CIRCULAR ECONOMY IS CONQUERING NEW AREAS

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The circular economy has rapidly evolved from a niche environmental strategy into a comprehensive development paradigm affecting multiple sectors of modern society. What began as a framework for waste reduction and recycling now encompasses industrial transformation, digital innovation, urban governance, sustainable finance, bioeconomy, regenerative agriculture, labor markets, and long-term policy architecture. This paper provides a full-length, deeply analytical academic examination of how the circular economy is expanding into new fields. It synthesizes theoretical foundations, evaluates global practices, identifies economic and political drivers, and explores emerging opportunities and challenges. Through integrative analysis, the study demonstrates that circularity is not only an ecological model but also a blueprint for resilient, competitive, and future-oriented economic development. The conclusions highlight strategic directions and policy solutions needed to advance circular systems in the decades ahead.

INTRODUCTION

The twenty-first century is marked by rising environmental pressures, escalating demand for natural resources, global supply chain disruptions, and intensifying climate change effects. In this context, the circular economy has emerged as a central framework for restructuring economic systems. Rather than relying on the traditional linear model—take, make, consume, dispose—the circular economy promotes regeneration, repair, reuse, remanufacturing, and closed-loop material flows. The growing recognition that natural resources are finite, and that waste streams represent

valuable secondary raw materials, has placed circularity at the forefront of sustainable development and industrial modernization[1].

Over the last decade, circularity has expanded beyond the domain of environmental management. Governments, multinational corporations, urban authorities, financial institutions, and civil society actors increasingly adopt circular principles to address ecological constraints, enhance resilience, stimulate innovation, and strengthen economic competitiveness. Circular models are now applied to digital transformation, bioeconomy, construction, energy systems, urban metabolism, agriculture, and mobility. These developments demonstrate that circularity is not merely a technical or ecological adjustment — it represents a structural reconfiguration of economic organization and a shift in value creation logic.

This paper offers a comprehensive and academically rigorous analysis of how the circular economy is conquering new areas. It provides theoretical grounding, explores global policy trajectories, investigates socio-economic effects, and outlines future scenarios that highlight the transformative potential of circular practices. The research aims to contribute to scholarly debates and policy discussions by presenting a holistic and multilayered understanding of circular transformation.

THEORETICAL FOUNDATIONS OF THE CIRCULAR ECONOMY

The circular economy integrates concepts from ecological economics, industrial ecology, systems theory, regenerative design, biomimicry, and cradle-to-cradle principles. Together, these traditions form a multidisciplinary foundation that allows circularity to be viewed not just as an environmental initiative but as a paradigm shift in economic reasoning.

Ecological economics forms the basis for understanding biophysical limits. It argues that economic systems operate within the boundaries of ecosystems, which provide finite stocks of materials and limited capacity for absorbing waste. Industrial ecology expands this view by analyzing material and energy flows, emphasizing that industrial systems must emulate natural cycles in which waste becomes input for other processes.

Cradle-to-cradle design promotes products that can continuously circulate through biological or technical cycles without degrading quality. Biomimicry introduces design approaches inspired by natural systems, emphasizing efficiency and regeneration. Systems theory explains how feedback loops, interdependencies, and adaptive mechanisms shape complex socio-economic and ecological systems.

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The synthesis of these approaches positions the circular economy as a systemic transformation—shifting from throughput maximization to resource stewardship, from product ownership to service-based consumption, and from waste generation to regenerative material cycles.

RESEARCH METHODOLOGY

Due to the specificity of the topic, the paper mainly uses analytical, comparative, scientific abstract, historical and logical, as well as systemic research methods. Thus, the analysis method examines the features of the manifestation of individual facts and principles of the chain economy model in different countries, and the combination method examines the model as a whole and its role in coordinating economic development and environmental protection. Through scientific abstraction, individual non-essential relationships between economic entities are excluded, and the observation of several objective features is emphasized. From this point of view, special attention is paid to the multiple use of production resources in the conditions of a circular model, the use of green technologies with zero waste and minimal emissions. At the same time, the observation of the ratio of additional investment costs and their compensation at each stage was summarized, choosing the maximum output with minimum mineral resources as the objective function.

