ABSTRACTS

Enhancing supply chain efficiency in textiles: a deep learning approach to Industry 4.0 implementation
(pages 51-61)

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Keywords: Industry 4.0, critical success factors, implementation priority, neural network, textile and clothing industry.
Abstract: Moroccan textile SMEs face increasing pressure to adopt Industry 4.0 (I4.0) technologies to enhance their competitiveness and improve their supply chains. However, a lack of clear implementation strategies, particularly regarding action prioritization, hinders their progress. This research addresses this challenge by developing an intelligent framework, grounded in Deep Learning, to guide I4.0 implementation for these SMEs. The framework leverages two key inputs: the Smart Industry Readiness Index (SIRI) dimensions, providing a structured assessment of the enterprises' current maturity across Process, Technology, and Organization, and Critical Success Factors (CSFs), identified through the DEMATEL method, capturing expert knowledge on the drivers of successful I4.0 adoption. The core of the framework is a set of specialized neural network architectures, trained to forecast the appropriate priority domain for I4.0 deployment. These specialized models, including the RNN with Attention (for Organization Priority) and the CNN-LSTM with Attention (for Technology and Process Priority), enable a nuanced and context-aware prioritization of actions. Key performance indicators show high accuracy in determining the appropriate focus area for Industry 4.0 deployment: the RNN with Attention architecture achieves 84.3% accuracy for Organization Priority, the CNN-LSTM with Attention achieves 93.3% for Technology Priority, and 83.3% for Process Priority. This data-driven and expert-informed prioritization approach offers a practical and actionable roadmap for Moroccan textile SMEs to optimize their limited resources and maximize the impact of their digital transformation efforts, ultimately contributing to a more competitive and sustainable sector.

The financial cost and profitability structures of the European air navigation service providers for Covid-19 period: a Monte Carlo analysis
(pages 63-73)

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Abstract: Civil aviation activities are open to various ambiguities regarding air traffic flow. Small changes in political, economic and technological bodies of civil aviation can change the direction of air traffic flow and air navigation. Likewise, the civil aviation industry and its dependent branch air logistics lived through hard times during the COVID-19 period. The airlines, airports, and service providers suffered from a lot of negativities. It was an expected result for Air Traffic Flow Management to come near a financial crisis with capacity deficiencies. This paper aims to investigate this period of 2017-2021 one more time, but with a slightly different simulation methodology which assumes the period lasted for 300 years and with specific variables of Return on Investment (ROI), Return on Assets (ROA), Return on Equity (ROE), Capital Expenditures (CAPEX) and Operational Expenditures (OPEX) in Air Navigation Service Provider Industry of Europe. According to findings, geographical location (for Central Europe, Turkey, the Mediterranean region and the United Kingdom) and the situation of states regarding development, routes and the situation of airports are the main variables of profitability and investment structures of Air Navigation Service Providers. It also concluded that the financial and economic situation of Air Navigation Service Providers in Europe cannot be changed considering these variables if this period continues for 300 years because of air the main air traffic routes and airflow order of Europe.

Hydrogels as bioactive scaffolds in biomedical engineering
(pages 75-79)

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Abstract: Hydrogels have emerged as promising biomaterials in tissue engineering and regenerative medicine due to their high water content, biocompatibility, and structural similarity to the extracellular matrix (ECM). This article reviews the design principles and key physicochemical properties of bioactive hydrogels—such as stiffness, porosity, degradation rate, and biochemical functionalization—and their role in modulating stem cell behavior and guiding tissue regeneration. Special attention is given to the influence of hydrogel mechanics on mechanotransduction, strategies for controlled drug and growth factor delivery, and surface functionalization to enhance cell adhesion and lineage-specific differentiation. Recent advances in dynamic, cell-responsive, and degradable hydrogels are highlighted as crucial developments for creating personalized and clinically relevant scaffolds.

Application of digital twin using discrete event simulation in intralogistics processes
(pages 81-85)

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Abstract: As technology advances, companies are increasingly using technologies such as computer simulations and digital twins. These technologies enable monitoring, analyzing and optimizing the performance of processes in real time. They are also very useful in testing new ideas. This article presents the concept of using discrete event simulation as an integral part of the digital twin in the design and analysis of intralogistics processes. The authors propose using the Enterprise Dynamics discrete event simulator to create a digital twin of the AMR vehicle. For this purpose, they assessed the available technologies and the possibilities of their cooperation within the proposed digital twin.

Study of tyres sustainability in the specific field of industry
(pages 87-91)

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Abstract: Tyre sustainability is an important aspect of environmental responsibility in the automotive industry. This paper encompasses the processes of tyre production, use, wear and disposal in a way that minimizes negative impacts on the environment and human health. It focuses on extending the life of tyres, reducing their ecological footprint and recycling them efficiently. From production to use to recycling, a number of measures can be taken to reduce the negative impacts of tyres on ecosystems and society. These steps include innovations in materials, improved recycling technologies and a responsible approach to waste management.

Prototype design of an inverted pendulum two-wheel vehicle
(pages 93-100)

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Abstract: This study presents the design and implementation of a two-wheeled self-balancing vehicle based on the inverted pendulum principle, controlled wirelessly via a PC interface. The system integrates an ATmega-based embedded platform with MRF24J40MA wireless transceiver modules for real-time bidirectional communication between the vehicle and a host computer. The vehicle's structure includes a custom mechanical frame, sensor modules (including accelerometers and encoders), motor drivers, and an LCD interface for status display. Control algorithms, including PID tuning, are executed through a PC-based graphical interface, allowing precise adjustments and live monitoring. A dual-microcontroller configuration—ATmega8 for PC interface and ATmega32 for onboard control—facilitates modularity and reliable data handling. The results confirm the system's effectiveness in maintaining balance and responding to commands under various test conditions. This prototype serves as a foundational model for further exploration in autonomous robotics, wireless control systems, and real-time embedded applications.

Managing technological innovation: organizational and administrative strategies for digital marketing

(pages 101-111)

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Keywords: technological innovations, strategy, management, marketing.

Abstract: This article is written on the technological innovation governance as part of the organizational and managerial strategies for digital marketing. The objective of the research is to identify the most important issues in the process of implementing innovations in the company and to propose efficient methods for controlling technological operations and changes. The article addresses the following challenges: the difficulty of implanting new technologies in the old structure of the organization, resistance to changes at the personnel level, the priority of ensuring the integration of innovations in the strategic development of the company. Attention is also drawn to the necessity of best investment for implementation of creative solutions, and to the requirement of any time technology market changes. Solutions to the problem include establishing adaptive strategic management programs to new technologies, creating innovative cultures in institutions, and training workers in the change readiness development of workers. Also, the implementation of digital platforms and tools to track and manage the innovation processes plays a key role. The method of investigation comprises data analysis methods, econometric models or mathematical formulas in order to study the effect of technological innovations upon organizational activities and the effectiveness of the latter. The novelty of this work is represented by the system approach toward innovation management development that based on the combination of various management and organizational methods. The key findings of the paper clarified agree that for any well-established technologies strategy should be dependent on flexibility, employee training and the cultivation of an innovating setting.