (PhD), Professor,
Malaysia



Ahmed Aziz Ismail
Doctor of Technical Sciences (DSc),
Professor (Egypt)



Lee Chin
Doctor of Philosophy in Economics (PhD), (Malaysia)



Asongu Simplice
Doctor of Philosophy in Economics (PhD), Cameroon



Rui Dang
Doctor of Chemistry (DSc), Professor, China



Zahoor Ahmed
Doctor of Philosophy in Economics (PhD), Turkey



Shujaat Abbas
Doctor of Philosophy in Economics (PhD), Russia



Tina A Coffelt
Doctor of Philosophy in Educational Sciences (PhD),
USA



Abdikarimova Dinara Rustamxanovna
Doctor of Economic Sciences (DSc), Professor

Kurbonbekova Mohichehra Turobjonovna
Doctor of Economic Sciences (DSc), Professor

Alimardonov Ilkhom Muzrabshokovich
Doctor of Economic Sciences (DSc), Professor



Razakova Barno Sayfieva
Doctor of Philosophy in Economics (PhD)



Khasanov Sarvar Ulugbek ugli
Doctor of Philosophy in Economics (PhD)



Kholikova Rukhsora Sanjarovna
Associate Professor (PhD)

CONTENTS

BUDGETING BASED ON THE BALANCED SCORECARD SYSTEM IN STRATEGIC MANAGEMENT ACCOUNTING.....	8
Pardaeva Shakhnoza Abdinabievna	
TURIZM SOHASIDA TARJIMA NAZARIYASINING O'RNI	13
Bahronova Charos Mirabbos qizi	
THE ROLE OF ESG PRINCIPLES AND DIGITAL TECHNOLOGIES IN THE DEVELOPMENT OF CORPORATE SOCIAL MANAGEMENT SYSTEMS	16
Shokhrukh Abdisalimovich Muratkosimov	
A COMPARATIVE SEMANTIC FIELD ANALYSIS OF "BENEFIT" ACROSS ENGLISH AND UZBEK CULTURES	23
Mohira Husanovna Divanova	
ROSSIYA TIJORAT BANKLARIDA DEPOZIT OPERATSIYALARINI RIVOJLANTIRISHNING O'ZIGA XOS JIHATLARI	30
Rahimov Akmal Matyaqubovich	
USE OF ARTIFICIAL INTELLIGENCE TECHNOLOGIES AGAINST CYBER THREATS IN THE PUBLIC SECTOR.....	37
Nuratdinov Xushnid Begzadovich, Erejepov Kewlimjay Kaymatdinovich	
PUL-KREDIT SIYOSATI INSTRUMENTLARIDAN FOYDALANISH AMALIYOTINI TAKOMILLASHTIRISH ..	42
A.A. Ismailov	
"O'ZBEKISTON TEMIR YO'LLARI" AJNING AMALIY IQTISODIY HOLATI TAHLILI VA OPSIONLARNI ANIQLASH	48
Bobojonova Zarnigor Shokirovna	
COMPARATIVE ANALYSIS OF DEEP LEARNING ALGORITHMS FOR AUTOMATED SKIN DISEASE DIAGNOSIS FROM DERMOSCOPIC IMAGES.....	56
Nazirova Elmira Shodmonovna, Abdusalomova Shokhista Boboyor qizi	
STRATEGY FOR THE DEVELOPMENT OF THE FINANCIAL MARKET OF UZBEKISTAN IN THE CONTEXT OF DIGITAL AND GREEN TRANSFORMATION	61
Muftaydinov Mansur Kiyomidinovich	
TOURISM POTENTIAL OF UZBEKISTAN AND FINANCIAL FACTORS FOR ITS DEVELOPMENT	68
Bau Long	
CASH FLOWS OF "TERRITORIAL ELECTRIC NETWORKS" JSC: COMPREHENSIVE ACCOUNTING ANALYSIS AND METHODOLOGICAL APPROACHES TO IMPROVEMENT.....	75
Djuraev Davlat Djonibekovich	
MONETARY POLICY INSTRUMENTS.....	78
A.A. Ismailov	
ECONOMIC EFFICIENCY OF IMPLEMENTING INNOVATIVE TECHNOLOGIES IN THE SERVICE SECTOR OF REGIONS	83
Abdikayumov Bekzod Turdiniyozovich	
KNOWLEDGE STRATEGY AND ITS SYSTEM OF INDICATORS IN STRATEGIC MANAGEMENT ACCOUNTING.....	89
Pardaeva Shakhnoza Abdinabievna, Pardaeva Zulfizar Alimovna	
ANALYSIS OF THE REGIONAL DYNAMICS AND STRUCTURAL CHARACTERISTICS OF LABOR MIGRATION	95
Mukhtorbek Rahimboyev, Alibek Normurodov	
SUN'IY INTELLEKT ASOSIDA KREDIT RISKLARNI BAHOLOVCHI TIZIMLARNI ISHLAB CHIQISH. MIJOZ SCORE MODEL VA QARORLARNI OPTIMALLASHTIRISH	104
Olimova Mukhlisa Vohidjon qizi	
PUBLIC-PRIVATE PARTNERSHIP IN ESG IMPLEMENTATION: OPPORTUNITIES AND CHALLENGES FOR SUSTAINABLE DEVELOPMENT	111
Khusenova Mekhrangiz	

