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**Article**

## Technological Challenges and Sustainable Development

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# TECHNOLOGICAL CHALLENGES AND SUSTAINABLE DEVELOPMENT

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In the contemporary context dominated by rapid technological advances, sustainable development has emerged as an essential and globally significant topic of discussion. While the undeniable benefits technology brings to everyday life, we must also confront the significant challenges it poses to sustainable development goals.

One of the major challenges we face in promoting sustainable development is the increasing dependence on the Earth's limited resources. Advanced technologies, including electronic devices and electric vehicles, generate a growing demand for natural resources. This phenomenon can lead to overexploitation of resources and significant negative environmental impacts. Addressing this challenge and finding solutions requires the development of more efficient and sustainable technologies, the promotion of advanced recycling practices, and the identification of innovative alternatives.

Paradoxically, technology can also be a significant source of solutions for promoting sustainable development. Through innovations like the Internet of Things (IoT) and Artificial Intelligence (AI), we have the opportunity to monitor and efficiently manage resources such as energy and water, thereby reducing waste and inefficiencies. Furthermore, technology can facilitate sustainable development by providing increased access to information and education in critical areas related to the environment and sustainability.

In this issue of the journal we have 12 articles on various topics of interest, as follows:

The paper “*Sustainable development of e-commerce in the post-covid times: a mixed-methods analysis of PESTLE factors*”, applies a mixed methods approach to identify the PESTLE factors affecting e-commerce in the post-COVID period. The study was conducted by developing a questionnaire for organizations using e-commerce and was applied to a sample of 309 Romanian firms. The results suggest that the pandemic has intensified the adoption of e-commerce, with businesses focusing on expanding their online presence and leveraging new technologies to enhance the customer experience.

The article “*Analysis of the impact of energy efficiency and renewable energy on greenhouse gas emissions and economic growth in EU member states*”, validates the hypothesis that energy efficiency and renewable energy production in the European Union member states effectively reduce greenhouse gas emissions while also positively influencing economic growth.

The sustainability of digital networks in the context of globalization has become a major topic of interest in contemporary academic research. In an increasingly interconnected and technology-dependent world, studying the relationship between these two aspects is essential for understanding how modern society can achieve and maintain resilience in the face of profound changes and challenges in its economic, social, and technological environment. In this context, the paper “*The sustainability of digital networks and*

*globalisation, the key to resilience?*” highlights a strong connection between the development of digital networks and innovative services, globalization, and resilience.

In the sphere of current academic research, the importance of the relationship between the tourism industry and sustainable development goals is becoming increasingly clear. The tourism industry plays a significant role in stimulating global economic growth, generating employment and income. Through the analysis of the connection between the tourism industry and the Sustainable Development Goals (SDGs) conducted in the study *“The relationship between the tourism industry and sustainable development goals – word cloud analysis”* decision-makers can identify opportunities to maximize the positive impact of tourism on the economy, including poverty reduction, promotion of social inclusion, and economic diversification.

The process of digitalization has generated a significant increase in data and connectivity across all sectors, opening up new opportunities and challenges. At the same time, individual skills are essential to harness technological potential and contribute to innovation and sustainable development. Digital skills, adaptability, technological knowledge, and problem-solving abilities are becoming increasingly important for EU citizens and the workforce. The article *“Implications of digitalization on skill needs in a sustainable economy”* investigates the links between digitalization and skills needs among digitalized enterprises, focusing on those implementing artificial intelligence solutions. The main results of this analysis indicate that digitalization leads to skills shortages and skills gaps among companies adopting different digital solutions. Additionally, the depreciation of employees' skills and the increasing skills needs at the firm level put pressure on increasing firms' investment in professional training. Furthermore, the study *“Digitalisation and skills adequacy as determinants of innovation for sustainable development in EU countries: a PLS-SEM approach”* aims to examine the extent to which the EU countries' level of digitalisation and skills adequacy impact the innovation output, as well as to determine whether the level of digitalisation can lead to an increase in the individuals' competencies and employability.

