

# INNOVATION SCIENCE AND TECHNOLOGY



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**ISSUE 4**

 Acceptance of papers April, 2026



**Acceptance of  
papers**

Published monthly



**Topics**

economics,  
technology, social  
sciences

**ISSN 3060-5229**



Digital  
Object  
Identifier



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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.

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# CONTENTS

THE IMPACT OF FINANCIAL RISKS ON THE DEVELOPMENT OF REGIONAL ECONOMIC GROWTH DRIVERS AND OPPORTUNITIES FOR THEIR MITIGATION .....	17
<b>Turopova Nigora Xolmurod qizi</b>	
UTILIZATION OF INTERNAL RESERVES FOR INCREASING THE EFFICIENCY OF REGIONAL TOURISM (CASE STUDY OF THE REPUBLIC OF KARAKALPAKSTAN) .....	20
<b>Naurizbaev Aliakbar Rustamovich</b>	
MATHEMATICAL MODELS AND ALGORITHMS FOR PROCESSING NOISE DATA .....	23
<b>Jovlieva Dilnoz Mustofa qizi</b>	
ASSESSMENT OF THE IMPACT OF ENVIRONMENTAL RISKS IN BUSINESS ACTIVITIES AND WAYS TO REDUCE THEM.....	28
<b>Abdukhamid Abdumalikovich Bektemirov</b>	
A MULTI-LEVEL SYSTEM OF STATISTICAL INDICATORS FOR REGIONAL TRANSPORT INFRASTRUCTURE ASSESSMENT: METHODOLOGY AND APPROBATION .....	34
<b>Keunimzhaev Mukhamedali Kuanyshaevich</b>	
THE IMPACT OF BANKS ON THE FINANCIAL STABILITY OF THE ECONOMY OF THE REPUBLIC OF UZBEKISTAN .....	39
<b>Usmonov Faridun Firdavsievich, Ishonkulova Feruza Asatovna</b>	
EMPIRICAL EVALUATION OF MACRO- AND MICROECONOMIC FACTORS AFFECTING THE EFFICIENCY OF INVESTMENT ACTIVITY AND THEIR RELATIONSHIP WITH ECONOMIC EFFICIENCY.....	43
<b>Aytmuratova Ulbike Jalgasovna</b>	
MECHANISMS FOR IMPROVING ECONOMIC EFFICIENCY THROUGH OPTIMIZATION OF PRODUCTION RESOURCE POTENTIAL IN UZBEKISTAN .....	47
<b>Sattarov Abdusamat Umirqulovich</b>	
PROMISING DIRECTIONS FOR APPLYING FOREIGN EXPERIENCE IN THE DEVELOPMENT OF GREEN TOURISM IN UZBEKISTAN .....	52
<b>Rakhimova Dilfuza Mirzakasimovna</b>	
PRIORITIES FOR REGULATING FINANCIAL RELATIONS IN PROVIDING HOUSING TO THE POPULATION IN UZBEKISTAN.....	58
<b>Khannarov Komiljon Karimovich</b>	
MPROVING THE ORGANIZATION OF PRODUCTION COST ACCOUNTING IN FULL-SYSTEM FARMS SPECIALIZING IN THE CULTIVATION OF CYPRINID FISH.....	62
<b>Aitimbetov Amirbek Qoishibekovich</b>	
THE TRANSFORMATIONAL ROLE OF SMALL BUSINESS IN UZBEKISTAN'S ECONOMIC DEVELOPMENT: A COMPREHENSIVE ANALYSIS BASED ON 2025 NATIONAL STATISTICS.....	68
<b>Isakjanova Sabokhat Muhamedovna</b>	
AN INTEGRATED METHODOLOGICAL FRAMEWORK FOR ADVANCING GREEN TOURISM MODELS IN THE DIGITAL ECONOMY ERA.....	79
<b>Rasulova Nigora Yusupovna</b>	
FACTORS AFFECTING THE COMPETITIVENESS OF COMPANIES.....	83
<b>Kamoliddinov Ilhomjon Muhammadjonovich, Nosirov Eldor Nosirjon ugli</b>	
THE ROLE OF INDUSTRIAL ENTERPRISES IN INCREASING THE EXPORT POTENTIAL OF THE UZBEK ECONOMY.....	88
<b>Musayeva Shoira Azimovna</b>	
DEVELOPMENT OF MARKET FACTORS TO ENSURE THE GROWTH OF THE ECONOMIC POTENTIAL OF THE ENTERPRISE (USING THE EXAMPLE OF THE SAG EXPRESS BRAND STORES) .....	92
<b>Usmonova Dilfuza Ilkhomevna</b>	
THE CONCEPT OF REGIONAL IMAGE AND ITS ECONOMIC CONTENT (THE CASE OF THE KHOREZM REGION).....	99
<b>Dilshod Ibragimovich Ibdullayev</b>	

