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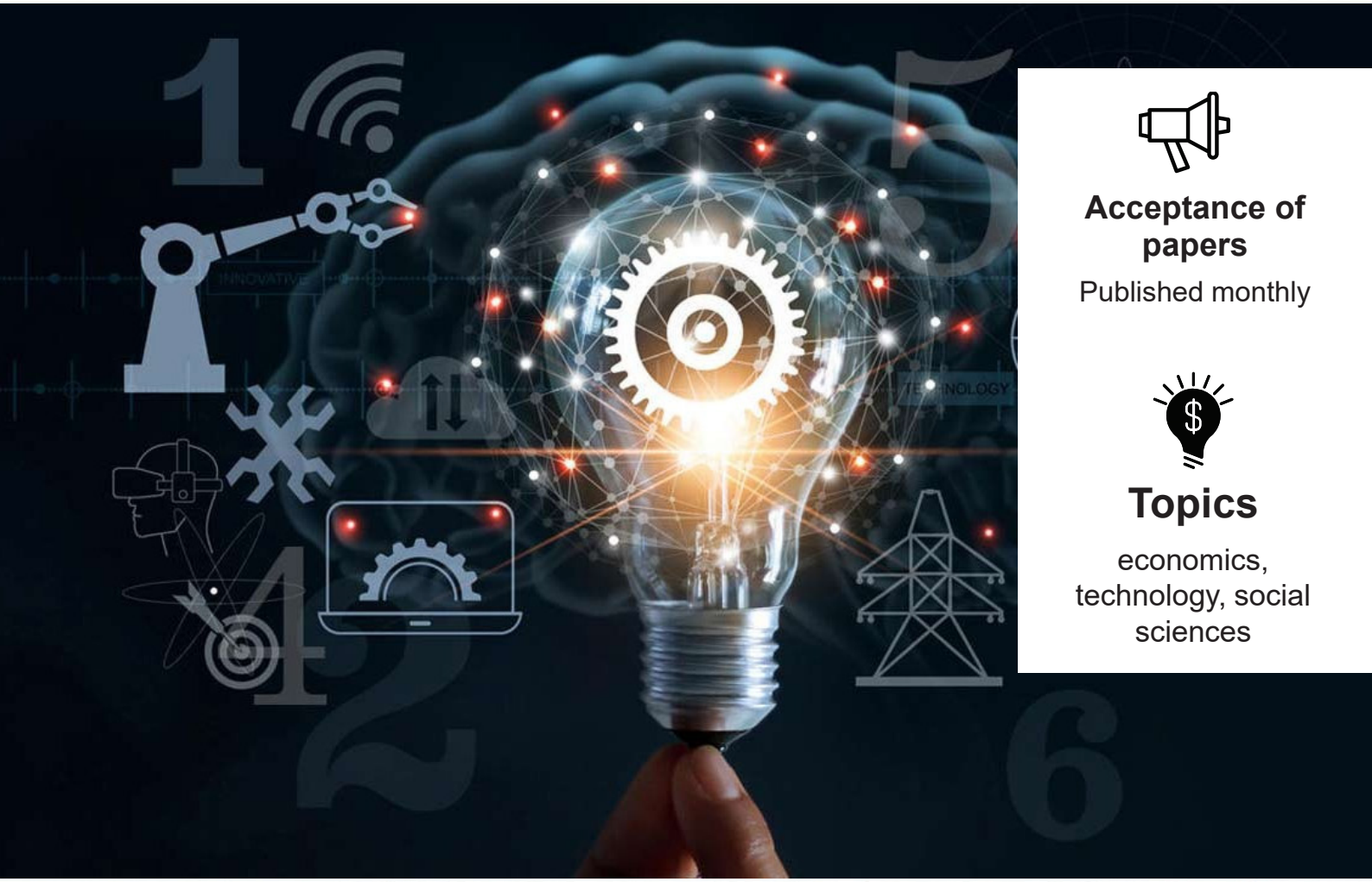

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EFFECTIVENESS OF INNOVATIONS USED IN ECOLOGICAL HOTELS

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Abstract: This article examines the global environmental challenges emerging in the early 21st century, including climate change, air pollution, soil degradation, and the loss of biodiversity, alongside the growing human concern for ecological security. It analyzes the trend of replacing destructive and anti-ecological approaches in economic activity with innovative environmental technologies in the context of ecological placement tools. The concept of ecological innovations is defined as a set of technological solutions aimed at protecting the environment from negative ecological factors.

