May 21, 2025

COLLECTION OF ABSTRACTS

SCIENTIFIC AND EXPERT CONFERENCE

DIGITALIZATION IN THE GREEN ECONOMY

INTERA
technology park

The Foundation for Innovation and Technological Development (INTERA Technology Park), under the patronage of the Federal Ministry of Education and Science, is organizing on May 21, 2025, in Mostar, a scientific-professional conference entitled Digitalization in the Green Economy.

Digitalization, as the process of applying digital technologies across various sectors of society, represents a key tool in the transformation towards sustainable development. In the context of the green economy, it enables more efficient resource management, reduction of harmful gas emissions, improvement of transparency, and data-driven decision-making. By integrating technologies such as artificial intelligence, distributed systems, BIM, and smart grids, new business and management models are created that focus on ecological responsibility and an energy-sustainable future. This is especially significant for local communities in Bosnia and Herzegovina, which through digitalization and green transition processes can identify opportunities for greater independence, more comprehensive engagement of their own resources, and alignment with European standards of quality governance.

So far, insufficient attention has been given in Bosnia and Herzegovina to this growing technological sector, despite the significant potential of such technologies and their direct applicability within the business processes of Bosnian-Herzegovinian economic entities. The Federal Ministry of Education and Science aims, through this and many other programs, to encourage and support all those who recognize opportunities to realize their own creative visions by connecting the three key components of development: research, innovation, and technology.

This conference is envisioned as a starting point for knowledge exchange, linking scientific research results with the interests of entrepreneurs, and laying the foundation for new visions, policies, and initiatives that will contribute to energy transition, environmental protection, and sustainable development. At the same time, the conference provides space for the presentation and public dissemination of scientific results aligned with priority areas, with particular emphasis on the integration of renewable energy sources, sustainable development of local communities through models such as electric vehicles, smart grids, and innovations within institutional frameworks that support the transition leading to sustainable development.

CONTENT

THE CONCEPT OF SMART CITY AS A GREEN ECONOMY STRATEGY: CASE STUDY OF THE CITY OF SARAJEVO

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Many cities in the world are using the concept of smart city as a new strategy and approach to urban planning to improve the quality of life of their citizens, ensure sustainable development and continuous economic growth. Smart cities use different technology and digital solutions in everyday processes to solve social and urban problems and make life in cities easier through various areas of application. Numerous challenges that Sarajevo is facing like air pollution, traffic congestion, non-transparent administration, waste management, etc. could be solved with the implementation of the concept of smart city. However, for a city to become smart, it needs significant preparation, utilization of diversified resources and a large number of people involved. Achieving this goal requires a good foundation of knowledge about the available opportunities and obstacles that may be encountered along the way. Therefore, the main goal of this paper is to explore what are the opportunities and constraints for the development of smart city projects in Sarajevo from the perspective of the key stakeholders; to examine to what extent this concept is known to them; how the decisionmaking process flows; and how city marketing approach can help Sarajevo in becoming a smart city. This paper aims to provide a significant contribution to fill the gap in the knowledge and existing literature on this topic in Bosnia and Herzegovina. Research has been conducted to provide insights and guidelines for smart city implementation for the purpose of improving life of Sarajevo's citizens, attracting new investors, and offering tourists' better experience. Hence, exploratory qualitative research was used in the form of semi-structured in-depth interviews. Participants in this research were people of interest related to the subject matter. They have been organized in four groups: international organizations, IT industry, academic community and local government. These four groups represent main stakeholders in the development of smart city projects. All research participants have already been involved in smart city projects. Despite the most commonly mentioned issues of complex bureaucratic procedures, unclear division of responsibilities and jurisdiction among municipalities, city and canton, absence of unified strategy, it can be concluded that Sarajevo holds a potential to be branded as a smart city. The findings suggest that change should start from the local government by taking a more proactive role, improving inter-institutional collaboration and inter-municipal coordination, addressing pressing urban issues, and ensuring transparent communication with citizens. These changes should be explained in a unified city marketing strategy that would focus on long-term positioning of Sarajevo as a smart city. This paper provides recommendations for all relevant stakeholders involved in the process of creation of smart city projects and city marketing. In addition, it provides a good foundation for future research in this area since there is a scarce number of academic papers from Bosnia and Herzegovina published on the topics of smart city and city marketing.

Keywords: smart cities, digital technology, sustainable development

DIGITAL SUPPORT IN PHARMACEUTICAL WASTE MANAGEMENT: DEVELOPMENT OF AN APPLICATION FOR TRACKING AND PROPER DISPOSAL OF MEDICATIONS FROM HOME PHARMACIES

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Pharmaceutical waste from home pharmacies, such as expired medications, should be disposed of properly to prevent harm to the environment and health. According to international guidelines, like those of the World Health Organization (WHO), proper disposal of pharmaceutical waste is essential for environmental and health protection. Active substances from medications can infiltrate soil, rivers, and lakes, leading to pollution and potentially forming hazardous compounds. These substances may linger in drinking water and seep into natural aquatic systems, impacting aquatic organisms and animals. Studies have shown that pharmaceutical agents can have cumulative effects on microorganisms exposed to contaminated water. Improper disposal of medications poses a serious challenge to the environment and public awareness, but launching educational campaigns could be a significant step toward addressing this issue. Research involved a survey with 505 respondents, which revealed that 68.3% of participants dispose of such waste in communal trash. The study proposes developing a mobile application, "e-Apoteka," as a digital solution for efficient home pharmacy management and disposal of expired medications. The app allows medication entry through API integration, QR codes, photographs (OCR), and manual input, and it automatically notifies users about medication expiration dates. Additionally, it includes an interactive map, inspired by the GoGreen application, to show safe pharmaceutical waste disposal locations. The app's development leverages modern technologies such as React Native, Firebase, OCR libraries, and the Google Maps API.

Keywords: pharmaceutical waste disposal, digital support.

BIOMATERIALS AND BIODEVICES AS DRIVERS OF PROGRESS IN ROBOTICS: DEVELOPMENT OF INTELLIGENT, FLEXIBLE AND ENVIRONMENTALLY SUSTAINABLE ROBOTIC SYSTEMS

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In the last ten years, the development of robotics has increasingly relied on biomaterials and biodevices to create intelligent, flexible and environmentally sustainable robotic systems. Traditional robots, which are mostly made of metal and plastic, face limitations in terms of adaptability, energy efficiency and interaction with the environment. The introduction of biomaterials, such as biodegradable polymers, hydrogels and bioinspired composites, enables the construction of robots that are softer, lighter and more adaptable to different environments. Biodevices, including bioelectronic sensors, actuator systems based on biological principles and neural interfaces, play a key role in improving the functionality of robots. These devices enable robots to perceive and react to changes in the environment, which gives them greater autonomy and interactivity. The integration of biological components into robotic systems not only improves their efficiency, but also reduces the ecological footprint, because biomaterials often offer the possibility of decomposition and recycling. Biomimetic approaches, inspired by organisms from nature, open up new possibilities for creating robots with the ability to self-heal, regenerate and adapt to extreme conditions. The application of these innovations is already being investigated in medical robotics, soft robots, industrial automation and space exploration. In this paper, we explore the potential of biomaterials and biodevices in robotics, analyzing the latest achievements, advantages and challenges in their application. Through the analysis of innovative solutions, the paper highlights how these technologies can transform the future of robotics and enable the development of sustainable, intelligent and adaptable robotic systems.