FORMATION OF MEDICAL TOURISM CLUSTERS IN THE REGION	115
Yusupova Mehribon O'ktamovna	
DIRECTIONS FOR IMPROVING THE INTEGRATION OF SCADA AND ERP SYSTEMS IN OIL AND GAS INDUSTRY ENTERPRISES	120
Abdullaev Munis Kurbonovich	
ANALYSIS OF THE EXPERIENCE OF FOREIGN COUNTRIES IN IMPLEMENTING GREEN PUBLIC PROCUREMENT AND LESSONS FOR UZBEKISTAN.....	125
Ruzimurodova Charos Ural qizi	
AGROTECHNICAL AND INNOVATIVE STRATEGIES FOR ENHANCING GRAIN PRODUCTION EFFICIENCY	129
Turayeva Gulizahro	
MINERALOGICAL OCCURRENCE OF RARE METALS IN THE INGICHKA DEPOSIT AND DEVELOPMENT OF TUNGSTEN EXTRACTION TECHNOLOGY	133
Shodiyev Abbos, Dononov Jasur, Safarov Gulomjon	
STRATEGIC DIRECTIONS OF PUBLIC-PRIVATE PARTNERSHIP COOPERATION IN THE GREEN ECONOMY OF UZBEKISTAN	140
Zukhra Bakhramovna Abdikarimova	
TIME MANAGEMENT IN THE CRAFT ECONOMY: STRATEGIES FOR OPTIMIZING THE TIME RESOURCES OF INDIVIDUAL PRODUCERS	148
Feruza Nazrillaevna Israilova	
DEVELOPMENT STAGES OF THE GREEN ECONOMY IN THE CONTEXT OF GLOBAL SUSTAINABILITY GOALS	154
Muminova Mokhchekhra	
FEATURES AND FACTORS OF WOMEN'S ENTREPRENEURSHIP DEVELOPMENT IN THE DIGITAL ECONOMY.....	160
Ibodullayeva Malohat Sirojiddin qizi	
MECHANISMS FOR POVERTY REDUCTION THROUGH THE DEVELOPMENT OF SMALL BUSINESS AND FAMILY ENTREPRENEURSHIP IN THE SERVICE SECTOR.....	165
Dauletmuratov Adilbay Mirzabovich	
IMPROVING THE METHODOLOGY OF ENVIRONMENTAL AUDITING AT ENTERPRISES BASED ON A RISK-ORIENTED APPROACH AND DIGITAL EVIDENCE	171
Abdullayev Khurshidjon Nazrullo o'g'li, Khurshidjon Abdullayev	
INTEGRATION MECHANISMS OF DIGITAL ECONOMY TECHNOLOGIES INTO REGIONAL GOVERNANCE SYSTEMS	176
Kurbanova Malika Ahmad kizi	
DEVELOPMENT OF A LOGICAL-LINGUISTIC MODEL OF THE KOREAN NOUN CATEGORY AND CREATION OF A PREFIX AND AFFIX DATABASE.....	181
Yendirboyeva Zumrad Zohidjon qizi	
THEORETICAL AND INSTITUTIONAL FOUNDATIONS OF MANAGING STATE SHARES IN BUSINESS ENTITIES	186
Akmaljon Valijonov	
ENSURING OBJECT SECURITY AND ANALYZING INFORMATION SECURITY BASED ON NEURAL NETWORKS.....	190
Babayazov Saidbek Po'latovich, Sultamuratova Dilnoza Gulmurotovna	
FUNDAMENTAL METHODS FOR IDENTIFYING AI-GENERATED DATA IN ACADEMIC AND ONLINE PUBLICATIONS USING MACHINE LEARNING AND NLP MODELS.....	196
Abdullaev Munis Kurbonovich, Kungratov Ilmurod Kuzibay ugli	
QUALITY ASSURANCE OF NON-AUTOCLAVED AERATED CONCRETE WITH THE ADDITION OF CMC (CARBOXYMETHYL CELLULOSE)	204
Pulatova D.G., Akhundjanov K.A.	
INTEGRATION MECHANISMS OF DIGITAL ECONOMY TECHNOLOGIES INTO REGIONAL GOVERNANCE SYSTEMS	210
Kurbanova Malika Ahmad kizi	