The use of historical and logical methods was of great importance for this research. In particular, the historical method was applied to examine the linear dynamics of the economy.

THE SHIFT FROM LINEAR TO CIRCULAR VALUE SYSTEMS

The traditional linear model faces structural limitations rooted in resource scarcity, pollution, and economic inefficiency. Rapid urbanization, growing middle classes, and expanding industrial output have intensified resource extraction to unprecedented levels. According to the International Resource Panel [2], global material extraction has tripled since 1970 and could double again by 2050. This trajectory is incompatible with global ecological boundaries.

Circular value systems reduce dependency on virgin resources by optimizing material use, extending product lifespans, and recovering high-value materials at end-of-life stages. Circularity also creates feedback loops between production and consumption, enabling the recirculation of materials within economic systems and reducing externalities such as waste and emissions.

Climate change further reinforces the need for circularity: nearly half of greenhouse gas emissions are related to material production, consumption, and disposal. Therefore, circular strategies — such as reuse, repair, recycling, material substitution, and modular design-are essential components of global climate mitigation frameworks.

Circular transformation also supports economic resilience. Countries and firms with closed-loop material systems become less vulnerable to supply chain disruptions, geopolitical risks, and commodity price volatility. These dynamics make circularity a strategic priority not only for environmental sustainability but also for industrial policy, national security, and competitiveness.

CIRCULAR ECONOMY ENTERING NEW AREAS

The expansion of circularity into new domains reflects technological innovation, evolving consumption patterns, policy advancements, and shifting economic logic. Today, circular practices influence sectors that have traditionally been considered linear.

Below are the key domains where circular expansion is most prominent:

Digital technologies—artificial intelligence (AI), the Internet of Things (IoT), blockchain, machine learning, and digital twins—enable advanced optimization of resource flows. Sensors and IoT platforms monitor product

[1] Bressanelli, 2018
[2] Nordic Council, 2020

performance, predict maintenance needs, and track materials across entire supply chains. Blockchain enhances transparency and traceability, supporting responsible sourcing and circular loops in electronics, textiles, and food production[1].

Digital twins simulate product life cycles, enabling designers to reduce waste, optimize materials, and improve durability. Data analytics supports circular decision-making at both firm and system levels.

CIRCULARITY IN THE BIO ECONOMY AND REGENERATIVE AGRICULTURE

One of the most dynamic areas where circularity is expanding is the bio economy. The bioeconomy includes renewable biological resources, bioproducts, bioenergy, biochemicals, and regenerative agricultural practices. Unlike fossil-based production, bio-based circular systems regenerate natural capital while simultaneously producing economic value. Countries such as Finland, Denmark, the Netherlands, and Canada incorporate bio-based circularity into long-term national strategies, emphasizing innovation, resource efficiency, and ecosystem restoration[2].

Regenerative agriculture, as an integral pillar of circularity, focuses on improving soil health, enhancing biodiversity, and increasing carbon sequestration. Practices such as cover cropping, crop rotation, agroforestry, composting, and reduced tillage help restore natural cycles of nutrients, water, and organic matter. Rather than relying on synthetic external inputs, regenerative systems create self-sustaining nutrient loops that lower costs and increase resilience to climate variability.

Circular agri-food value chains play a critical role in reducing food losses and diverting organic waste from landfills. Byproducts such as grain husks, fruit residues, and dairy waste can be converted into fertilizers, biofuels, animal feed, enzymes, and bio-based plastics. These processes close loops within agricultural systems, reducing pressure on ecosystems and improving economic sustainability. Numerous studies show that circular agricultural models enhance productivity while reducing environmental externalities[3].