Keywords: biomaterials, biodevices, intelligent robots, ecological sustainability, flexible robotic systems

TECHNOLOGY-ENRICHED AGRIFOOD SYSTEMS – NEW AND EMERGING SOLUTIONS FOR CURRENT SYSTEM STRUGGLE

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Agri-food systems encompass a range of multifaceted activities and actors involved in getting food from the farm to the fork, including agricultural production, processing, distribution, consumption, and waste management. These activities integrate economic, social, and environmental dimensions, shaping how food and non-food agricultural products reach consumers. Their contributions to achieving food security, economic development, improving livelihoods, resilience, and social well-being are well documented. But, current agri-food systems are seen as inefficient, causing (i) major environmental degradation due to the unsustainable practices that exacerbate climate change, have (ii) negative health impacts with prevalence of processed foods, high in sugars, unhealthy fats, and additives, leading to rising rates of obesity, diabetes, and heart disease, resulting in (iii) social and economic inequalities i.e. food scarcity and malnutrition, overconsumption and waste, (iv) food insecurity and vulnerability i.e. food price inflation, supply chain breakdowns, (v) cultural and traditional loss i.e. loss of biodiversity and cultural identify, loss of societal resilience. This conceptual paper is built on literature review and case-study selection by offering insights into the „new" technology-enriched agri-food systems, one that are successfully dealing with problems mentioned above, by implementing new paradigms, new roles of actors in distributed physical – digital – social eco systems, systems that are constructed collaboratively and promote responsible research and innovation. Such systems are centered around the science–policy–society triangle, reflecting a people, mindset, cross-operation, and cross-collaboration approach. This modified ecosystem can effectively and adaptively address societal challenges, simultaneously promoting human well-being, biodiversity benefits, and a "guardian" role in sustainable development.

Keywords: technology-enriched, "guardian" role, agri-food system, transformation, participatory process, innovation, change, sustainable development

DIGITALIZATION AS A CATALYST FOR HYBRID ENERGY SYSTEMS IN POSITIVE ENERGY DISTRICTS

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This paper presents the concept of hybrid energy systems based on renewable energy sources as a key element in the development of Positive Energy Districts (PEDs). It examines the role of hybrid systems that combine solar photovoltaic panels, heat pumps, and energy storage, supported by the use of SCADA systems, the Internet of Things (IoT), and machine learning algorithms to improve the efficiency and flexibility of energy networks. Special attention is given to the practical implementation through a case study conducted on the building of the Faculty of Mechanical Engineering at the "Džemal Bijedić" University of Mostar, where a hybrid energy system was installed to enhance the building's energy self-sufficiency and its contribution to creating a Positive Energy District within the university campus. The paper concludes that the digitalization and flexibility offered by hybrid energy systems are essential factors in overcoming the challenges of the energy transition, and that university campuses can serve as models for future sustainable energy communities.

Keywords: hybrid energy systems, renewable energy sources, positive energy districts, digitalization

DIGITAL TECHNOLOGIES AS A DRIVER OF GREEN TRANSITION: AN INTERNATIONAL ECONOMIC PERSPECTIVE OF SUSTAINABLE DEVELOPMENT

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In the context of increasingly pronounced global challenges related to climate change and the growing emphasis on sustainable development, the green transition is becoming an imperative of international economic policy. Digital technologies in the modern era represent a key tool for achieving sustainable development goals and they are a crucial mechanism for accelerating the green transition of countries. Climate change requires urgent measures, and digital technologies offer concrete solutions for reducing emissions and using resources more efficiently. Through the application of advanced digital solutions such as the Internet of Things (IoT), artificial intelligence (AI), blockchain, and big data analytics, countries around the world are trying to optimize resource use, reduce carbon emissions, transform industrial processes into more environmentally friendly ones, and encourage a circular economy. The aim of this paper is to explore how digitalization contributes to the green transition from an international economic perspective by analyzing the strategies, policies and challenges faced by developed and developing countries. Specifically, this paper seeks to explore the role of digital technologies as a key driver of the green transition from a global economic standpoint. Through a theoretical framework, programs, and examples of good practices from developed countries, developing countries, and the private sector, it is shown how digital innovations contribute to energy efficiency, resource optimization, and the reduction of harmful gas emissions. Special emphasis is placed on challenges such as the digital divide, the energy footprint of digital infrastructure, and the sustainability of digital devices production. Studying thethese issues can help creat international policies that link technological development with sustainable development goals. In addition, a better understanding of these issue is important for both developed and developing countries, as it allows access to clean technologies and helps reduce energy poverty. It is concluded that for a successful digital green transition, integrated policies are necessary - those that link technological progress, environmental sustainability, and social inclusiveness. Digital technologies, if properly directed, have the potential to become one of the main pillars of a sustainable international economy.

Keywords: digital technologies, green transition, sustainable development, international economy, climate change, energy efficiency

BIM IN CONSTRUCTION INDUSTRY

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The construction industry is one of the biggest factors in every country's economy, but it's also one of the main contributors to the global warming with an example of cement industry being responsible for 8% of the total CO_2 emission on the planet. Of course, it's not expected that BIM solves all of these problems, but it can help reduce them in the initial stages of the project. BIM (Building Information Modelling) is in it's core – an information. Therefore, it is vital for our world's sake that the information (BIM) is formed, treated and shared in a right way so that we can be on the sustainability side of things and leading a correct approach to this form of digitalization in green economy.

Keywords: construction industry, BIM, ecology, information, sustainability

FUSION OF ARTIFICIAL INTELLIGENCE AND OPTIMIZATION MODELS FOR ENHANCING ENERGY EFFICIENCY IN SMART FACTORIES

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The increasing demand for sustainable industrial practices paired with high energy costs has prompted manufacturers to seek innovative solutions for optimizing energy consumption without compromising productivity. This paper presents an integrated approach combining artificial intelligence (AI) and mathematical optimization techniques to enhance energy efficiency in smart factory environments. Smart factories offer a unique opportunity to leverage real-time data, connected devices, and intelligent algorithms to dynamically manage and reduce energy usage across various production processes. The proposed methodology involves the use of AI models, particularly machine learning models, for accurate prediction of energy demand, production load, and missing dana estimation. These predictive insights serve as inputs to mixed integer optimization model (MILP) that generates energy-efficient operational schedules, machine allocation plans, and load-balancing strategies. By integrating AI-driven forecasting with constraint-based optimization, the system is capable of making automated, data-driven decisions that minimize energy waste and peak demand or optimize carbon credits. Results demonstrate notable improvements, including a 15–30% reduction in energy costs for medium sized smart factory. This work contributes to the growing body of knowledge on digital energy management in industrial settings by illustrating the benefits that combination of AI and optimization frameworks bring.