Key words: green technologies, hospitality industry, environmental protection, social responsibility, environmental friendliness, waste recycling systems, sustainable tourism, environmental management.

INTRODUCTION

In the 21st century, the widespread adoption of green technologies in the tourism and hospitality sector in our country has become a pressing priority. The primary objective of green construction is to reduce energy and resource consumption. At the same time, it is essential to ensure a comfortable environment for guests throughout all stages of hotel operations — including engineering research, project development, construction, operation, major repairs, reconstruction, and even dismantling. In recent years, several initiatives have been launched to enhance efficiency through the integration of green technologies.

The International Hotel Environmental Initiative (IHEI) brings together the world's leading hotel companies to promote environmental and social responsibility within the industry. The main aim of this initiative is to demonstrate the practical benefits of environmental and social responsibility for businesses. To achieve this, IHEI offers hotels a comprehensive range of practical tools and programs related to sustainable development and addresses emerging issues through collaborative working groups.

Energy Star for Hospitality (http://www.energystar.gov) is a U.S.-based nonprofit organization operating under an environmental protection program. It supports businesses and individuals in reducing costs and protecting the climate by leveraging innovative technologies.

The European Union Ecolabel is a unique and comprehensive information platform that consolidates data on 463 different eco-labels from 199 countries and 25 distinct industry sectors. This system facilitates the identification of environmentally friendly products and services, empowers consumers to make sustainable choices, and encourages businesses to adopt eco-conscious practices. Beyond providing information, the platform plays a vital role in harmonizing environmental standards globally and streamlining their implementation[1].

1 http://www.ecolabelindex.com/ecolabels/

Green Globe 21 (http://greenglobe.com) is an international organization that provides environmental certification, education, consulting services, and marketing support across 83 countries, including Russia. The organization implements programs focused on environmental protection and the advancement of sustainable tourism. It promotes environmentally responsible practices among hotels, tourist facilities, and related businesses, assists them in obtaining certifications that align with international standards, and supports the development of marketing strategies aimed at attracting environmentally conscious customers.

REVIEW OF LITERATURE ON THE SUBJECT

The goal of eco-innovation is to reduce anthropogenic impacts on the ecosystem. To date, two main approaches to solving environmental problems have been formulated. The first approach is based on the fact that environmental problems can be solved by introducing ecological innovations into production. Y. Yakovets substantiated this idea as follows: “Humanity, given that the natural conditions of its existence and development can change very little, slowly changes the trends of demographic dynamics, which is the main resource that is subject to human intelligence, will and labor. This is a technological breakthrough, a transition to an eco-friendly post-industrial technological mode of production. Many scientists have dealt with the problem of classifying innovations , the most famous of which are: Y.V. Yakovets, Pavit and Walker, A. Prigozhin, G. Mensh, A. Kleinknicht, K. Freeman, etc. Analysis shows that innovations can be classified in the most general form according to their economic characteristics, scope, terms, effectiveness, sources of origin, types of innovations, etc.[2]

RESEARCH METHODOLOGY

The Green Key Award confirms that a business complies with leading environmental standards. Hotel Energy Solutions (http://www.hes-unwto.org) is a collaborative project initiated by the UN World Tourism Organization (UNWTO) in partnership with a team of leading UN and EU agencies focused on tourism and energy. The project provides advisory services, technical assistance, and training to small and medium-sized enterprises (SMEs) in the hospitality and tourism sector across the European Union, with the aim of improving building energy efficiency and promoting the use of renewable energy sources. Currently, 110 hotels from 10 different EU countries are participating in the project. As part of the initiative, energy efficiency audits of buildings have been conducted, feasibility studies for renewable energy sources have been completed, and hundreds of tourism company managers have received specialized training. This information is confirmed by ecolabelindex.com.[3]