DEVELOPMENT OF QUALITY MANAGEMENT SYSTEMS IN THE CONTEXT OF DIGITAL TRANSFORMATION .....	106
<b>Shakhnoza Samandarovna Ziyadillayeva</b>	
ADVANCED APPROACHES TO THE ASSESSMENT AND MANAGEMENT OF CURRENT FINANCIAL STABILITY IN JOINT-STOCK COMPANIES USING CFAR (CASH FLOW AT RISK) AND 3 $\Sigma$ STATISTICAL RISK MODELS .....	114
<b>Kurbonov Xayrilla</b>	
DEVELOPMENT OF A PROGRAM FOR ANALYZING MEDICAL LABORATORY RESULTS USING ARTIFICIAL INTELLIGENCE MODELS.....	118
<b>Gofurjonov Muhammadali, Kamolov Shamsiddin</b>	
APPLICATION OF DIGITAL TRANSFORMATION IN IMPROVING MANAGEMENT STRATEGIES OF CONSTRUCTION MATERIALS INDUSTRY ENTERPRISES.....	122
<b>Ubaydullayev Mukhammadjon Abdusamad o'g'li</b>	
IMPROVING MECHANISMS FOR ENHANCING THE RESOURCE POTENTIAL OF ORGANIZATIONS IN THE EDUCATIONAL SERVICES SECTOR.....	125
<b>Ibrohim Meliboyev</b>	
ECONOMETRIC ANALYSIS OF THE RELATIONSHIP BETWEEN SERVICE QUALITY AND ECONOMIC EFFICIENCY.....	130
<b>Khudoyorov Lochinbek Bahromovich</b>	
MONETARY POLICY INSTRUMENTS IMPROVE USAGE PRACTICES .....	135
<b>A.A. Ismailov</b>	
E-COMMERCE ADOPTION IN TRADITIONAL STORES.....	140
<b>Nuserov Bakhtiyor</b>	
ENHANCING FINANCIAL SUSTAINABILITY AND OPERATIONAL EFFICIENCY OF JSC "HUDUDGAZTAMINOT": KEY FACTORS AND DIGITAL TRANSFORMATION STRATEGIES.....	146
<b>Ergashev Muhibbek Aslamovich</b>	
METHODS FOR IMPROVING AUTOMOTIVE FUEL QUALITY INDICATORS THROUGH THE USE OF ADDITIVES.....	151
<b>Xushnayev Obid, Sheraliyev Ulugbek, Astonov Alisher</b>	
MONETARY POLICY INSTRUMENTS.....	156
<b>A.A. Ismailov</b>	
THE ROLE OF STRATEGIC MANAGEMENT IN ENHANCING A COUNTRY'S INTERNATIONAL IMAGE: THE CASE OF SWITZERLAND.....	161
<b>Idirisbaeva Hurliman Amanbay qizi, Kurolov Maksud Obitovich</b>	
VOLUNTEER TOURISM: CURRENT IMPACTS AND FUTURE DIRECTIONS .....	170
<b>Ossama Moustafa Elsetouhy</b>	
COMPUTER GRAPHICS IN MODERN EDUCATION: PRACTICAL CAPABILITIES OF THE FIGMA PLATFORM.....	176
<b>Maxamadov Rustam Xabibullayevich, Djamatov Mustafa Xatamovich</b>	
DEVELOPING THE FINANCIAL SUSTAINABILITY OF HIGHER EDUCATION INSTITUTIONS BASED ON DIGITAL TECHNOLOGIES.....	182
<b>Abdurasulov Sardor Tolqin ugli</b>	
THE IMPORTANCE AND PROSPECTS OF TOURISM DEVELOPMENT .....	187
<b>Ibodova Dilsora Ibodovna, Qosimov Jahongir Ruziboyevich</b>	
STRATEGIES FOR OPTIMIZING THE STRUCTURE OF COMMERCIAL BANK ASSETS AND INCREASING EFFICIENCY IN UZBEKISTAN .....	194
<b>Ibrohimov Davronbek Muhammadi o'g'li</b>	
STRATEGIC DIRECTIONS FOR THE DEVELOPMENT OF EXPORTS OF PRODUCTS BASED ON ARTIFICIAL FIBERS.....	199
<b>Raximov Furqat Jalolovich</b>	
FUNDAMENTALS OF USING MARKETING RESEARCH TO IMPROVE SALES SYSTEM EFFECTIVENESS.....	206
<b>Abduxalilova Laylo Tuxtasinovna</b>	