IMPROVING TAX ADMINISTRATION IN UZBEKISTAN AND ITS SOLUTIONS	215
Shamsiyev O'ktam Sayfitdinovich	
ASSESSING THE SOURCES AND QUALITY OF REGIONAL ECONOMIC GROWTH USING THE SOLOW MODEL.....	222
Turaev Bakhtiyor Ergashevich	
THEORETICAL AND METHODOLOGICAL FOUNDATIONS OF BANKING SYSTEM DIGITALIZATION	228
Suyunov Feruz, Ergashov Firdavs, Norqulov Habibullo	
HARDWARE-AWARE PERFORMANCE OPTIMIZATION OF YOLOV8 FOR REAL-TIME APPLICATIONS: GPU ACCELERATION WITH TENSORRT AND AN ANALYTICAL FPGA COMPARISON.....	232
Ulugbek Tursunaliyev, Bakhromjon Tulkinov	
DEVELOPMENT OF SPATIAL INFORMATION MODELS OF TERRITORIAL DEVELOPMENT TAKING INTO ACCOUNT ENVIRONMENTAL FACTORS (ON THE EXAMPLE OF THE REPUBLIC OF KARAKALPAKSTAN AND THE ARAL REGION)	241
Reymova Gulmira Polatovna	
LEADERSHIP STYLES AND QUALITY ASSURANCE CULTURE IN UNIVERSITIES.....	248
Urinov Bobur Nasilloevich	
SOCIO-ECONOMIC MECHANISMS FOR ENHANCING THE EFFECTIVENESS OF SCIENTIFIC RESEARCH AND INCENTIVE SYSTEMS IN THE AGRICULTURAL SECTOR.....	256
Zafar Ibragimovich Xakimov	
SOCIOLINGUISTIC FEATURES OF NEGATIVE AESTHETIC EVALUATION UNITS DENOTING PHYSICAL APPEARANCE IN ENGLISH AND UZBEK.....	260
Qalandarova Shaxzoda Qurbonboy qizi	
REMITTANCE INFLOWS AND THE SUSTAINABILITY OF ECONOMIC GROWTH: A TIME-SERIES ANALYSIS FOR UZBEKISTAN.....	265
O. B. Gimranova	
FORECAST INDICATORS, PROSPECTS, AND OUTCOMES OF DEVELOPING THE MECHANICAL ENGINEERING INDUSTRY THROUGH GREEN INVESTMENTS.....	271
Xursandov Komiljon Maxmatkulovich	
FEATURES AND FACTORS OF WOMEN'S ENTREPRENEURSHIP DEVELOPMENT IN THE DIGITAL ECONOMY.....	276
Ibodullayeva Malohat Sirojiddin qizi	
FACTORS INFLUENCING TAX REVENUE EFFICIENCY IN UZBEKISTAN IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT	282
Jurayev Xusan Atamuratovich	
THE DIGITAL GASTRONOME: HOW TECHNOLOGY CONNECTS TOURISTS, RESTAURANTS, AND DIGITAL PLATFORMS	286
Freshta Qayoumi	
THE REPRESENTATION OF RESTRICTED LEXICON IN FRENCH LITERARY WORKS	290
Gulnoz Akhmedova	
RESEARCH ON THE TRANSMISSION MECHANISMS AND IMPLEMENTATION PATHS OF SHANDONG PROVINCE'S "SILVER ECONOMY" DEVELOPMENT EXPERIENCE IN THE FERGANA REGION	294
Zhang Zhe	
APPLICATION OF NET PRESENT VALUE ANALYSIS TO SHORT-TERM PERSONAL FINANCIAL DECISIONS	299
Akhunova Elena Anvarovna	
ECONOMIC OPPORTUNITIES FOR INCREASING EMPLOYMENT THROUGH THE DEVELOPMENT OF SMALL BUSINESS ENTITIES IN KHOREZM REGION	307
Azadova Gulnoza Sardorbekovna	
DEVELOPMENT TRENDS AND INSTITUTIONAL FEATURES OF THE STOCK MARKET IN THE REPUBLIC OF UZBEKISTAN	313
Nargiza E. Jiyanova, Diana D. Qurbaniyazova	
MODELING AND FORECASTING THE SCIENTIFIC PUBLISHING ACTIVITY OF HIGHER EDUCATION INSTITUTIONS (A CASE STUDY OF SCOPUS DATA)	321
Ozoda B. Sakieva	

YELLOW TOURISM: CONCEPTUAL CONTOURS, SPECTATORIAL LOGICS, AND THE POLITICS OF JOYFUL MOBILITY	326
Samiev Siroj, Ochilova Guli	
SHAKESPEARE'S CREATIVE METHOD: ADAPTATION, COLLABORATION, AND THEATRICAL REFINEMENT	334
Mirzakhidova Nozima Ulugbek kizi	
THE IMPACT OF TOURISM ON UNESCO SITES: THE CASE OF SAMARKAND	338
Samiev Siroj, Kakhramanova Maftuna	

THE IMPACT OF TOURISM ON UNESCO SITES: THE CASE OF SAMARKAND

Samiev Siroj Saitovich

Associate Professor (acting), Department of Tourism,
“Silk Road” International University of Tourism and Cultural Heritage
ORCID: 0009-0008-4542-5949
e-mail: sirojsamiyev93@gmail.com

Kakhramanova Maftuna Davronovna

Master's Student, Faculty of Tourism and Hospitality
“Silk Road” International University of Tourism and Cultural Heritage
e-mail: maftunaqahramonova25@gmail.com

Abstract. This study examines the impact of tourism on UNESCO World Heritage Sites, focusing on the Historic Centre of Samarkand – Crossroads of Cultures. Tourism has become a major contributor to local economic development, cultural promotion, and infrastructure improvement in Samarkand. However, rapid growth in visitor numbers has also generated challenges related to overcrowding, environmental pressure, conservation issues, and community well-being. The research employs qualitative analysis based on secondary data, UNESCO reports, academic literature, and tourism statistics. The findings indicate that while tourism contributes significantly to economic growth and heritage awareness, sustainable management strategies are necessary to mitigate negative impacts and preserve the Outstanding Universal Value of the site. The study recommends strengthening visitor management, enhancing community participation, and implementing sustainable tourism policies.