URBAN CIRCULAR ECONOMY AND METROPOLITAN METABOLISM

Urban areas consume more than 70% of global resources and generate the majority of waste and emissions. Therefore, cities have become laboratories for circular innovation. The concept of urban metabolism analyzes flows of materials, water, energy, construction inputs, and food within cities. This analytical framework helps policymakers identify inefficiencies and redesign systems to minimize waste and enhance resource recovery.

Amsterdam was one of the first cities to adopt a systemic circular strategy, focusing on construction, manufacturing, food flows, and consumer goods. Paris, Barcelona, Glasgow, and Ljubljana have implemented circular urban plans prioritizing repair centers, reuse markets, municipal composting systems, shared mobility, green procurement, and zero-waste districts[4].

Circular construction is especially important in metropolitan metabolism. Buildings contain large quantities of steel, concrete, glass, wood, and other materials that can be reused or recycled at the end-of-life stage. Material passports, modular building components, and design-for-disassembly methods help ensure that materials remain in circulation. Cities that adopt these models significantly reduce their environmental footprint while generating new jobs in deconstruction, sorting, recycling, and remanufacturing.

Urban circularity is also expanding in mobility systems. Shared bicycles, electric car-sharing services, micro-mobility platforms, and smart public transport reduce dependency on private vehicles and lower material demand. In addition, circular textile hubs, repair cafés, and reuse cooperatives encourage behavioral shifts toward more sustainable lifestyles.

[3] Popp et al., 2017
[4] European Commission, 2021

CIRCULARITY IN GLOBAL VALUE CHAINS AND INDUSTRIAL COMPETITIVENESS

Circular economy principles are reshaping international value chains by redefining product design, transport logistics, material sourcing, and end-of-life management. Companies that adopt circular strategies become more resilient to supply shocks, regulatory pressures, and resource price volatility. Circular design enhances competitiveness by improving durability, facilitating repair, and enabling modular upgrades.

In the automotive industry, manufacturers increasingly incorporate remanufactured engines, modular battery components, and recyclable plastics. Electric vehicle batteries are designed for second-life applications, such as stationary energy-storage systems. In the electronics sector, producers like Fair phone and Dell integrate modularity and reparability to reduce resource use and limit e-waste generation.

Packaging industries are transitioning toward biodegradable materials, refillable systems, and reusable container logistics. In the textile sector, major brands experiment with fiber-to-fiber recycling, repair services, and take-back schemes. These shifts indicate that circular innovation strengthens industrial competitiveness by reducing input costs, increasing product longevity, and meeting rising consumer and regulatory expectations.

Circular supply chains also reduce dependency on imported raw materials. The European Union estimates that circular strategies can decrease reliance on critical materials by up to 30% by 2030[5]. This contributes to geopolitical resilience and strategic autonomy—key motivations for governments investing in circular innovation.

CIRCULAR FINANCE AND SUSTAINABILITY-LINKED INVESTMENT

Global financial markets increasingly recognize the circular economy as a strategic investment domain. Green bonds, sustainability-linked loans, and ESG (Environmental, Social, Governance) investment frameworks channel capital toward circular projects. The European Taxonomy on Sustainable Activities includes circularity criteria, enabling financial institutions to classify and prioritize circular investments[6].

Circular finance supports projects such as:

- recycling and material recovery facilities,
- eco-industrial parks and industrial symbiosis networks,
- digital traceability platforms (e.g., block chain-based systems),
- repair and refurbishment centers,
- bio-based material production plants,
- sustainable construction and green infrastructure.

Financial actors increasingly evaluate companies based on circular performance indicators such as recycled content, repair rates, reverse logistics capacity, modular design, and life-cycle carbon reduction. As investors prioritize long-term value and risk mitigation, circular business models become more attractive.