FASHION MARKETING AS AN INSTRUMENT FOR SHAPING CONSUMER-BASED BRAND VALUE.....	213
<b>Navruz-Zoda Bakhtiyor Negmatovich, Aripova Makhliyo Salakhiddinovna</b>	
ENSURING SUSTAINABLE GROWTH OF THE NATIONAL ECONOMY IN THE CONTEXT OF DIGITAL TRANSFORMATION, IMPROVING INNOVATIVE DEVELOPMENT STRATEGIES, AND ENHANCING THE EFFICIENCY OF IMPLEMENTING DIGITAL ECONOMY PRINCIPLES IN THE FINANCE, BANKING, AND TOURISM SECTORS .....	220
<b>Inatullayeva Intizor Jamshid qizi, Uroqov Uchqun Yunusovich</b>	
SOCIAL AND SECURITY PROBLEMS OF INNOVATIVE TOURISM DEVELOPMENT IN THE REGION.....	223
<b>Q.A. Musakhanov</b>	
DIGITAL ECONOMY AND INNOVATION AS FACTORS OF SOCIAL DEVELOPMENT IN UZBEKISTAN .....	228
<b>Ibragimova Saodat Abdumuminovna, Sadullayeva Sevara Uchqun qizi</b>	
THE SOCIAL INSURANCE SYSTEM OF THE UNITED STATES OF AMERICA .....	232
<b>Javliyev Nuriddin Bektemir o'g'li</b>	
DEVELOPMENT OF EFFECTIVE ORGANIZATIONAL-ECONOMIC MECHANISMS FOR TRANSITION TO THE INNOVATIVE MARKETING CONCEPT IN ENTERPRISES UNDER DIGITAL TRANSFORMATION .....	236
<b>Bobomurodov Qayimjon Homidovich</b>	
FOMO-DRIVEN PURCHASING IN E-COMMERCE FLASH SALES: AN INTEGRATIVE CONCEPTUAL FRAMEWORK .....	241
<b>Muhammadimov Abdukodir Bakhodirjon Ugli, Arciana Damayanti, Javliev Nuriddin Bektemir ugli</b>	
PHYSICO-MECHANICAL PROPERTIES OF COARSE FEEDS .....	250
<b>Yodgorov Jamoliddin Nomozovich, Yadgarov Sirojiddin Nomozovich</b>	
EVOLUTION AND STANDARDIZATION OF SI MEASUREMENT UNITS IN THE INTERNATIONAL SYSTEM .....	255
<b>Maxmudov Dostonbek Soyibjon o'g'li</b>	
PROCEDURE FOR ACCOUNTING OF ESTIMATED LIABILITIES BY BUDGETARY ORGANIZATIONS .....	259
<b>Jabbarova Charos Aminovna</b>	
FEATURES OF AUDIT IN DEVELOPING INVESTMENT LENDING PRACTICES IN COMMERCIAL BANKS.....	263
<b>Jamshid Mirzakhmedov</b>	
ECONOMIC EFFICIENCY OF RENEWABLE ENERGY SOURCES: THE CASE OF SOLAR AND WIND ENERGY .....	271
<b>Hayitov Jamshid Kholboyevich</b>	
ADVANCED FOREIGN EXPERIENCE IN HIGHER EDUCATION FINANCING: THE CASE OF THE UNITED KINGDOM .....	275
<b>Kurbanov Baxodir Negmatullayevich</b>	
THE IMPACT OF DIGITAL DESTINATION IMAGE ON TOURIST SATISFACTION AND REVISIT INTENTION: EVIDENCE FROM UZBEKISTAN .....	279
<b>Shaxnoza Almasovna Ashurova</b>	
FACTORS INFLUENCING THE DEVELOPMENT OF THE CIRCULAR ECONOMY .....	287
<b>Narzullaev Elmurod Shukhrat ugli</b>	

UDC: 33.330.15

# FACTORS INFLUENCING THE DEVELOPMENT OF THE CIRCULAR ECONOMY

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**Abstract:** This article analyzes the main economic, institutional, and environmental factors influencing the development of the circular economy. It also examines major barriers slowing down its implementation, including infrastructure limitations, financial constraints, and environmental awareness issues. The study proposes scientific and practical recommendations for the effective implementation of circular economy principles.