Keywords: smart factories, artificial intelligence (AI), energy efficiency, machine learning

THE LOCAL FUND OF OUCOMMES AS AN EFFICIENT INSTRUMENT FOR THE IMPLEMENTATION OF THE GROWTH PLAN IN THE WESTERN BALKANS

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After the Russian invasion of Ukraine in 2022, which marked the emergence of an unstable geopolitical order, the importance of the Western Balkans region became even more pronounced for the European Union, which adopted the Growth Plan for the Western Balkans on November 8, 2023. This ambitious plan aims to accelerate the region's socio-economic rapprochement with the EU and pave the way for EU membership. The plan is supported by an increase in financial assistance through the new Instrument for Reforms and Growth, which entered into force on 25 May 2024. The instrument will complement the current financial assistance under the Instrument for Pre-Accession Assistance (IPA III). The instrument has a financial scope of EUR 6 billion, including EUR 2 billion in grants and EUR 4 billion in highly concessional loans. At least half of the total amount (grants and loans) will go to investments through the Western Balkans Investment Framework (WBIF). The remaining amount of loans will be allocated to the treasuries of the Western Balkan governments in order to accelerate growth based on socio-economic reforms. Part of the financial resources planned for placement by the WBIF can be effectively placed in local investment funds that are designed as PPP models, and from which profits are paid out based on results, so we can freely call them Funds of Outcomes. Results can arise from investments in energy efficiency measures - energy renovation of buildings, installation of solar panels or heat pumps, digitalization of public administration or SMEs, creation of new value chains, etc. In these funds, profits are paid out among shareholders according to the achieved performance and the financial role of shareholders in the process of achieving a certain result. The advantage of these Funds is that they can provide investments in various sectors such as energy, digitalization (public administration and SMEs), tourism, agriculture, etc. Their basic function is to increase the creditworthiness of LGUs, whose current debt is limited to 10% of the annual budget, and they can have a very good effect in terms of the efficiency of public administration, where the principles of New Public Management are introduced through entrepreneurial spirit.

Bosnia and Herzegovina, as well as other countries of the Western Balkans, do not have the issue of financing the decarbonization process secured. Although in Bosnia and Herzegovina, UNDP made significant efforts to establish a Strategic Investment Fund through the "Framework for Financing Sustainable Development Goals", which was supposed to finance the decarbonization process, it was reduced to a pilot project with an investment potential of 160 million KM due to the misunderstanding and negligence of the authorities. As a result of this misunderstanding and negligence, Bosnia and Herzegovina is threatened with losing its energy sovereignty due to the existence of an investment gap of 8.4 billion KM, which we can overcome by attracting private funds from citizens and entrepreneurs. If we do not overcome the mentioned investment gap, foreign investors could appear on the BiH market who would build energy facilities based on our resources, and BiH citizens and entrepreneurs would pay for the energy from the aforementioned facilities at high market prices. In such circumstances, the standard of living of the citizens, as well as the economy, will be threatened.

If they are conceived in the above-mentioned way, the Effect Funds can play a significant role in financing the decarbonization process because they will ensure the attraction of private capital, but also the easier establishment of a Strategic Investment Fund that will give the best effects in the process of decarbonization in terms of innovation and digitization-led economic growth

The paper will present other possibilities that the Fund can realize in the process of decarbonization, namely: financing of energy communities and prosumers, digitalization of the distribution network and provision of flexibility services to local distribution companies and CSOs.

From the foregoing, we can conclude that the mentioned Funds can stimulate the reform of the energy sector, digitization, but also the reform of public administration, and thus achieve certain conditions for efficient local development, which is one of the goals of the Growth Plan

Keywords: effect funds, decarbonization, Western Balkans, energy efficiency, private investments

APPLICATION OF LARGE LANGUAGE MODELS IN SMART CITY MANAGEMENT

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Generative artificial intelligence (AI) and large language models (LLMs) are revolutionizing smart city management by enabling advanced digitalization and sustainable solutions within the green economy.

LLM models utilize data from various sources-sensors, citizen reports, and historical patterns-to generate predictive and personalized solutions. By integrating IoT sensors into waste bins, real-time monitoring of fill levels is enabled, while the LLM analyzes the collected data and proposes optimal waste collection routes. This reduces fuel consumption, CO_2 emissions, and operational costs.

In addition to optimizing logistics, LLM models facilitate direct communication with citizens through chatbots, providing personalized recycling advice, education, and rapid responses to reported issues. This approach encourages greater citizen participation and the development of environmental awareness.

Implementing these technologies requires careful planning, including privacy protection, algorithm transparency, and compliance with local legislation. The development of digital twins of the city is recommended to simulate various scenarios and assess impacts before actual implementation.

Examples from other cities such as Barcelona, Singapore, and Helsinki demonstrate that applying generative AI and LLM models can significantly improve sustainability and quality of life in urban environments. Mostar, by implementing such solutions, has the opportunity to become a regional leader in digitalization and the green transition.

The key to success lies in collaboration between local authorities, citizens, and international partners, along with continuous monitoring and adaptation of the system to new challenges and technological possibilities. Generative AI and LLM models provide the foundation for smarter, more efficient, and more sustainable cities of the future.

In the context of Mostar, a hypothetical application using an LLM model for waste management has been presented, demonstrating potential for process optimization, cost reduction, enhanced data transparency, real-time insights, and increased environmental efficiency.

Keywords: generative artificial intelligence, large language models (LLM), smart cities, green transition, waste management

APPLICATION OF ARTIFICIAL INTELLIGENCE AND COMPUTER VISION TO IDENTIFY MAJOR LIGHT POLLUTANTS BASED ON NIGHTTIME IMAGES OF AN URBAN AREA

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Light pollution is a growing environmental, health and astronomical problem, especially in densely populated regions. The development of artificial intelligence (AI) and computer vision has led to an increased use of these tools in identifying large sources of light pollution in urban areas based on nighttime satellite or aerial images. Using advanced deep learning techniques, such as convolutional neural networks (CNN), it is possible to analyze visual lighting patterns and precisely locate the main sources of excessive lighting – such as industrial plants, commercial buildings, sports fields and transport infrastructure. The paper discusses the processing and training of models on datasets, the evaluation of recognition accuracy, and the potential of applying these technologies in adopting urban and environmental measures. This approach contributes to a better understanding of the spatial distribution of light pollution and enables the development of strategies for its reduction.