Some countries experiment with innovative financial instruments, such as:

- circular venture capital funds,
- circular accelerators,
- resource efficiency grants,
- tax credits for recycled materials,
- blended financing for SMEs.

These instruments reduce the cost barriers that often prevent firms — especially small and medium-sized enterprises — from adopting circular technologies. As a result, circular finance is becoming a central driver of large-scale circular transformation.

CIRCULAR ECONOMY AND SOCIAL INCLUSION

Circularity generates not only environmental and economic co-benefits, but also social ones. Community-based reuse centers, repair cafés, and sharing

[5] EU Commission, 2022
[6] European Commission, 2022

platforms support social cohesion and provide accessible, low-cost services. Circular jobs — particularly in repair, maintenance, recycling, quality sorting, and community initiatives — offer employment opportunities for individuals with diverse educational backgrounds.

In developing economies, integrating informal waste pickers into formal circular systems enhances livelihoods, improves working conditions, and ensures more efficient material recovery. Inclusive circular models emphasize:

- gender equality,
- youth engagement,
- vocational training for vulnerable groups,
- fair prices for reusable goods,
- mechanisms to prevent green gentrification (where sustainable practices raise living costs).

Social inclusion strengthens the legitimacy of circular policies and accelerates cultural acceptance.

GLOBAL POLICY ARCHITECTURES AND COMPARATIVE CIRCULAR MODELS

Circular transformation unfolds differently across world regions depending on institutional capacity, regulatory frameworks, levels of industrialization, and strategic national priorities. Comparative analysis reveals three major global circular governance models: The European Union's regulatory leadership model, China's state-coordinated industrial modernization model, and the United States' market-driven corporate innovation model. Emerging economies form a fourth hybrid cluster where circularity is shaped by development constraints, rapid urbanization, and informal sector integration.

THE EUROPEAN UNION'S SYSTEMIC AND REGULATORY MODEL

The European Union is widely recognized as the global leader in circular economy policy. The EU Circular Economy Action Plan (2020) is one of the most comprehensive frameworks to date. It emphasizes durable, repairable, and recyclable product design; strict waste prevention measures; extended producer responsibility across multiple sectors; and sustainability requirements for electronics, textiles, plastics, packaging, construction, and mobility.

The EU's approach is systemic: it integrates circularity into industrial strategy, climate policy, consumer protection, green finance, regional development, and digital transformation. Member states are required to harmonize waste legislation, adopt national circular action plans, and implement eco-design standards. This ensures regulatory consistency across the Single Market and enables large-scale diffusion of circular innovation.

Northern and Western European countries—particularly the Netherlands, Finland, Denmark, Sweden, Germany, Belgium, and France—are among the most advanced. They adopt circular construction regulations, green procurement requirements, and advanced recycling technologies. Finland's strategy emphasizes bio-based circularity; Denmark focuses on waste-to-resource systems; the Netherlands prioritizes construction material cycles and product passport systems.

The EU model demonstrates that strong regulation, long-term strategy, and coordinated governance can accelerate circular transformation across large economic areas.

CHINA'S INDUSTRIAL MODERNIZATION MODEL

China's circular transformation is rooted in industrial modernization, environmental protection, and economic restructuring objectives. While the European Union prioritizes consumer rights and eco-design rules, China emphasizes large-scale industrial infrastructure, eco-industrial parks, and green manufacturing zones.

China's Circular Economy Promotion Law (2009) institutionalized circularity within the national legal framework. Subsequent Five-Year Plans expanded investment into:

- industrial symbiosis networks,

- smart waste management systems,
- closed-loop manufacturing parks,
- large-scale recycling centers,
- renewable energy integration,
- high-tech material recovery processes.