Keywords: UNESCO World Heritage, Samarkand, sustainable tourism, overtourism, cultural heritage, heritage conservation.

Аннотация. Данное исследование посвящено изучению влияния туризма на объекты Всемирного наследия ЮНЕСКО на примере Исторического центра Самарканда - «Перекрёсток культур». Туризм стал важным фактором экономического развития, популяризации культурного наследия и совершенствования инфраструктуры города Самарканда. Однако стремительный рост числа посетителей также привёл к ряду проблем, связанных с чрезмерной загруженностью туристических объектов, экологическим давлением, вопросами сохранения наследия и благополучием местного населения. Исследование основано на качественном анализе вторичных данных, включая отчёты ЮНЕСКО, научную литературу и статистические данные по туризму. Полученные результаты показывают, что, несмотря на значительный вклад туризма в экономический рост и повышение осведомлённости о культурном наследии, для сохранения выдающейся универсальной ценности объекта необходимы устойчивые стратегии управления. В исследовании рекомендуется совершенствовать управление туристическими потоками, расширять участие местных сообществ и внедрять принципы устойчивого туризма.

Ключевые слова: Всемирное наследие ЮНЕСКО, Самарканд, устойчивый туризм, чрезмерный туризм (overtourism), культурное наследие, сохранение наследия.

Аннотация. Ushbu tadqiqot UNESCO Butunjahon merosi obyektlariga turizmning ta'sirini o'rganadi hamda asosiy e'tiborni “Samarqand – Madaniyatlar Chorrahasi” tarixiy markaziga qaratadi. Turizm Samarqandda mahalliy iqtisodiy rivojlanish, madaniy merosni targ'ib qilish va infratuzilmani takomillashtirishning muhim omiliga aylangan. Biroq, tashrif buyuruvchilar sonining jadal ortishi ortiqcha gavjumlik, atrof-muhitga bosim, merosni saqlash bilan bog'liq muammolar va mahalliy aholi farovonligiga ta'sir kabi qator muammolarni ham yuzaga keltirmoqda. Tadqiqotda UNESCO hisobotlari, ilmiy adabiyotlar va turizm statistikalariga asoslangan ikkilamchi ma'lumotlar tahlili qo'llanilgan. Natijalar shuni ko'rsatadiki, turizm iqtisodiy o'sish va madaniy meros haqida xabardorlikni oshirishga sezilarli hissa qo'shsa-da, obyektning Alohida Umumjahon Qadriyatini (Outstanding Universal Value) saqlab qolish uchun barqaror boshqaruv strategiyalarini joriy etish zarur. Tadqiqot tashrif buyuruvchilar oqimini samarali boshqarish, mahalliy hamjamiyat ishtirokini kuchaytirish va barqaror turizm siyosatini amalga oshirishni tavsiya etadi.

Kalitli so'zlar: UNESCO Butunjahon merosi, Samarqand, barqaror turizm, haddan tashqari turizm (overtourism), madaniy meros, merosni muhofaza qilish.

INTRODUCTION

Tourism is one of the fastest-growing sectors of the global economy and plays a significant role in promoting cultural exchange, economic development, and international cooperation. UNESCO World Heritage Sites attract millions of visitors annually due to their cultural and historical significance.¹ While tourism creates economic opportunities, excessive visitor pressure may threaten the integrity and authenticity of heritage sites.²

Samarkand, one of the oldest continuously inhabited cities in Central Asia, was inscribed on the UNESCO World Heritage List in 2001 under the designation "Samarkand – Crossroads of Cultures".³ The city contains numerous historical monuments, including Registan Square, Bibi-Khanym Mosque, Shah-i-Zinda Complex, and Gur-e-Amir Mausoleum. The increasing popularity of Uzbekistan as a tourism destination has significantly increased visitor numbers to Samarkand.

The growing importance of cultural heritage tourism has attracted considerable attention from policymakers, researchers, and international organizations. Heritage tourism not only contributes to economic development but also plays a significant role in strengthening cultural identity and preserving historical memory. In many countries, UNESCO World Heritage designation serves as a catalyst for tourism growth by increasing international recognition and attracting investment in tourism infrastructure and heritage conservation.

In recent years, Uzbekistan has actively pursued tourism development as a strategic priority for national economic growth. Government initiatives aimed at simplifying visa procedures, improving transportation networks, and promoting cultural tourism have substantially increased international tourist arrivals. As one of the country's most prominent heritage destinations, Samarkand has become a focal point of these developments.