Keywords: Artificial Intelligence, Computer Vision, Light Pollution, Urban Areas

FIRST ELECTRICAL OVEN WITH ELECTRICALLY HEATING TAB SYSTEM (THERMAL AFTER BURNER) AT MANN+HUMMEL BA

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Energy efficiency in industry is evaluated by the specific energy consumption per unit mass of the product or per unit mass that is the target of a specific technological operation. Increasing energy efficiency in industry leads to a reduction in energy consumption, and at the same time to a reduction in the negative impact of technological and energy plants on the environment. A series of appropriate measures, which include modern technical solutions, can influence this reduction, and thus improve energy efficiency. Considering the requirements in the automotive industry related to CO_2 neutrality and the continuous application of energy efficient measures, implementation is necessary. The defined measures and action plan at the MANN+HUMMEL BA filter factory will be presented in this paper. In particular, the first electric oven with an electric afterburner system will be presented. Curing filter paper is the basic process in the production of filters. When curing paper (most often cellulose papers with a high content of resin and moisture), combustion products are produced. In this modern oven, the combustion products are addition-ally exposed to high temperatures in the afterburner system so that the level of waste/harmful particles released into the air is within legal limits, all with the aim of protecting the environment. Testing the curing process, analysis of exhaust gas measurements, as well as the concept of the ovens operation itself will be presented. Instead of classic gas burners for additional combustion, electric heaters are used here. A comparative analysis of the technological parameters of the oven and the results of exhaust gases will be presented. Types of electricity savings, as well as a comparative analysis of the operation of electric and gas ovens.

Keywords: energy efficiency, industrial processes, electric furnace, afterburner system, reduction of CO_2 emissions

APPLICATION OF MATHEMATICAL MODEL AND GREEN'S ALGORITHM IN OPTIMIZATION OF GREEN LOGISTICS CHAINS

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Determining routes in networks is one of the most frequently considered optimization problems in graph theory. In the context of the growing need for sustainable business, the optimization of green logistics chains through the application of graph theory focusing on reducing CO_2 emissions, fuel consumption and other negative environmental impacts is becoming one of the problems of great importance. Through the application of graphs as a model for analyzing connections between different points in the supply chain, it is possible to identify optimal routes, minimize transportation costs and reduce emissions of harmful gases. The paper will present the application of Green's algorithm in optimizing the road network in Bosnia and Herzegovina, as a method for identifying minimal transportation costs and reducing emissions within logistics systems. Green's algorithm, as a method for finding a minimum spanning tree in graphs, is used to model road infrastructure as a network of nodes and branches, where nodes are distribution points, while branches are transport routes between them. The goal is to minimize total costs including fuel and CO_2 emissions through the selection of optimal transportation routes, taking into account various factors such as traffic congestion, road quality and distances. Implementation of this algorithm on the road network in BiH can contribute to significantly improving the efficiency of logistics operations, reducing pollution and increasing sustainability.

Keywords: Optimization, Green's algorithm, Logistics Chains, CO_2 emissions

MATHEMATICAL MODELING OF PMSG GENERATOR FOR APPLICATION IN WIND ENERGY SYSTEMS

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In the context of the global energy transition towards sustainable solutions, renewable energy sources play a key role in achieving the goals of green digitalization and reducing carbon dioxide emissions. The integration of smart technologies and digital control systems with renewable energy sources such as wind power requires reliable and efficient models for converting wind energy into electrical energy that can be delivered to consumers. This paper provides a detailed explanation of the mathematical model of a Permanent Magnet Synchronous Generator (PMSG), with a particular focus on its application in modern wind energy systems. The aim of the study is to develop an accurate mathematical model that enables an understanding of the dynamic behavior of the PMSG under varying input conditions characteristic of wind energy. All key components of the model are considered, including the mechanical and electrical dynamics of the system. Special attention is given to the Park and Clarke transformations, which allow the transition from a three-phase system to the d–q coordinate system, significantly simplifying the analysis and control of the PMSG. Using these transformations, mathematical equations are derived to describe the voltage and current relations in the stator, as well as the electromagnetic torque. This mathematical model provides insight into the relationship between the variable mechanical input (wind speed) and the stable electrical output, which is essential for efficient integration into power grids. The proposed model forms a foundation for further simulation, stability analysis, and the development of control strategies for wind energy systems based on PMSG generators.

Keywords: Permanent Magnet Synchronous Generator (PMSG), Wind energy system, Mathematical modeling, Renewable energy sources, Park transformation, Clarke transformation, Green digitalization

INTEGRATION OF COMPOSITE SIMPSON'S RULE FOR MPPT ESTIMATION IN PV SYSTEMS FOR GREEN TRANSITION APPLICATION

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The transition to sustainable and green energy systems increasingly relies on the integration of intelligent digital methods that increase the efficiency of renewable technologies. In this paper is proposed a digital approach to estimate the maximum power point (MPP) of photovoltaic (PV) systems using composite Simpson's rule, a numerical integration technique, under different irradiance conditions while maintaining a constant temperature.

The proposed method for estimating MPPT in PV systems approximates the power-voltage P-V curve of a PV panel and determines the point at which maximum power is delivered. By simulating multiple sun irradiance scenarios while maintaining a constant temperature, it is demonstrated how the proposed method can be effectively applied to support MPPT without the need for complex real-time hardware. The proposed method is implemented in Python, offering a simple, fast, and energy-efficient estimation technique. This approach contributes to the digitalization of energy systems and aligns with the goals of green transition and sustainable development.

Keywords: Photovoltaic systems, Green economy, Renewable Energy Sources, Maximum Power Point Tracking (MPPT), Composite Simpson's rule, Numerical integration, Energy Optimization

PITCH ANGLE OPTIMIZATION OF WIND TURBINES USING THE NEWTON-RAPHSON METHOD

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The transition to renewable energy sources is one of the most important and active global activities aimed at reducing harmful gas emissions, increasing energy independence, and preserving the environment. As a result, new technologies and optimization methods for renewable energy-based systems are being intensively developed. One of the key systems being mass-installed in all regions of the world with favorable meteorological conditions is wind turbines, i.e., energy systems that harness wind energy. The physical basis of optimizing the blade pitch angle of a wind turbine lies in the efficient utilization of the wind's kinetic energy, whose velocity directly affects the power the turbine can generate, with the rotational motion of the blades converting kinetic energy into mechanical, and subsequently into electrical energy.

This paper presents a method for optimizing the pitch angle of wind turbine blades using the Newton-Raphson numerical method. The goal of the research is to determine the optimal pitch angle that allows for maximizing or maintaining the wind turbine power production at the nominal level, depending on wind speed, rotor speed, and other operational parameters. Based on known input values such as wind speed, air density, rotor diameter, and power coefficient, a mathematical model of the system is developed. The Newton-Raphson method is used to quickly and efficiently determine the pitch angle at which the turbine reaches the desired power level. The chosen numerical method is suitable for this problem because it converges in just a few iterations, with both the function and its derivative being analytically known.

Graphical analysis of the relationship between generated power and pitch angle is implemented in the MATLAB. The proposed method shows high efficiency and accuracy and can be applied in the optimization of wind turbine operations in real-world conditions and in the design of advanced control algorithms for wind energy systems.