China is also a world leader in recycling rare earth elements used in electronics, magnets, and clean technologies. Its circular policies strengthen competitiveness in strategic sectors such as photovoltaics, batteries, and electric vehicles. China's approach—centralized, infrastructure-driven, and scale-oriented—contrasts with Europe's normative and regulatory system, illustrating that circularity can follow diverse pathways

THE UNITED STATES: MARKET-DRIVEN CIRCULAR INNOVATION

The United States lacks a unified national circular economy policy, yet it leads in technological innovation and private-sector initiatives. Corporations such as Apple, Google, Microsoft, Dell, Patagonia, and Walmart voluntarily adopt circular strategies driven by consumer demand, ESG performance criteria, and competitive advantage. These firms invest heavily in:

- modular product design,
- recycling robotics,
- AI-based sorting systems,
- repair programs and take-back schemes,
- renewable materials research.

State-level initiatives in California, Oregon, Washington, and New York complement corporate efforts by introducing extended producer responsibility laws, recycled content mandates, and circular procurement standards.

The U.S. model demonstrates that circular transformation can emerge through market mechanisms when supported by technological leadership, innovation culture, and consumer awareness.

CIRCULARITY IN EMERGING ECONOMIES AND THE GLOBAL SOUTH

Circular strategies in developing economies often respond to urban overcrowding, informal waste streams, resource scarcity, and community-driven innovation. Informal waste pickers perform essential environmental services and recover large volumes of materials that would otherwise be landfilled. Integrating these workers into formal circular systems improves livelihoods, enhances working conditions, and increases material recovery efficiency.

India promotes circularity through digital waste marketplaces, plastic reuse centers, and city-level zero-waste initiatives. South Africa focuses on eco-industrial parks and job creation in recycling sectors. Brazil and Colombia encourage circular entrepreneurship and community-based repair networks. Rwanda and Kenya pioneer bans on single-use plastics, positioning themselves as continental leaders in circular transition.

Emerging economies illustrate that circularity can function both as a development tool and as a climate resilience strategy.

According to the analysis of the study results, on average, about 700 thousand tons of straw are produced from grain and legume crops in Armenia annually. If we assume that approximately half of it is utilized as fodder and silage, then about 350 thousand tons of straw and silage can be used for energy purposes. If we also take into account the residues and other biological wastes from technical and fodder crops, as well as part of the manure obtained in the manure period, then at least 1 million tons of pellets and briquettes can be produced (UNDP, Conceptual Assessment of Biomass Energy Use Prospects in Armenia (Lori, Tavush and Shirak), 2017). A significant part of the mentioned waste is currently simply dumped or burned, contributing to the increase in greenhouse gases, the pulverization of the topsoil, environmental pollution, disruption of the ecological system of the environment, and the activation of numerous dangerous effects. In countries with developed horticulture and viticulture, pruning has long been mechanized. Moreover, the cut branches are not burned for "barbecue" or other purposes, but are crushed using the same pruning unit and mixed into the soil between the rows of the garden as fertilizer.

In Armenia, farmers are well-known for biohumus, which is obtained from manure and organic waste. Clean biohumus obtained from the processing of organic waste using Californian red worms promotes waste-free production. In addition, it serves as a raw material for the production of organic fertilizers, which, due to their rich nutrient composition, improve soil properties, increase crop yields, and promote their healthy growth and development (https://orwaco.am). Currently, an attempt is being made to introduce a waste sorting system in large cities of Armenia, which is the first important step in waste recycling. If various types of buckets, flower pots, and other household items are made by recycling household solid waste, particularly plastic and plastic residues, then high-quality organic fertilizers are obtained as a result of the recycling of organic waste. Hydroponic greenhouses, which have recently been intensively established in Armenia, and aquaponic and aeroponic technologies, which are still being introduced, also operate on the principle of a circular economy. In hydroponic greenhouses, plants receive all the necessary nutrients by dissolving fertilizing salts in water. The use of nutrient solutions allows for improved plant growth, economical use of production resources, and waste reduction. In addition, measures to combat diseases and pests are also implemented more effectively. The aquaponic system is based on innovative and resource-saving technologies for cultivating agricultural crops. In a closed greenhouse, water is used instead of soil, which is enriched with the excrement of fish bred nearby. The circular chain is as follows: water from a pond filled with carp is supplied to the greenhouse. The cultivated plants take the fish excrement from the water as fertilizer, and the purified water flows back to the fish farm. Currently, similar greenhouses operate in Armavir, Ararat, Gegharkunik, and other regions. Conclusion Thus, the organization of production in the agrarian sector using a circular method provides not only additional economic output, but also limits the volume of production waste and emissions, which is an important factor in reducing the risks of environmental pollution and climate change. Following the experience of developed countries, in order to promote the introduction of circular economy structures, establish certain privileges and prevent exceeding waste norms, it is necessary to adopt a Law on the Promotion of the Circular Economy, relevant sub-legislative acts, and a circular economy development program. Although separate provisions related to the circular economy are included in the laws on the