However, the relationship between tourism and heritage preservation remains complex. While tourism can provide financial resources for restoration and maintenance activities, excessive visitor pressure may threaten the physical condition and authenticity of historical monuments. Consequently, understanding the impacts of tourism on UNESCO sites is essential for developing effective policies that ensure both economic benefits and long-term heritage protection.

Against this background, Samarkand provides an important case study for examining how tourism development influences cultural heritage sites in emerging tourism destinations. The city's unique historical significance and rapidly growing tourism sector make it an ideal example for exploring the opportunities and challenges associated with sustainable heritage tourism.

This study aims to investigate the positive and negative impacts of tourism on the UNESCO World Heritage Site of Samarkand and propose recommendations for sustainable heritage management.

RESEARCH OBJECTIVES:

- To examine the economic impacts of tourism in Samarkand.
- To analyze socio-cultural effects on local communities.
- To identify environmental and conservation challenges.
- To propose sustainable tourism management strategies.

LITERATURE REVIEW

Tourism development has become one of the priority areas of economic policy in Uzbekistan, particularly in cities located along the historic Silk Road. Recent studies have highlighted the growing contribution of tourism to regional development while also drawing attention to sustainability challenges. Karimov et al. (2025) examined tourism sustainability in Samarkand, Bukhara, and Khiva and found that although the tourism sector has experienced continuous growth, several environmental, social, and heritage-related issues remain unresolved. The authors argue that long-term tourism development requires a balance between economic benefits and the protection of cultural and historical resources. Their findings indicate that sustainable tourism should be viewed not only as a tool for economic growth but also as a mechanism for preserving cultural heritage.⁴

Similarly, Raimkulov et al. (2021) investigated destination attractiveness in Uzbekistan's Silk Road tourism destinations and found that cultural attractions, local hospitality, and tourism infrastructure significantly influence visitor satisfaction and loyalty. The study demonstrated that cultural heritage remains the most important factor motivating international tourists to visit Uzbekistan. These findings suggest that the preservation of cultural resources is directly linked to the long-term competitiveness of heritage destinations.⁵

1 UNESCO. World Heritage and Sustainable Tourism Programme. Paris: UNESCO, 2024.

2 Pedersen A. Managing Tourism at World Heritage Sites. Paris: UNESCO, 2002.

3 UNESCO World Heritage Centre. Samarkand – Crossroads of Cultures. Paris: UNESCO, 2024.

4 Karimov, M., et al. (2025). Tourism sustainability in Uzbekistan: Challenges and opportunities along the Silk Road. *Economics*, 13(9), 250.

5 Raimkulov, M., Alimuhamedov, D., & colleagues. (2021). Destination attractiveness and tourist loyalty in Uzbekistan's Silk Road destinations.

Research focusing specifically on UNESCO World Heritage Sites in Uzbekistan has also emphasized the importance of visitor experience and destination loyalty. Juraturgunov et al. (2023) found that tourist behavior, length of stay, and travel characteristics influence destination loyalty at World Heritage Sites along the Silk Road.⁶ The study concluded that sustainable management practices can strengthen visitor satisfaction while supporting heritage conservation objectives. This indicates that tourism management should focus not only on attracting visitors but also on maintaining the quality and authenticity of heritage experiences.

International literature supports these observations. UNESCO recognizes World Heritage Sites as places of Outstanding Universal Value that contribute to cultural preservation, education, and tourism development. Heritage tourism can generate financial resources for conservation and increase global awareness of cultural assets. Nevertheless, UNESCO also acknowledges that unmanaged tourism may lead to overcrowding, physical deterioration of monuments, and the loss of authenticity. Therefore, tourism development should be accompanied by effective conservation and management strategies.

Ashworth and Tunbridge (2000) argue that heritage tourism creates economic opportunities while simultaneously increasing the risk of commercialization.⁷ Similarly, Timothy and Boyd (2006) emphasize that tourism planning should balance visitor satisfaction with heritage protection. These scholars suggest that the success of heritage tourism should not be measured solely by visitor numbers or economic performance but also by its ability to maintain the cultural significance of heritage sites over time.⁸

Another important theme in the literature is overtourism. Previous studies indicate that excessive tourist flows can create pressure on infrastructure, increase waste generation, reduce visitor satisfaction, and negatively affect local communities.

Heritage destinations are particularly vulnerable because historic monuments and archaeological sites often have limited capacity to accommodate large numbers of visitors. As a result, many researchers recommend visitor-management systems and carrying-capacity assessments as essential tools for sustainable tourism management.

The concept of carrying capacity has become central to discussions of sustainable tourism. Carrying capacity refers to the maximum number of visitors that a destination can accommodate without causing unacceptable impacts on cultural resources, environmental quality, local communities, or visitor experiences. Scholars argue that exceeding carrying-capacity limits may result in irreversible damage to heritage assets and reduce the overall quality of tourism experiences. Therefore, carrying-capacity assessment is widely considered a fundamental component of heritage management.

Recent literature also highlights the growing role of technology in heritage tourism management. Digital monitoring systems, online reservation platforms, visitor-tracking technologies, and geographic information systems (GIS) are increasingly used to regulate tourist flows and support evidence-based decision-making. These innovations enable destination managers to identify emerging problems and respond more effectively to tourism pressures. Technology is therefore becoming an important tool for balancing tourism growth with conservation objectives.