Keywords: Pitch angle, Blade pitch angle, Wind turbines, Renewable energy sources, Energy systems, Newton-Raphson method, Numerical methods

APPLICATION OF MECHATRONICS IN THE DESIGN AND IMPLEMENTATION OF AN IRRIGATION SYSTEM

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Irrigation represents a key factor in the successful cultivation of agricultural crops, with the optimal water dosage depending on a range of complex variables, including crop type, soil characteristics, specifics of the irrigation system, and the availability of water resources. Traditional irrigation approaches often face challenges in achieving precise control and efficiency, highlighting the need for the integration of advanced technologies. This paper presents the development of an automated irrigation system based on mechatronic principles, aiming to optimize the process and increase productivity. The core of the system is a Programmable Logic Controller (PLC), which serves as the central control unit. Interacting with environmental monitoring sensors, the PLC makes decisions about activating actuators, ensuring precise and adaptive irrigation. The implementation of such a system enables more efficient use of water resources, cost reduction, and yield improvement, making it a crucial tool in modern irrigation systems.

Keywords: mechatronics, automation, automatic irrigation, programmable logic controllers, control

THE IMPORTANCE AND ROLE OF TELECOM OPERATORS FOR THE DEVELOPMENT OF SMART AGRICULTURE PRODUCTS AND SERVICES

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Smart agriculture, smart farms and solutions in this segment in general, are the future of the agricultural business segment. The Internet of Things (IoT) and other advanced technologies will be a key part of this entire process. Smart agriculture is one of the TOP 5 business segments for IoT applications along with smart cities, smart homes, industrial applications and smart healthcare. Telecom operators, system integrators, application developers and many other companies from different business segments have great opportunities for business growth in the era of the Fourth Industrial Revolution. The creativity of all these companies and partnerships with agricultural farms will enable the creation of new revenues and new business opportunities in this value chain. This paper will analyze the current state of application of advanced technologies in smart agriculture in the world and will present a review of potential opportunities for the introduction of such applications and processes in Bosnia and Herzegovina. Emphasis will be placed on telecom operators and their role in the development of smart agriculture in Bosnia and Herzegovina.

Keywords: smart agriculture, Internet of Things, cloud solutions, ICT, telecom operators

OPTIMIZATION OF IRRIGATION MANAGEMENT USING ARTIFICIAL INTELLIGENCE: CORRELATION OF ATMOSPHERIC CONDITIONS AND SOIL MOISTURE USING MACHINE LEARNING

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This study aimed to develop an Artificial Neural Network (ANN) model to optimize irrigation systems by correlating soil moisture sensor data with weather station data. We collected data from soil moisture sensors and weather stations for one month and used the ANN model to demonstrate the dependency of soil moisture on external weather factors. The Principal Component Analysis (PCA) method yielded the best performance, indicating that the ANN model can accurately predict soil moisture levels based on weather information. Our research demonstrates the potential of using an AI-driven irrigation system to reduce human labor costs and regulate water consumption to align with environmental conditions, contributing to more sustainable and efficient agricultural practices.

Keywords: Artificial Neural Network, Soil moisture, Irrigation optimization

POTENTIAL OF PHYTOCHEMICALS IN THE DIGITAL TRANSFORMATION OF THE GREEN ECONOMY

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Phytochemicals, naturally occurring bioactive compounds in plants, are gaining increasing importance in the food industry due to their numerous beneficial health effects. In the context of global sustainability challenges, the efficient extraction and application of phytochemicals represent a key strategy for the valorization of agricultural and industrial by-products, thereby actively contributing to the development of a circular and green economy. The introduction of digitalization, including the use of sensors, artificial intelligence, and big data analytics, opens new opportunities for optimizing the utilization of natural resources, monitoring plant growth conditions, and accurately determining optimal stages for the extraction of bioactive compounds. These technological solutions not only enhance the quality and yield of phytochemicals but also reduce the need for synthetic additives and pesticides, aligning production processes with the principles of green chemistry and sustainable development. Furthermore, the valorization of food industry by-products through phytochemical extraction enables waste reduction and supports the transition toward more sustainable production models. The synergy between sustainability goals, digital technologies, and biological resources is shaping a new paradigm in the food industry—one that promotes healthier products, reduces environmental footprints, and strengthens the resilience of food systems in the face of global changes.

Keywords: phytochemicals, sustainability, digitalization, food industry, food by-products, green economy

INTEGRATION OF ESG PRINCIPLES INTO THE REGULATORY FRAMEWORK FOR MANAGING CLIMATE AND ENVIRONMENTAL RISKS IN BOSNIA AND HERZEGOVINA

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Climate change and environmental risks are becoming an increasingly significant challenge for global financial systems, making the integration of Environmental, Social, and Governance (ESG) principles into regulatory frameworks crucial. Bosnia and Herzegovina, as a signatory of international climate agreements, recognizes the vital role of the financial sector in supporting the transition to a sustainable economy. In this context, the challenge lies in aligning the domestic regulatory framework with international standards. The Banking Agency of the Federation of BiH is developing a regulatory framework for managing ESG risks, aligning it with EU guidelines, including the EU Taxonomy and CRR/CRD regulations, which provide the foundation for sustainable business practices and responsible risk management.

While the responsible entities are increasingly aware of climate and environmental risks, progress in managing these risks remains slow. Key challenges include the lack of adequate tools, capacities, and awareness. The regulatory framework in BiH is being shaped in line with the European Banking Authority (EBA) guidelines, with a particular focus on the obligation to report on climate risks. Additionally, the EU's sustainable finance strategy encourages the integration of ESG principles into business processes to achieve higher sustainability standards.

Digitalization is emerging as a key tool for more effective management of climate and environmental risks. Initiatives such as the BIS's GAIA project demonstrate the potential of advanced technologies, such as Artificial Intelligence (AI) and blockchain, to automate the extraction of climate indicators, track green financial instruments, and enhance reporting transparency. These technologies enable precise data analysis and improved risk forecasting, contributing to proactive risk management and mitigating adverse impacts.

In BiH, the application of ESG standards and digital tools, such as virtual exposure units and process automation, facilitates better monitoring, reporting, and risk reduction. Although challenges such as the lack of technical capacities and specialized education exist, the proactive integration of ESG principles contributes to the reduction of non-financial risks and enhances the resilience of the financial sector. Rapid digitalization and the use of advanced analytical tools open new possibilities for managing climate and environmental risks, improving efficiency and transparency, as well as increasing market trust in sustainable financial products.

Keywords: ESG principles, climate and environmental risks, regulatory framework, sustainable finance, digitalization, GAIA project, Artificial Intelligence (AI), blockchain, climate indicators, green financial instruments, monitoring climate risks, ESG standards, process automation, technical capacities, proactive integration of ESG principles, financial sector resilience, sustainable financial products.