environment, subsoil and natural resources, as well as in other legal acts, it is still necessary to adopt a law generalizing them. As a best example, it can be noted that China adopted and implemented the Law on the Circular Economy in 2008. Similar legal acts have also been adopted by the USA, Canada and EU countries, and among the post-Soviet countries, Ukraine and Belarus are most interested in this regard.

The importance of the circular economy is emphasized in various sectors of the Armenian economy. This was evidenced by the fact that on June 25, 2025, the first international forum on the topic of the circular economy was held in Dilijan, bringing together more than a hundred industry players and more than 150 representatives of the Impact Hub Network from 40 countries around the world.

The event was organized within the framework of the "CirculUP!" Capacity Building and Awareness Raising for the Publicization of the Circular Economy in Armenia" project, funded by the Delegation of the European Union to Armenia.

It was emphasized that today 90% of the waste generated in Armenia ends up in landfills or waste collection sites. This leads to a waste of resources and harm to the environment and human health. Therefore, an attempt is being made to introduce the best practices operating in the European Union in Armenia. "In general, the circular economy has been introduced in the EU since 2015, and since then we have been able to accumulate certain examples of best practices that have allowed us to see how resources can be saved, how economic benefits can be obtained, while creating new jobs and employment. That is why it is very important that the circular economy is also introduced in Armenia," said Zuzanna Sorocinova, representative of the EU Delegation to Armenia[7].

At a thematic panel discussion held within the framework of the forum, leading representatives of the sector from government, business, international partners and the expert community presented their vision and touched upon the changes that are necessary for the development, integration and more effective use of the internal potential of the circular economy in Armenia.

"This is not just a conference. This is a turning point," says Tatyana Glad, Executive Director of Impact Hub Network, "Armenia is showing what it means to move beyond pilot projects and create real ecosystems, where

[7] https://abnews.am/post/2606-9

policymakers, entrepreneurs, investors and citizens jointly create long-term solutions."

This large-scale event was also an effective platform for presenting the successes of businesses operating in our country with a circular economy model and for building strong international cooperation. During the forum, a showcase of businesses operating in a circular economy model was held, where organizations that received financial support within the framework of the "CirculUP!" program presented their innovative circular solutions and models.

More than 100 startups, SMEs and civil society organizations received expert training on the circular economy within the framework of the "CirculUP!" program. More than two dozen business companies and CSOs have received grants of more than 500,000 euros to promote circular approaches and introduce circular tools in business.

"CirculUP!" also contributes to the formation of sectoral policy by cooperating with state institutions through the Armenian Circular Economy Coalition (ACEC), which was formed within the framework of the program itself.

"Armenia is becoming a regional leader in the field of circular economy and social innovations. The forum is a unique opportunity for people interested in this field in Armenia to establish international contacts, share local experience and implement joint projects with foreign partners.

The forum also officially presented for the first time the "Problem-Based Ecosystem Building Methodology" developed by the global Impact Hub Network, which is designed to solve complex problems through inclusivity and collaboration.