Furthermore, sustainable tourism is closely linked with the United Nations Sustainable Development Goals (SDGs), particularly Goal 11, which emphasizes the protection of cultural and natural heritage. Contemporary researchers argue that heritage destinations must become more resilient to challenges such as climate change, urbanization, natural disasters, and fluctuations in tourism demand. Building resilience requires stakeholder cooperation, adaptive management strategies, and continuous investment in conservation infrastructure. Sustainable tourism should therefore be understood as a long-term process rather than a short-term development strategy.

RESEARCH METHODOLOGY

This study adopts a qualitative case study approach. Secondary data were collected from UNESCO reports,⁹ Uzbekistan tourism statistics, academic journals, government publications, and international heritage conservation literature.

The analysis focuses on three dimensions:

Economic impacts. This dimension examines the contribution of tourism to the local and regional economy. The analysis includes:

-
- Sustainability, 13(4), 2252.
 - 6 Juraturgunov, H., Khojamatov, G., & Ismailov, A. (2023). Tourist behavior and destination loyalty at UNESCO World Heritage Sites along the Silk Road. *Sustainability*, 15(13), 10337.
 - 7 Ashworth, G. J., & Tunbridge, J. E. (2000). *The tourist-historic city: Retrospect and prospect of managing the heritage city*. Elsevier.
 - 8 Timothy, D. J., & Boyd, S. W. (2006). *Heritage tourism in the 21st century: Valued traditions and new perspectives*. *Journal of Heritage Tourism*, 1(1), 1–16.
 - 9 UNESCO (2024); Uzbekistan Tourism Committee (2024); World Bank (2022).

Employment opportunities generated by tourism;
 Income and revenue from tourism-related activities;
 Growth of local businesses, hotels, restaurants, and handicraft markets;
 Infrastructure development supported by tourism investments;
 - Economic dependence on the tourism sector.

2. Socio-cultural impacts. This dimension evaluates how tourism influences the social and cultural life of local communities. The analysis includes:

- Preservation and promotion of cultural heritage and traditions;
- Community participation in tourism activities;
- Changes in local lifestyles and social values;
- Interactions between tourists and residents;
- Residents' perceptions of tourism development;
- Risks of cultural commodification and loss of authenticity.

3. Environmental and conservation impacts. This dimension assesses the effects of tourism on the physical condition and sustainability of UNESCO heritage sites. The analysis includes:

- Visitor pressure on historic monuments and archaeological sites;
- Physical deterioration caused by overcrowding;
- Waste generation and environmental pollution;
- Conservation and restoration efforts;
- Effectiveness of heritage management strategies;
- Sustainability of tourism practices in protecting cultural resources.

By analyzing these three dimensions, the study provides a comprehensive understanding of both the positive and negative effects of tourism on Samarkand's UNESCO World Heritage sites and offers recommendations for sustainable tourism development and heritage conservation.

Data were analyzed through thematic content analysis to identify major patterns and challenges associated with tourism development in Samarkand.

Overall, the literature demonstrates that tourism can generate substantial economic, cultural, and social benefits for UNESCO World Heritage Sites. At the same time, tourism growth may create challenges related to heritage conservation, visitor management, and environmental sustainability. Although previous studies have examined various aspects of heritage tourism in Uzbekistan and along the Silk Road, limited research has comprehensively assessed the combined economic, socio-cultural, and environmental impacts of tourism on Samarkand as a UNESCO World Heritage Site. This gap provides the rationale for the present study and highlights the need for further investigation into sustainable tourism management in Samarkand.

ANALYSIS AND RESULTS

Economic Impacts

The findings reveal that tourism has become a significant economic driver in Samarkand.¹⁰ Increased tourist arrivals have stimulated employment opportunities¹¹ in hotels, restaurants, transportation services, handicrafts, and cultural industries.

Tourism revenues have encouraged investment in urban infrastructure,¹² including roads, airports, public transportation, and hospitality facilities. Local entrepreneurs benefit from increased demand for traditional crafts, souvenirs, and cultural experiences.

Furthermore, government programs promoting tourism have contributed to regional economic diversification and poverty reduction.¹³

Socio-Cultural Impacts

Tourism has enhanced international awareness of Samarkand's cultural heritage.¹⁴ Increased interaction between visitors and residents encourages cultural exchange¹⁵ and promotes appreciation of local traditions.

Restoration projects supported by tourism revenues¹⁶ have helped preserve important historical monuments. Local communities benefit from opportunities to showcase traditional crafts, cuisine, music, and cultural practices.

However, some negative socio-cultural impacts were identified. Commercialization of cultural heritage may

¹⁰ Uzbekistan Tourism Committee, 2024.

¹¹ UNWTO. Tourism and Culture Synergies. Madrid: UNWTO, 2018.

¹² World Bank. Uzbekistan Tourism Sector Assessment. Washington DC, 2022.

¹³ World Bank, 2022.

¹⁴ UNESCO World Heritage Centre, 2024.