**Keywords:** circular economy, sustainable development, resource efficiency, waste management, green economy, environmental policy, innovation, economic factors, institutional development, environmental challenges.

## INTRODUCTION

In the global economy, excessive exploitation of natural resources, the continuous growth of waste volumes, and the intensification of environmental problems demonstrate the inefficiency of the traditional linear economic model of “take → produce → consume → dispose.” Therefore, the concept of the circular economy has emerged as a new model of economic development aimed at efficient resource use, waste reduction, and ensuring environmental sustainability. The circular economy promotes closed-loop principles in production and consumption processes, extending product life cycles, transforming waste into secondary resources, and harmonizing economic growth with environmental safety. However, the implementation of this model is influenced by various economic, institutional, technological, and social factors. In particular, limited financial resources, underdeveloped innovation infrastructure, insufficiently formed regulatory and legal mechanisms, and low levels of environmental awareness act as major barriers to the development of a circular economy. The purpose of this article is to systematically analyze the factors influencing the development of the circular economy, identify existing challenges, and develop scientific and practical recommendations aimed at overcoming them. The research findings serve as a scientific basis for the effective integration of circular economy principles into the national economy.

## LITERATURE REVIEW

The circular economy concept has become one of the key directions of modern economic development, contributing to efficient resource utilization, waste reduction, and sustainable economic growth. The theoretical foundations of the circular economy were first introduced by American economist Kenneth Boulding, who emphasized that the Earth functions as a closed economic system and demonstrated the unsustainability of unlimited resource consumption models [1]. Later, Robert Frosch and Nicholas Gallopoulos developed the concept of industrial ecology, arguing that industrial processes should be organized based on closed-loop systems similar to natural ecosystems [2]. The modern interpretation of the circular economy was further advanced by Walter R. Stahel, who proved that extending product lifetimes through repair, reuse, and remanufacturing can significantly increase economic efficiency [3]. Within the framework of sustainable development economics, David Pearce and R. Kerry Turner formulated principles of ecological economics, emphasizing that economic growth must be aligned with environmental limitations [4].

In recent years, significant contributions to measuring and assessing the circular economy have been made by Julian Kirchherr, Denise Reike, and Marko Hekkert, who systematized more than 100 scientific definitions

of the circular economy [5]. A practice-oriented approach was developed by the Ellen MacArthur Foundation, which promoted the global adoption of closed resource loops based on the “reduce–reuse–recycle” model [6]. Contemporary studies indicate that the circular economy plays a crucial role in increasing economic efficiency, reducing environmental pressure, and creating new employment opportunities. Consequently, many countries are integrating circular economy principles into their national development strategies.

## RESEARCH METHODOLOGY

This study applies a comprehensive scientific approach to identify factors influencing the development of the circular economy and the challenges limiting its implementation. The research methodology is based on a systems approach combining theoretical and empirical analysis methods. Scientific abstraction and logical analysis were used to examine theoretical foundations of the circular economy, while comparative analysis enabled the comparison of international best practices with the conditions of Uzbekistan. Statistical analysis methods were applied to evaluate waste recycling rates, resource efficiency, and environmental performance indicators. Furthermore, an indicator-based approach was employed to develop an integrated system for assessing circular economy development, using normalization and indexing techniques to standardize diverse indicators within a unified measurement framework. A systems analysis approach was also used to determine interrelationships among economic, environmental, and institutional factors.

## ANALYSIS AND RESULTS

The article examines internal and external factors influencing the sustainable development of the circular economy sector and the efficiency of waste recycling enterprises in the Republic of Uzbekistan. In our view, a comprehensive assessment of existing regional factors makes it possible to determine the economic, environmental, and social benefits achievable through circular economy development. Studying the specific characteristics of the operating environment and the interrelationships among influencing factors is essential for effective implementation.

Factors affecting circular economy development were classified into internal and external groups. Internal factors include institutional and political conditions, economic and financial factors, information and management systems, technological capacity, infrastructure development, social conditions, and corporate and business-related aspects. External factors include international political and legal conditions, global economic trends, geopolitical influences, socio-cultural global dynamics, technological and innovation developments, financial and investment conditions, environmental challenges, and international trade and market factors. Each of these categories consists of multiple sub-factors that collectively shape development outcomes.

Although the internal and external factors influencing circular economy development in Uzbekistan have not yet been fully systematized, significant attention is being paid to the greening of the national economy. External factors influencing recycling enterprises extend beyond firm-level activities and require strong governmental support and intersectoral cooperation. Among external influences, environmental challenges and environmental degradation issues, along with the socio-cultural awareness level of the population, play a crucial role. The creation of a favorable investment climate contributes to attracting foreign investors, facilitating the transfer of international experience, and supporting solutions to existing environmental problems (table 1).