"In Armenia, agriculture, tourism, and textiles are the areas in which we see the most opportunities for circular economy investment today," summarizes Gevorg Poghosyan, Executive Director of Impact Hub Yerevan.

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ՇՐՋԱԿԱ ՄԻՋԱՎԱՅՐ ԵՎ ԿԼԻՄԱՅԻ ՓՈՓՈԽՈՒԹՅՈՒՆ

ՇՐՋԱՆԱՁԵՎ ՏՆՏԵՍՈՒԹՅՈՒՆԸ ՆՈՐ ՈԼՈՐՏՆԵՐ Է ՆՎԱՃՈՒՄ

Շրջանաձև տնտեսությունը, որը նիշային բնապահպանական ռազմավարությունից արագորեն վերաճել է համապարփակ զարգացման մոդելի, ազդում է ժամանակակից հասարակության բազմաթիվ ոլորտների վրա: Այն, ինչ սկսվել է որպես թափոնների կրճատման և վերամշակման գործընթաց, այժմ ներառում է արդյունաբերական վերափոխումը, թվային նորարարությունը, քաղաքային կառավարումը, կայուն ֆինանսները, կենսատնտեսությունը, վերականգնողական գյուղատնտեսությունը, աշխատաշուկաները և երկարաժամկետ քաղաքականության ճարտարապետությունը: Այս հոդվածում ներկայացվում է շրջանաձև տնտեսության՝ դեպի նոր ոլորտներ ընդլայնվելու վերաբերյալ լիարժեք, խոր ակադեմիական վերլուծություն. համադրվում են տեսական հիմքերը, գնահատվում է համաշխարհային փորձը, նույնականացվում են տնտեսական և քաղաքական շարժիչ ուժերը և ուսումնասիրվում առաջացող հնարավորություններն ու մարտահրավերները: Ինտեգրատիվ վերլուծությամբ ուսումնասիրությունը ցույց է տալիս, որ շրջանաձևությունը ոչ միայն էկոլոգիական մոդել է, այլև դիմացկուն, մրցունակ և ապագային ուղղված տնտեսական զարգացման նախագիծ: Եզրակացություններում ընդգծվում են այն ռազմավարական ուղղություններն ու քաղաքական լուծումները, որոնք անհրաժեշտ են առաջիկա տասնամյակներում շրջանաձև համակարգերն առաջ մղելու համար:

Հիմնաբառեր. *գծային մոդել, ռեսուրսախնայողական, շրջանաձև տնտեսություն, թափոններ, վերաօգտագործում, շրջակա միջավայր*

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ОКРУЖАЮЩАЯ СРЕДА И ИЗМЕНЕНИЕ КЛИМАТА

ЦИРКУЛЯРНАЯ ЭКОНОМИКА ОХВАТЫВАЕТ НОВЫЕ ОБЛАСТИ

Циркулярная экономика быстро превратилась из узкоспециализированной экологической стратегии в комплексную модель развития, влияющую на многие сферы современного общества. То, что начиналось как основа для сокращения отходов и переработки, теперь охватывает промышленную трансформацию, цифровые инновации, городское управление, устойчивое финансирование, биоэкономику, регенеративное сельское хозяйство, рынки труда и долгосрочную политическую архитектуру. В данной статье представлено всестороннее, глубокое, аналитическое академическое исследование распространения циклической экономики на новые области. В ней синтезируются теоретические основы, анализируется мировая практика, выявляются экономические и политические драйверы, а также изучаются возникающие возможности и проблемы. С помощью комплексного анализа исследование показывает, что цикличность — это не только экологическая модель, но и устойчивая, конкурентоспособная и ориентированная на будущее модель экономического развития. В выводах обозначены стратегические направления и политические решения, необходимые для развития циклических систем в ближайшие десятилетия.

Ключевые слова: *линейная модель, циклическая экономика, отходы, повторное использование, окружающая среда*