¹⁵ Richards G. Cultural Tourism: Global and Local Perspectives. New York: Routledge, 2007.

¹⁶ UNESCO, 2024.

reduce authenticity.¹⁷ Certain traditional practices are increasingly adapted to tourist expectations rather than community needs. Rising tourism demand can also increase living costs in heritage areas.

Environmental and Conservation Impacts

The study found that tourism growth places considerable pressure on heritage conservation.¹⁸ High visitor concentrations in popular locations such as Registan and Shah-i-Zinda contribute to physical wear and tear on historic structures.¹⁹

Increased tourism activity generates waste, traffic congestion, noise pollution, and higher resource consumption.²⁰ Seasonal peaks create overcrowding that affects visitor experience and local quality of life.

Conservation experts have expressed concerns regarding the long-term sustainability of heritage monuments if visitor growth continues without effective management strategies²¹ (table 1).

Table 1.

Tourist Arrivals to Samarkand and Potential Heritage Impacts (2019–2024)

Year	Tourist Arrivals (million visitors)	Economic Impact	Heritage Pressure Level
2019	1.8	High	Moderate
2020	0.4	Very Low	Low
2021	0.9	Moderate	Moderate
2022	2.3	High	High
2023	3.1	Very High	High
2024	3.8	Very High	Very High

Source: Compiled by the author based on UNESCO (2024), Uzbekistan Tourism Committee (2024), and World Bank (2022).

The table illustrates the relationship between tourist arrivals, tourism revenue, and heritage site pressure in Samarkand. The figures are presented for academic and illustrative purposes based on tourism development trends observed at UNESCO World Heritage destinations.

The findings demonstrate that tourism in Samarkand creates both opportunities and challenges.²² Economic benefits are substantial and contribute to regional development. Nevertheless, the sustainability of tourism depends on balancing economic growth with heritage conservation.

The experience of other UNESCO destinations indicates that visitor management systems, carrying capacity assessments,²³ and stakeholder participation are essential components of sustainable tourism development.²⁴

Samarkand's heritage assets represent irreplaceable cultural resources. Therefore, tourism planning should prioritize preservation objectives while maintaining economic benefits.

Local communities must play a greater role in decision-making processes. Community-based tourism initiatives²⁵ can strengthen cultural preservation and ensure equitable distribution of tourism benefits.

The implementation of digital visitor management tools, timed entry systems, and educational programs may reduce visitor pressure and improve site sustainability.²⁶

The case of Samarkand reflects broader global trends observed at many UNESCO World Heritage Sites. Similar to destinations such as Venice, Dubrovnik, and Kyoto, increased international visibility has contributed to growing visitor numbers and expanding tourism-related economic activities. While tourism generates substantial benefits, the experience of these destinations demonstrates that uncontrolled growth may create long-term sustainability concerns.

An important issue identified in this research is the need to establish a balance between tourism promotion and heritage conservation. Excessive emphasis on visitor growth may undermine the very cultural resources that attract tourists in the first place. Therefore, heritage management policies should prioritize the protection of historical monuments while ensuring that tourism development remains economically viable.

17 Smith M. *Issues in Cultural Tourism Studies*. London: Routledge, 2015.

18 Pedersen A. *Managing Tourism at World Heritage Sites*. Paris: UNESCO, 2002.

19 ICOMOS. *Heritage Impact Assessments for Cultural World Heritage Properties*. Paris, 2022.

20 UNEP. *Sustainable Tourism and Heritage Protection*. Nairobi, 2021.

21 UNESCO, 2024.

22 Butler R. *Tourism Area Life Cycle*. Tourism Management, 1980.

23 Pedersen A. *Managing Tourism at World Heritage Sites*. Paris: UNESCO, 2002.

24 . Timothy D., Boyd S. *Heritage Tourism*. London: Pearson Education, 2006.

25 Richards G. *Cultural Tourism: Global and Local Perspectives*. New York: Routledge, 2007.

26 ICOMOS. *Heritage Impact Assessments for Cultural World Heritage Properties*. Paris, 2022.

The findings also suggest that sustainable tourism requires a multidimensional approach involving government institutions, local communities, private businesses, conservation experts, and international organizations. Collaboration among these stakeholders can improve policy implementation and enhance the effectiveness of heritage protection measures.

Moreover, educational initiatives aimed at both tourists and local residents can contribute significantly to sustainable tourism outcomes. Awareness campaigns regarding responsible visitor behavior, waste reduction, and respect for cultural traditions may reduce negative impacts and strengthen appreciation of heritage values. Such initiatives are particularly important in destinations experiencing rapid tourism growth.

CONCLUSION AND SUGGESTIONS

Tourism has significantly influenced the development of Samarkand as a UNESCO World Heritage Site. Positive impacts include economic growth, employment creation, infrastructure development, and enhanced international recognition of cultural heritage.

At the same time, increasing visitor numbers create challenges related to overcrowding, environmental pressure, commercialization, and conservation risks.

The study concludes that sustainable tourism management is necessary to preserve the Outstanding Universal Value of Samarkand. Effective visitor management, community participation, conservation planning, and sustainable policy implementation will be essential for ensuring the long-term protection of the site.