ANALYSIS AND RESULTS

One of the most significant and notable examples of energy-saving “green” technologies is the JW Marriott Hotel in Singapore. Located adjacent to the hotel, a special canopy structure covering an area of about 3 hectares imitates the curves of ocean waves. The angles of inclination of this aluminum structure are carefully designed so that it cools the area by 1-2 degrees using natural air flow, which eliminates the need for air conditioning systems. “In addition, this structure is specially designed to collect rainwater and is equipped with solar panels that serve to illuminate the exterior of the building. The spectral glass used in the hotel reduces heat by filtering infrared rays, but at the same time allows natural light to enter. As a result, cooling costs are significantly reduced, and the interior spaces become cooler and more comfortable,” the articles say.[4]

It is also worth noting other well-known hotel facilities that have successfully implemented “green” technologies. For example, the Marina Bay Sands hotel in Singapore is equipped with an intelligent lighting, heating and water supply management system, where elevators with regenerative motors are installed, which consume 40% less energy than traditional elevators. Another notable example is the Park Royal garden hotel, where engineering solutions such as rainwater sensors, solar panels and natural landscaping are used. The principles of developing ecological systems are becoming widespread in the construction and operation of hotels not only in Russia, but also in foreign countries. This is especially confirmed by the analysis of projects based on “green” technologies, including buildings built according to the concept of zero energy consumption (Zero-Energy Building, ZEB). ZEB buildings are highly energy-efficient facilities that use renewable energy

2 Educational-methodological complex on the module «Environmental education and upbringing». Tashkent-2024.
3 http://www.green-key.org)
4 Khashimov Pazliddin Zukurovich Mirzo Ulugbek National University of Uzbekistan, Doctor of Economics, Professor Taxonomy of the Green Economy One of the factors of sustainable development of Uzbekistan Article “Green Economy - the Economy of the Future: Innovations, Investments and Prospects”. International Scientific and Practical Conference/ https://ilmiyanjumanlar.uz/files/

sources to ensure that the energy produced during the year is equal to the energy consumed. If the energy produced is less than the consumption, such a building is called «nearly zero-energy».

The architectural composition of the building under construction is based on a convex polygon in the form of a crystal. The building has 11 floors and 8 triangular faces, through which one can see the nearby historical sights of St. Petersburg. SCHUCO facades allow you to adjust the level of illumination of the office at different times of the year and day, and also provide a comfortable temperature regime inside the building.

Table 1. The main "green" technological solutions of an ecological building[5]

Technological solution	Description
High-performance glazing	The almost complete glass covering of the facade provides visual comfort and high natural light. Double-glazed windows with solar protection reduce energy consumption. Thermal conductivity resistance is 70% higher than Russian standards.
Ventilation systems	Using the heat of the exhaust air, it saves 60% of heat when heating the supply air in winter. The air flow is automatically regulated depending on the number of people. The volume of fresh air complies with Russian and ASHRAE standards.
Recuperation system	During the transition period (outdoor air ~0°C), recuperation eliminates the use of external energy resources for heating, reducing energy consumption to zero.
Modern air conditioning and fire suppression systems	Ozone-friendly refrigerants are used. The "free cooling" option uses outside air to cool the indoor air without electricity consumption during winter and transitional periods.
Automation and management system	The EBI (Enterprise Building Integrator) system automatically manages and monitors all engineering systems, ensuring efficient use of resources.

The system allows you to integrate into a common information system both the engineering equipment of the entire building and the engineering systems of the business center tenants. Accounting for energy resources is carried out separately for the entire building, for each tenant and for each power consumer.

Energy saving. Energy-efficient lamps help reduce overall electricity consumption and ease the load on air conditioning systems. In parking areas, the airflow of the ventilation system is automatically adjusted based on traffic intensity, enhancing operational efficiency.