GREEN SUPPLY CHAINS: OPPORTUNITIES AND CHALLENGES IN THE APPLICATION OF DIGITAL TECHNOLOGIES

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Evolving from traditional through sustainable and closed-loop supply chains to green, from an operations management perspective, the supply chain has reflected the growing importance of environmental thinking in the stages of product design, input procurement, product manufacturing and delivery, and end-of-life management. Taking environmental concerns into account, whether motivated by a certain type of constraint due to the growth of regulations in the area under consideration or by expected benefits, brings entire supply chains into a context characterized by new nuances of complexity. In order for green supply chains to successfully navigate environments where new stakeholder demands are present and to be characterized, among other things, by supply chain visibility (SCV) and resilience, the question of applying digital technologies and tools such as the Internet of Things (IoT), blockchain technologies, cloud computing, autonomous vehicles, big data analytics, additive manufacturing, etc. inevitably arises. Taking into account the above, the purpose of the paper is to present, based on the systematization of findings from academic and professional literature, opportunities and challenges in the application of digital technologies in the context of greening supply chains, accepting that supply chains by their very nature include activities that can negatively impact the environment. The expected contribution of the paper is threefold. In the academic aspect, it contributes to the discussion on green topics in the economy and business of Bosnia and Herzegovina. In the practical aspect, it introduces economic actors in Bosnia and Herzegovina to green solutions applied in other economic environments. Finally, through the presentation of green regulations relevant to supply chains, it contributes to the policy-making processes in Bosnia and Herzegovina, especially in the context of the country's aspirations for EU membership.

Keywords: green supply chains, application of digital technologies, supply chain resilience, supply chain visibility, green supply chain performance

EINVOICING AS A TOOL FOR DECARBONISING ACCOUNTING PROCESSES IN THE B2B SECTOR

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In contemporary business environments, digital transformation represents a pivotal aspect of strategic development, both at the level of individual enterprises and within the broader economic and institutional framework. The alignment of business practices with the principles of sustainable development necessitates a reduction in operational costs, process rationalisation, and the minimisation of environmental impact. In this context, electronic invoicing (eInvoicing) in business-to-business (B2B) transactions is gaining increasing prominence as a mechanism through which greater efficiency can be achieved while simultaneously advancing the objectives of a green economy.

This paper examines the importance of systemic implementation of eInvoicing at the national level as a means of decarbonising accounting processes. It considers the regulatory requirements defined by Directive 2014/55/EU on electronic invoicing in public procurement, the comprehensive regulatory framework proposed by the European Union's VAT in the Digital Age (ViDA) initiative, as well as the technical guidelines outlined in the EN 16931 standard for electronic invoices. The EN 16931 standard, which establishes common specifications for eInvoices across the EU, provides a foundation for the harmonisation of electronic invoicing practices among member states, thereby facilitating more seamless and efficient implementation of eInvoicing systems and contributing to the reduction of both operational and environmental costs.

The introduction of eInvoicing facilitates a significant reduction in CO_2 emissions by eliminating paper-based documentation, physical transport, and archiving, thereby contributing to the overall reduction of the carbon footprint associated with the accounting function. Particular emphasis is placed on analysing the benefits that the establishment of such a system would offer to countries undergoing fiscal digitalisation and alignment with EU standards, as is the case with Bosnia and Herzegovina. Accordingly, the paper includes a comparative overview of the experiences of countries that have already implemented mandatory eInvoicing regimes. Furthermore, it summarises the findings of relevant studies that quantify the contribution of eInvoicing to the reduction of greenhouse gas emissions, as well as calculations of potential savings for the national economy.

Keywords: eInvoicing, decarbonisation of accounting processes, B2B sector, Bosnia and Herzegovina

DIGITAL TRANSFORMATION OF THE WORKPLACE AS A DRIVER OF SUSTAINABILITY AND THE GREEN ECONOMY: LESSONS FROM THE POST-PANDEMIC PERIOD

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This paper explores the impacts of digital workplace transformation on sustainability processes and the growth of the green economy in the post-pandemic era. The COVID-19 pandemic significantly accelerated the adoption of digital technologies in business, prompting traditional companies to reevaluate their operational approaches. Digital workplace transformation—through the introduction of hybrid work models, online collaboration tools, digital management systems, and business process automation—has provided numerous economic, social, and environmental benefits. This research particularly addresses the reduction of operational costs, increased productivity, enhanced work flexibility, and substantial reduction in CO_2 emissions due to decreased employee commuting. It also addresses challenges, including increased investment costs for technology, time management issues, and privacy concerns among employees. The paper offers policy recommendations to decision-makers aiming to effectively integrate digital transformation into their strategies for achieving long-term sustainable development.

Keywords: digital transformation, green economy, sustainability, digital workplace, hybrid work, change management, COVID-19 pandemic

DIGITAL INFRASTRUCTURE OF GEOLOGICAL INSTITUTES IN BOSNIA AND HERZEGOVINA AS THE FOUNDATION FOR THE GREEN ECONOMY: THE ROLE OF GEOPORTALS, DIGITAL ARCHIVES, AND METADATA CATALOGS

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In the context of contemporary digital transformation processes and the development of the green economy, geological institutes play a key role in creating a reliable and accessible database of natural resources. This paper presents the importance of establishing an integrated system encompassing a geoportal, digital archive, and metadata catalog as the foundation for efficient management of geological data, including geological maps, data on mineral resources, hydrogeological resources, geothermal potentials, engineering-geological characteristics of terrain, etc.

The geoportal enables visualization and spatial analysis of data, the digital archive ensures the preservation and easy access to documents and records, while the metadata catalog ensures consistency, organization, and interoperability of all information. The synergy of these three elements significantly increases the accessibility and transparency of geological information, thereby improving planning and decision-making in areas such as mineral resource management, protection and utilization of hydrogeological resources, identification of geological hazards such as landslides, as well as supporting the energy transition through sustainable use of geothermal and other natural resources.

The digital infrastructure of geological institutes represents an essential tool in the planning and implementation of green economy policies, contributes to sustainable development, and strengthens institutional capacities for data-driven decision-making based on geological information.

Keywords: geoportal, digital archive, metadata, green economy, geological institutes, digitization

DIGITAL MARKETING IN THE GREEN ECONOMY SECTOR

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This paper provides an overview of selected successful digital campaigns primarily focused on promoting sustainability and the green economy. It highlights the significance and role of digital technology in spreading messages about environmental responsibility, as these technologies enable reaching a broader audience and more effectively raising awareness about the importance of sustainable practices. Promoting green values through various digital channels plays an important role in shaping consumer behavior, encouraging ecological innovations, and strengthening economic stability through green initiatives. In all these efforts, digital technology and the digital communication it facilitates are not only tools but also drivers of social change, capable of ensuring long-term sustainability and a balance between economic development and environmental protection.