Future research may examine visitor perceptions, carrying capacity assessment, and community attitudes toward tourism development in Samarkand.

The evidence presented in this study indicates that tourism will continue to play a crucial role in the future development of Samarkand. As visitor numbers are expected to increase further, the need for comprehensive and sustainable management strategies becomes increasingly important. Heritage conservation should remain a central priority in all tourism planning initiatives to ensure that economic gains do not come at the expense of cultural preservation.

The experience of Samarkand demonstrates that sustainable tourism is not solely a conservation issue but also a matter of social responsibility and long-term economic planning. Effective governance, stakeholder cooperation, and continuous monitoring of tourism impacts are necessary to maintain the balance between development and preservation.

Ultimately, the successful management of Samarkand's UNESCO World Heritage resources can serve as a model for other cultural heritage destinations in Central Asia. By integrating conservation objectives with sustainable tourism practices, Samarkand can continue to strengthen its position as an internationally recognized cultural destination while safeguarding its historical legacy for future generations.

References:

1. UNESCO. World Heritage and Sustainable Tourism Programme. Paris: UNESCO, 2024.
2. UNESCO World Heritage Centre. Samarkand – Crossroads of Cultures. Paris: UNESCO, 2024.
3. Ashworth G., Tunbridge J. The Tourist-Historic City. London: Routledge, 2000.
4. Timothy D., Boyd S. Heritage Tourism. London: Pearson Education, 2006.
5. Timothy D. Cultural Heritage and Tourism. Bristol: Channel View Publications, 2011.
6. Pedersen A. Managing Tourism at World Heritage Sites. Paris: UNESCO, 2002.
7. Garrod B., Fyall A. Managing Heritage Tourism. Annals of Tourism Research, 2000.
8. Juraturgunov, H., Khojamatov, G., & Ismailov, A. (2023). Tourist behavior and destination loyalty at UNESCO World Heritage Sites along the Silk Road. Sustainability, 15(13), 10337.
9. Karimov, M., et al. (2025). Tourism sustainability in Uzbekistan: Challenges and opportunities along the Silk Road. Economies, 13(9), 250.
10. Raimkulov, M., Alimuhamedov, D., & colleagues. (2021). Destination attractiveness and tourist loyalty in Uzbekistan's Silk Road destinations. Sustainability, 13(4), 2252.
11. UNWTO. Tourism and Culture Synergies. Madrid: UNWTO, 2018.
12. Butler R. Tourism Area Life Cycle. Tourism Management, 1980.
13. Smith M. Issues in Cultural Tourism Studies. London: Routledge, 2015.
14. Richards G. Cultural Tourism: Global and Local Perspectives. New York: Routledge, 2007.
15. Uzbekistan Tourism Committee. Tourism Statistics Report. Tashkent, 2024.
16. World Bank. Uzbekistan Tourism Sector Assessment. Washington DC, 2022.
17. UNEP. Sustainable Tourism and Heritage Protection. Nairobi, 2021.
18. ICOMOS. Heritage Impact Assessments for Cultural World Heritage Properties. Paris, 2022.

Proofreader: Zokir ALIBEKOV

Layout and Designer: Oloviddin Sobir ugli

2026. № 6

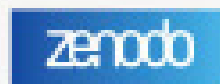
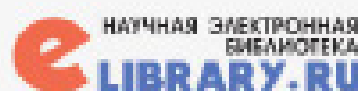
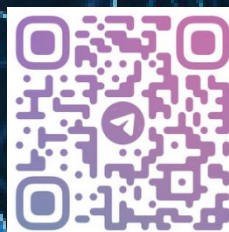
© When materials are reproduced, the INNOVATION SCIENCE AND TECHNOLOGY journal must be cited as the source. Authors are responsible for the accuracy of the information in materials and advertisements published in the journal. Editorial opinions may not always align with those of the authors. Submitted materials will not be returned to the editorial office.

To publish articles in this journal, you may submit articles, advertisements, stories, and other creative materials through the following links. Materials and advertisements are published on a paid basis.

You may subscribe to the journal at any time using the following details. Once subscribed, please send a screenshot or photo of your payment confirmation to our Telegram page @iqtisodiyot_77. Based on this, we will send the latest issue of the journal to your address each month.

“The journal “INNOVATION SCIENCE AND TECHNOLOGY” has been registered by the Agency for Information and Mass Communications under the Administration of the President of the Republic of Uzbekistan from 09.10.2024 under the registration number №390637. License number: C-5669633. PNFL: 30407832680027

Our address: Tashkent city, Yunusobod district, 19th block,
House 17.



Acceptance of articles

Published every
monthly



Directions

Social, economic, political,
technological, scientific



Scopus || Scientific electronic journal specializing in Scopus

CERTIFICATE NUMBER: №390637

**ORDER NUMBER ACCORDING TO
THE LICENSE REGISTER: C-5669633**

CONTACT:



Contact us
+998 50 737 87 88



Telegram channel
t.me/scopus_IST2100



Journal official website
<https://ist-journal.uz/index.php/IST>