Water saving. During winter, warm air from "dirty" zones and service rooms is reused to melt snow accumulated on the roof, allowing for a highly economical and effective use of thermal energy. The building is equipped with modern sanitary and technical infrastructure, including rooftop rainwater collection systems that provide adequate water for irrigation and environmental cleaning.

The city of Sochi has emerged as a leader in the number of "green" buildings. Thanks to infrastructure developed for the past Olympic Games, the resort city now hosts many facilities that comply with modern sustainable construction standards. One notable example is the "Big" Ice Palace, which features a structurally flexible design, allowing it to be used in multiple modes for different types of sports. Its lighting system is partially powered by solar energy, while water consumption has been significantly reduced through the use of energy-efficient technologies. Remaining resources are effectively managed through smart control systems. Both the interior and exterior finishes of the arena use only environmentally friendly materials.

In Russia, numerous organizations are engaged in scientific research on the energy supply of buildings — especially hotels. Among these are the nonprofit "Engineers of Heating, Ventilation, Air Conditioning, Heat Supply, and Building Thermophysics" (NP "AVOK"), the Big-RU Automation Association, the Association of Complex System Manufacturers "Connex", and the Association of Enterprises in the Field of Climate Technologies. Additionally, international companies such as Siemens, Delta Controls, Sauter, Property Lab, and Isilux Rus operate in the Russian market, alongside various online platforms and service organizations.

The implementation of energy-saving technologies and advanced equipment provides substantial benefits to the hotel industry. It reduces operational costs and enhances environmental responsibility. A study conducted by Interregionenergoservice, Russia's largest energy management company, revealed that nearly all office buildings and commercial centers could cut electricity bills by at least 30 percent through energy efficiency measures — a strategy equally applicable to hotel complexes. Investments aimed at reducing energy

5 A.P. Kovalchuk. Doctor of Economics, Associate Professor of the Faculty of Industry, Tourism and Sport REU. G.V. Plekhanova, "Zelenye" technology and industry gostepriimstva

consumption can yield annual returns of 60 to 100 percent. Specifically, upgrading heating, ventilation, and air conditioning (HVAC) systems can lower utility expenses by 40–60 percent.

Since 2010, the Green Key program has been operating as an international voluntary certification system for hotels, business centers, hostels, boarding houses, recreational areas, and children's camps. Developed by the International Organization for Environmental Education, the program promotes the adoption of sustainable construction principles. For example, Green Key-certified hotels must meet more than 90 mandatory and voluntary criteria, including reduced electricity, water, and chemical use; waste minimization; and proper recycling. Each property undergoes an on-site inspection by program experts. Certified hotels strictly adhere to environmental standards, demonstrate a responsible business approach, and make a tangible contribution to both local and global environmental protection.

Participation in this program — similar in philosophy to the Active House concept — requires the use of specific green technologies. In Russia, the number of Green Key-certified hotels remains limited. Most belong to the Radisson chain (particularly the Park Inn brand), along with Nogay in Kazan, Meridian in Samara, Rakurs in Ulyanovsk, Vatan in Sochi, and properties under the Cronwell and Sokos brands.[6]

Although eco-hotels are still a relatively new trend in the country, the industry is expanding rapidly. Many tourists — especially international travelers — are willing to pay more to support environmentally responsible tourism. As a result, global organizations and national hotel certification systems based on environmental standards are becoming increasingly widespread and popular.[7]

CONCLUSION AND SUGGESTIONS

Over the past decade, the hotel business has undergone a huge transformation due to the development of digital technologies. Automation of hotel operations, online booking, gadgets, electronic menus, cable TV, wireless Internet, ecological distribution and supply of light and energy, online check-in, digital keys, robotics and many other technologies are being introduced. The hotel business actively uses and benefits from digital transformation by optimizing costs and improving hotel processes, improving the quality of service, increasing the flow of potential customers and improving the economic performance of this industry. Technological innovations in the service, hospitality and tourism sectors are becoming an important source of development and growth. In this sense, the development and implementation of technological innovations is fully becoming a strategic weapon for hotel chains and independent hoteliers.