Table 1

The process influencing the development of the circular economy [8]

Factors	Description
<b>Internal Factors</b>	
Technological capability	Availability of advanced recycling, eco-design, and clean production technologies within firms and industries.
Organizational strategy	Degree to which companies integrate circular economy principles into their business models and long-term plans.
Financial resources	Access to funding for green investments, innovation, and infrastructure development.
Human capital and skills	Level of employee knowledge, expertise, and training in sustainable production and waste management.
Corporate culture	Awareness and commitment of management and employees toward sustainability and resource efficiency.

R&D and innovation capacity	Ability of organizations to develop new circular products, materials, and processes.
<b>External Factors</b>	
Government policies and regulations	Laws, incentives, taxes, and environmental standards that promote or restrict circular practices.
Market demand	Consumer preference for sustainable, recycled, and eco-friendly products.
Economic conditions	Macroeconomic stability, inflation, and investment climate affecting green transformation.
Infrastructure availability	Presence of waste collection, recycling systems, and reverse logistics networks.
International cooperation	Global agreements, trade policies, and knowledge transfer supporting circular economy development.
Environmental pressure	Resource scarcity, pollution levels, and climate change challenges pushing transition toward circular models.
Technological diffusion	Access to global innovations and transfer of green technologies between countries and firms.

In today's rapidly developing global economy, the waste problem has become one of the most pressing environmental and economic challenges [9]. The rapid growth of the world's population, accelerated urbanization processes, and the expansion of industrialized areas have led to a continuous annual increase in the volume of various types of waste. This situation negatively affects not only the environment but also public health, sustainable economic development, and biodiversity [10]. In particular, the linear economic system based on the traditional "brown economy" model results in inefficient exploitation of natural resources and a sharp increase in waste generation. Although industrialization plays an important role in ensuring economic growth, it simultaneously creates numerous environmental challenges [11]. For example, the growing volume of harmful emissions released into the atmosphere contributes to global climate change, while increased carbon emissions intensify the greenhouse effect. Moreover, industrial and household waste causes air pollution, depletion of drinking water resources, and soil degradation. In addition, noise pollution generated by industrial activities has a negative impact on human health [7].

Under these conditions, effective waste management and reuse have become critically important. Waste composition is diverse and includes paper, plastics, batteries, used electronic devices, wood products, construction materials, food waste, and textile waste [11]. A significant portion of these wastes consists of non-biodegradable materials that remain in the environment for long periods and disrupt ecological balance. Plastic and electronic waste, in particular, are considered among the most hazardous types of modern waste. At the same time, biodegradable waste also occupies an important place and includes food residues, plants, organic materials, and other natural waste. Although such waste decomposes relatively quickly, systems for efficient collection, recycling, and reintegration into the economy as secondary resources remain insufficiently developed. As a result, organic waste is often disposed of in landfills, leading to methane emissions, which further contribute to global climate change.

## CONCLUSION AND RECOMMENDATIONS

The results of the study indicate that the development of a circular economy is an important factor in ensuring sustainable economic growth, rational use of natural resources, and reduction of environmental problems in the modern economy. The analysis shows that the use of resources within a traditional linear economic model leads to increasing waste volumes, growing environmental pressure, and decreasing economic efficiency. The implementation of circular economy principles makes it possible to achieve economic and environmental balance through waste recycling, the use of secondary resources, and the application of innovative technologies.

At the same time, the research identified several key barriers hindering the development of the circular economy, including insufficiently developed regulatory and legal mechanisms, limited investment resources, low environmental awareness among the population, and inadequate recycling infrastructure.

Based on the research findings, the following recommendations are proposed:

Improve institutional mechanisms and develop a dedicated national strategy supporting circular economy principles.

Expand economic incentive measures such as tax benefits, subsidies, and green investments to promote waste sorting, recycling, and the development of secondary resource markets.

Accelerate the introduction of resource-efficient technologies and green production standards in domestic enterprises.

Increase environmental awareness, develop separate waste collection systems, and integrate circular economy concepts into the education system.

Support scientific research activities and encourage innovative startups to promote technological solutions related to the circular economy.

In general, a gradual transition to a circular economy model will contribute to strengthening Uzbekistan's economic competitiveness, ensuring environmental sustainability, and supporting long-term economic development.

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**Proofreader:** Zokir ALIBEKOV  
**Layout and Designer:** Oloviddin Sobir ugli

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**2026. № 4**

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