In the context of current concerns about sustainability and the environment, analyzing consumer behavior and market segmentation in the second-hand clothing industry becomes essential to understand current consumer trends and practices in the effort to promote more sustainable consumption. Thus, the study *“Towards sustainable consumption: consumer behavior and market segmentation in the second-hand clothing industry”* identifies the main factors that influence consumers to buy second-hand clothing products and to examine the profile of customers who make these purchases, focusing specifically on Romania. The analysis results highlight various consumer typologies, including consumers motivated by good value for money and the desire to contribute to a circular economy, younger consumers with lower incomes and those who occasionally buy second-hand products.

Gamification in learning is an educational strategy that uses game-specific elements to stimulate students' engagement and motivation in the learning process. It involves the use of elements such as competition, rewards, challenges, and constant feedback to transform educational content into a more appealing and captivating experience for students. Engagement and motivation are two key aspects of learning success, and gamification can play a significant role in enhancing them. When students are involved in a learning environment that offers challenges and tangible rewards, they become more inclined to actively engage and improve their academic performance. The study of these aspects in the article *“Students' engagement and motivation in gamified learning”* highlights three specific engagement factors: the first factor represents interest in new challenges; the

second factor reflects the immersion in gamified learning and satisfaction of completing; the third factor is related to students' purposes and clarity of the goals.

The intersection of digitalization and sustainable development goals in the European Union has gained significant importance as the EU seeks to address complex global challenges. Digitalization has become a key driver of societal and economic transformation worldwide, offering opportunities to enhance economic growth, increase efficiency, promote innovation, and address environmental and social challenges. By analyzing the challenges and projections related to key digitalization indicators, the article *"Analysing EU countries' digital progress towards sustainable development goals"* highlights the progress of the European Union in achieving sustainable development goals. The focus is the need for a comprehensive understanding of how digitalization can drive economic prosperity, enhance social inclusivity, and mitigate environmental impacts while aligning with the broader Sustainable Development Goals framework.

Exploring the path towards modern leadership through the lens of sustainable leadership is a current intellectual challenge. In this context, the study titled *"Towards a modern leadership: sustainable development-oriented management"* emphasizes the need to adapt leadership styles in line with the changing requirements of the current economic environment and sustainability-related challenges. The result reflects the appreciations that the employees operating in the organisational environment manifest with respect to the features of sustainability-oriented leaders, as well as to their long-run role in promoting sustainability.

Increased interest in health and the origin of food has led to a shift in consumer preferences towards organic food products, reflecting a growing environmental responsibility trend. The paper *"Organic food consumption during the COVID-19 pandemic. A bibliometric analysis and systematic review"* aim to identify the most relevant specialized articles, published during the pandemic which address sustainable consumption of organic food. The results highlight that approaches to the strategies adopted by retailers to promote the purchase of organic food require a better use of online marketing tools for development and/or strengthening a favourable mindset for this type of consumption, raising awareness about the importance of health, food safety, generating positive attitudes and perceptions, as well as understanding the need to pay a premium price for these types of foods.

The study *"Social image in the online environment – sustainable motive for book sales during the pandemic"* aims to determine whether a good-looking, interesting and attractive bookshelf used as a background on online communication platforms is a good reason to buy books during the pandemic. Through empirical analysis, it is demonstrated that the perception that the presence of books confers an intellectual look, mediated by the fact that a background with books induces an intellectual image, becomes a valid buying motive for books. Therefore, the study has significant implications for shaping the future book sales strategy and highlights the major role played by the aspect of book-covers for the sustainable future sales.

This special issue mainly focused on technological advances, sustainable development and the impact on economic and civil society could be an useful instrument for researchers, academics, and the business community and all parties interested in these topics, offering a complex perspective over these dimensions within a dynamic and unpredictable context.

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