Experts believe that there is currently a high potential for the digitalization of business in general and the hotel industry in particular. Let's look at the popular areas of development of digital technologies in the hospitality industry. Digital solutions in the hospitality industry optimize the work of hotel enterprises by replacing employees with gadgetized services and devices. The digital transformation of business is underway, which allows hotel enterprises to develop and implement market-oriented and even personalized offers. Currently, hotel applications for guests track the location of the guest near the hotel and send notifications about the readiness of the room directly to the guests' mobile phones ; conversations with hotel staff are relevant when unusual requests and questions arise that cannot be answered by the hotel website or application. Consumer trends include the development of voice assistant services and virtual companions designed to help tourists, potential and actual customers of the hospitality industry, solve urgent problems in a virtual form.[8]

List of used literature:

1. D.I. Abidova. O'zbekistonda ekologik mehmonxonalar faoliyatini yuritish metodologiyasini takomillashtirish. Monografiya. – T.: Ilm-fan va Innovatsiya, 2023-yil. – 100 b.
2. D.I. Abidova, A.A. Abdullaxo'jayev. Environmental Certification as a Way to Increase the Competitiveness of Hotels. American Journal of Education and Evaluation Studies, Vol. 2, No. 1, Jan. 2025. E-ISSN: 2997-9439. https://semantjournals.org/index.php/AJEES
3. Бокарева А.Р., Давыдкова М.А. Тенденции перехода гостиничных предприятий на экологические и ресурсосберегающие источники. Вестник ассоциации вузов туризма и сервиса. Экономика и бизнес. – ФГБОУ ВО «РГУТиС», Москва, 2020 г.
4. O.X. Xamidov. O'zbekistonda ekologik turizmni rivojlantirishni boshqarish mexanizmini takomillashtirish. (DSc dissertatsiyasi avtoreferati). – T.: 2017-yil.

6 A.P. Kovalchuk. Doctor of Economics, Associate Professor of the Faculty of Industry, Tourism and Sport REU. G.V. Plekhanova, "Zelenye" technology and industry gostepriimstva

7 Khan A.D. napravlenie "Hostinichnoe delo" DGTU g. Rostov-na-Donu I spolzovanie eco-technological and industry gostepriimstva . f orum molodyx uchenyx 12(64) 2021

8 Sh. Abdusaidova. Innovation and sustainable hospitality business . International University of Tourism and Cultural Heritage «Shyolkovy put» Journal of marketing, business and management(jmbm)/sjif factor: 5.57 www.jmbm.uz volume 2, issue 2 (may) isn: 2181-3000 page 224

5. Emerson Javier Jácome-Mogro, Pablo Morales, Cristian Jiménez-Jácome, D.I. Abidova. Development of Neutrosophic Cognitive Maps (NCM) for the Evaluation and Ranking of the Main Causes of the Appearance of Fruit Fly Pests. International Journal of Neutrosophic Sciences, Vol. 25, No. 1, pp. 485–494, 2025. (Scopus)
6. М.Т. Алиева, Д.И. Абидова. Управление окружающей средой в туризме. Учебник. – Т.: Инновацион ривожланиш нашриёт-манбаа уйи, 2022 й. – 304 бет.
7. Д. Абидова, А. Абдуллаходжаев ва бошқалар. Региональный туризм в Самарканде, анализ проведений экскурсий и его перспективы развития. Yashil iqtisodiyot va taraqqiyot, 2025-yil, yanvar, № 1-son.
8. www.cont.org
9. www.interunion.ru
10. www.tag-group.com
11. www.e-tours.ru
12. https://www.evkova.org/kursovye-raboty/issledovanie-opyita-primeneniya-ekologicheskih-innovatsij-na-primere-gostinichnogo-predpriyatiya
13. https://uz.traasgpu.com/2018-yilgi-eng-yaxshi-ekologik-sayyohlik-mehmonxonalari

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