Keywords: digital campaigns, sustainability, green economy, digital communication

CYBER THREATS AND THE DEFENSIVE POTENTIAL OF ARTIFICIAL INTELLIGENCE IN PROTECTING THE GREEN DIGITAL TRANSITION

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The transition to a green economy is a key step in combating climate change, reducing dependence on fossil fuels and promoting sustainable development. Global and uneven economic development, the challenges of climate change, the decline in biodiversity, and the increasing consumption of resources require a transition in the current way of working, doing business, managing, and also in education. The transition involves digitalization, or the integration of digital technologies such as smart grids, artificial intelligence (AI) and automation in the sectors of production, distribution and resource consumption. However, digitalization also carries risks. The digital infrastructure that supports the green economy – such as smart energy grids, automated water management systems and digital platforms for sustainable agriculture – is increasingly being targeted by cyberattacks. These attacks can have serious consequences, not only in terms of economic losses, but also on the safety of citizens and the stability of environmental systems. Cyberterrorism, as a specific form of digital attack motivated by ideological or political goals, is becoming an increasingly present threat. Attackers can use sophisticated methods to disrupt the functioning of green systems, destabilize infrastructure, and create distrust in sustainable technologies. Given the interconnectedness of digital and ecological systems, the consequences of such attacks can be multiple and far-reaching. In this context, artificial intelligence (AI) is emerging as a key tool for defending against threats. From big data analysis and anomaly detection to predictive security analytics and automated threat response, AI offers innovative ways to keep the digitalized green economy secure. The aim of this paper is to explore the interconnectedness of the digitalization of the green economy, the threat of cyberterrorism, and the role of AI in preventing and responding to such threats. By analyzing existing examples, trends, and technologies, the paper seeks to contribute to understanding how to protect a green future in the digital age.

Keywords: green economy, digitalization, cyber threats, artificial intelligence, cyberterrorism

APPLICATION OF DIGITALIZATION IN THE INTERNAL AUDIT PROCESS

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Significant changes in the way of doing business are the result of new and innovative information and communication technologies. In modern business conditions, one of the most significant challenges for internal auditors is certainly to incorporate new digital technologies into their work. Today, the way of doing business is based on mobile business, cloud data storage, use and analysis of large amounts of data, use of the Internet, robotics, 3D printing, use of drones, 'blockchain' technology, use of artificial intelligence, emergence of cybersecurity risks, fraud risks, etc. Modern technologies fundamentally change business models, and today it is necessary for internal auditors to follow global trends and innovations that shape this profession. In practice, this is not a simple process because it requires additional training and a change in the way of working, which is why there is often resistance from internal auditors. However, regardless of resistance, the methodology of internal audit requires the application of digitalization in the process of performing internal audit. This paper will analyze the application of digital technologies in the process of internal audit. Special focus will be placed on the use of the PIFC application used by internal auditors in Bosnia and Herzegovina. The aim is to identify the importance of the use of digitization, as well as the importance of continuous professional education of internal auditors.

Keywords: internal audit, digitization, information technology, digital transformation of business, risk management, Global Internal Audit Standards

SMART CITIES IN THE CONTEXT OF GREEN ECONOMY: WHAT DO YOUTH THINK?

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Developed countries are rapidly "creating" smart cities using advanced digital technologies, data analytics, renewable energy sources, and participatory governance. Cities like Copenhagen, Singapore, or Barcelona already implement integrated systems for smart traffic, digital energy management, public participation through applications, and the Internet of Things (IoT) in their daily services. These cities are investing in sustainable mobility, green infrastructure, and using big data for real-time decision-making.

In contrast, Bosnia and Herzegovina still faces infrastructural challenges, limited investments in the digitalization of public services, and insufficient institutional support for the development of smart solutions. Nevertheless, projects such as electric scooters, pilot projects of energy efficiency, smart lighting, and other individual attempts to introduce smart solutions show that there is interest and potential, but an integrated, systematic, planned, and strategic approach is lacking. To catch up developed countries, it is necessary to invest in infrastructure and the development of citizens' awareness and their active involvement in the digital and green transformation of urban environments.

In this process, young people play a special role - the generations that grew up with digital technologies, who naturally perceive them as assistants in everyday life, but also the generations that are left with everything - future experts, decision-makers, and users of urban solutions. However, the question arises: do young people know enough about the concept of smart cities and are they ready to actively participate in their development?

These questions served as a starting point for a survey conducted among students to examine their attitudes, level of information, and readiness to engage in initiatives related to smart cities, especially in the context of the green economy and digitalization of urban environments.

The results provide insight into the level of awareness, acceptance, and potential of young people to engage in digital-green initiatives in all environments. Furthermore, they contribute to a better understanding of the role of young people in shaping sustainable development strategies through digital innovations because their readiness to accept and develop purposeful technological solutions, as well as awareness of the importance of sustainable development, are crucial for creating smart cities that will not only be technologically advanced but also socially inclusive and environmentally responsible.

Keywords: smart cities, green economy, digital technology, students, young people

ICT AS ASSISTIVE TECHNOLOGY IN ENVIRONMENTAL EDUCATION AND TEACHING

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This paper explores the role of ICT as assistive technology in environmental education, examining how digital tools can enhance ecological awareness of children, including those with special educational needs. It also discusses the benefits, challenges, and potential of these technologies in creating an inclusive and sustainable educational environment.

Keywords: assistive technologies, environmental education, ecological awareness, digital tools, and inclusive education

DRIVING GREEN ENTREPRENEURSHIP AMONG STUDENTS: PERCEIVED BENEFITS, CHALLENGES, AND MOTIVATIONAL STRATEGIES

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This paper explores the perceptions of students regarding green entrepreneurship, focusing on their understanding of its benefits, challenges, and the factors that motivate them to engage in environmentally sustainable business practices. Through qualitative analysis using Grounded Theory, responses from 31 students were systematically examined to identify and categorize their views on green entrepreneurship. The findings reveal a robust interest in integrating environmental, social, and economic factors into business practices, with a strong emphasis on the need for educational initiatives, legislative support, and community engagement to foster green entrepreneurial ventures. This study highlights the critical role of education in shaping the future leaders of green business and underscores the importance of providing students with the tools and support necessary to undertake sustainable entrepreneurship. By identifying the perceived barriers and motivational drivers for students, this research contributes valuable insights into how educational policies and business practices can be aligned to support the emerging generation of green entrepreneurs, thus aiding in the broader transition towards sustainable development.

Keywords: Green Entrepreneurship, Student Perceptions, Sustainable Business Practices, Educational Impact, Environmental Ethics, Motivational Factors, Policy Support

INNOVATIONS IN ENVIRONMENTAL EDUCATION: THE ROLE OF DIGITAL TOOLS IN DEVELOPING ENVIRONMENTAL AWARENESS IN EARLY CHILDHOOD EDUCATION

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In the context of increasing environmental challenges and rapid digital advancement, early childhood is recognized as a critical period for developing environmental awareness and values. This review paper explores the role of digital tools in early childhood environmental education, with the aim of identifying their potential, benefits, challenges, and guidelines for effective implementation. Various digital tools—such as educational applications, digital stories and animations, interactive whiteboards, digital portfolios, and AR/VR technologies—are analyzed through the lens of their pedagogical value and their integration into daily preschool activities.

The paper emphasizes that digital tools can significantly contribute to children's understanding of environmental concepts, foster emotional connection with nature, and encourage responsible behavior, especially when combined with experiential learning and hands-on activities. At the same time, it addresses key challenges, including limited resources, technical constraints, insufficient digital competencies among educators, and ethical concerns regarding the use of technology with young children.

