EDITORIAL

Innovative Technologies and Sustainable Solutions in Engineering, Informatics, and Architecture

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As societies worldwide strive to balance progress with environmental stewardship, the integration of innovative technologies and sustainable solutions in engineering, informatics, and architecture has become essential. The theme *"Innovative Technologies and Sustainable Solutions in Engineering, Informatics, and Architecture"* highlights how these disciplines can lead transformative changes by adopting new technologies and fostering sustainable practices that support resilient, efficient, and responsible advancements.

In **engineering**, emerging technologies such as advanced robotics, AI, and data analytics are unlocking new pathways for sustainable solutions. For instance, studies indicate that using energy-efficient materials and methods can reduce a building's energy consumption by up to 40% (Kalbasi, Samali and Masoud, 2023), aligning with global goals to decrease carbon footprints and promote green building practices. Industrial robotics, driven by intelligent control systems, are now optimized for energy efficiency, reducing operational costs and resource use while increasing production capacity.

In **informatics**, big data and artificial intelligence offer substantial contributions to sustainable practices. The simulation findings reveal that the yearly energy consumption in the smart city may be reduced by more than 35%-40% via the optimization of energy consumption using the proposed reinforcement learning approach (Ordoueia, Broumandnia,Banirostamb and Gilanic, 2023). By using data-driven algorithms to enhance systems like transportation, water distribution, and waste management, cities can minimize waste and improve resource allocation. Research also indicates that robust cybersecurity frameworks are crucial to protect the increasing amount of data generated by these smart systems, underscoring the importance of security in sustainable digital infrastructure.

In **architecture**, the adoption of eco-friendly designs, such as ventilated facades and solar-integrated structures, has demonstrated significant environmental benefits. Several studies highlighted OVFs' positive contributions with respect to a traditional solution in summer. For example, ventilated solutions have been found to save energy in the range of 47–51 % in summer in hot Italian climates, depending on wind conditions (Gagliano, Nocera and Aneli, 2016). Architects are increasingly exploring materials that combine aesthetic value with sustainability, such as recycled composites and bio-based materials, fostering both environmental responsibility and aesthetic innovation.

This topic will serve as a platform for examining how these technologies are applied in real-world contexts. Contributors will delve into case studies, data analyses, and experimental research, such as the design and implementation of AI-driven systems for urban planning or the performance metrics of energy-efficient building materials in reducing operational costs. Through quantitative and qualitative research, this issue will highlight the tangible impact of integrating innovative technology with sustainable practices, reflecting the faculty's commitment to a forward-thinking, data-driven approach to addressing global challenges.

Also, this issue provides a rich, data-informed exploration of how the fusion of engineering, informatics, and architecture contributes to sustainable development. By presenting practical applications and empirical research, the journal aims to inspire further advancements that support a technologically advanced, eco-conscious future.