In conclusion, the paper proposes directions for future research and the development of locally relevant digital content that promotes sustainability. It highlights the need for a holistic approach that integrates technology, nature, and value-based education in early childhood learning environments.

Keywords: environmental education, early childhood, digital tools, educational technology, sustainable development, preschool education

THE IMPORTANCE OF DIGITAL AND INNOVATIVE TECHNOLOGIES IN THE GREEN ECONOMY

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Digital transformation refers to the integration of digital technologies to increase productivity and economic efficiency. Green transition refers to the application of relevant transition solutions to the economy, especially in the so-called green economy, which should be arranged in such a way that they are as less dependent and neutral as possible on the negative effects of the climate and the environment. Digital technologies of the green economy and research represent a significant opportunity for growth and increased productivity within the service-oriented economy, especially for the production of quality food. The same technologies are directing markets towards less dependence on physical proximity from production, sales to consumption, then in increased automation and greater investments in intangible capital. Investments in green and digital technology have the potential to significantly boost the prospects for the development of a country. Research on the green economy through the prism of digital transformation, through research primarily in Western democracies, has quickly reached research in the Balkan countries. For more than a decade, key issues in the development of the global economy and society in general have been those related to the potential of information and communication technologies, or the digitalization of the challenges of sustainable development and environmental protection today, where technology represents a key moment in achieving a balance between the development of society and the natural environment, especially in the area of the green economy in transition. The significance and role of digitalization are extremely important in the transformation of certain sectors, especially the green economy, as well as the role of digitalization in the transformation of certain areas, such as energy and food production. The European Green Plan or the Eurogreen Deal are new growth strategies in the European Union, which "aims to transform the European Union into a fair, prosperous society with a competitive economy." The European Commission presented the Green Plan to EU institutions and the public in 2019. The EU Sustainable Development Agenda contains key elements of the European Green Plan until 2030. The intention of the same Agenda is to protect EU citizens from harmful effects on the environment, which should be inclusive and fair for everyone, as stated in the European Commission's note from 2020, and with the mentioned areas that make up the so-called The European Green Deal. The European Green Digital Coalition within the pilot project of the European Parliament, was founded as a consortium to support the EGDC (European Green Digital Coalition), and to define scientifically based methods for assessing the reduction and avoidance of greenhouse gas emissions using special ICT solutions (International Coalition Transformation/Technology) in various sectors and to support green digital transformation. Led by the Global Initiative for Enabling Sustainability, the project brought together various key associations that worked with EGDC members to develop scientific methodologies. Today, the main goal of the EGDC is to maximize the benefits of digitalization for sustainability, reducing and avoiding harmful emissions of production by-products. The green economy is based on the principle of sustainability, which means that economic activities must be directed towards the long-term preservation of natural resources and reducing the negative impact on the environment. Digital technology in itself does not only contribute to the development of a green economy, but digital transformation should be a key process in which the

principles of sustainable development and the impact of digital technology on the green economy would be taken into account. The European Green Deal puts the challenge of climate change at the forefront of ensuring sustainable development, which also includes the application of digital technologies in order to introduce a green economy. The green economy and green entrepreneurship represent a sustainable path for the development of the business sector, reducing the negative impact on the environment and creating new jobs. There is a growing potential for the expansion of green entrepreneurship through innovations in agriculture, renewable energy sources, recycling and sustainable products, and for further development it is necessary to strengthen education, ensure better access to finance and improve infrastructure conditions. The green economy and entrepreneurship have a huge potential for long-term growth, which can contribute to the preservation of the environment and better economic prospects in all the countries of Southeast Europe.

Keywords: digital transformation, green economy, sustainable development, European Green Deal, digital technologies, green entrepreneurship

APPLICATION OF MATHEMATICAL MODELING AND DIGITAL TOOLS IN THE SIMULATION OF THE GREEN ECONOMY

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This paper presents a hybrid digital tool developed for the simulation and prediction of CO_2 emissions within the framework of the green economy, integrating classical mathematical modeling and artificial intelligence. The deterministic model is based on a system of differential equations describing energy consumption and CO_2 emissions as functions of time, economic growth, and the share of renewable sources. Simultaneously, a neural network (fitnet) is trained on historical data for the period 2017–2021 provided by the Agency for Statistics of Bosnia and Herzegovina.

The model was implemented in MATLAB as a functional application that allows users to select between classical and AI-based prediction models, input simulation parameters, and visualize the results through dynamic plots and export functions (Excel and PDF). The simulation covers the forecasted period from 2025 to 2030 and provides a robust framework for comparing methodologies and assessing environmental impact scenarios.

The results show a gradual decrease in CO_2 emissions in the predicted period, confirming consistency between the classical model and the neural network output. The neural model adds value through its capability to detect non-linear trends and patterns, essential for modeling complex ecological systems. This hybrid approach demonstrates high potential for educational use, policy planning, and further scientific research in the field of green transition and sustainable development.

The work concludes by emphasizing the importance of integrating digitalization and artificial intelligence into environmental strategies, particularly in emission modeling, where multidimensional variables and uncertain data require adaptable and intelligent systems for effective forecasting and decision-making.

Keywords: green economy, digitalization, mathematical modeling, MATLAB, simulation, sustainable development, smart technologies, real-time systems, energy efficiency, resource management

SUSTAINABLE FASHION AND DIGITALIZATION IN BOSNIA AND HERZEGOVINA?!

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While artificial intelligence is increasingly taking over jobs and marginalizing human labor on a global scale, in Bosnia and Herzegovina it is still predominantly used for basic tasks or entertainment purposes. The processes of digitalization remain incomplete, as if only the surface has been scratched. With digitalization come new terms such as sustainable business and green economy — concepts that, although now present in everyday communication, raise questions about whether their true meanings are genuinely understood. In order to change habits and raise awareness of our daily routines, it is essential to take the "pulse of the public." This is where research comes in — to provide answers to all the questions that seem to linger in the air. Are we truly digitalized, sustainable, and ready to live according to the principles of the green economy? To give these issues a more tangible dimension — beyond theoretical discussion — a case study approach is applied to explore various questions and answers, expose our position in the market, move away from linear business models, and shift toward circular ones. The market is a living organism, constantly evolving, and it requires not only keeping pace with trends and demand but also initiating a revolution. In order to conduct meaningful market analysis, one must be an active part of it — examining it from multiple perspectives: that of the client on one side and the entrepreneur on the other. Only then can the puzzle pieces fall into place and reveal the full picture. The author of this paper is a co-founder of the small business Soul Business Concept, which embodies the synergy of fashion, the green economy, and digitalization. Through the lens of this business, the paper will illustrate the challenges and efforts of modern entrepreneurship and the shifting of boundaries. Are the people of Bosnia and Herzegovina inclined toward traditional business models, do they prefer to remain within their comfort zones, or is there a pressing need to educate and inform the public? The answers to these questions serve as guidelines for future actions.

Keywords: digitalization, green economy, fashion industry, sustainability, circular economy