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EDITORIAL

Sustainability and Operational Excellence opportunities with Industry 4.0, Lean and Circular Economy

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Dear Esteemed Readers,

We are delighted to present this comprehensive editorial note summarizing the seven papers published in response to our Call for Papers on "When Titans Meet – Industry 4.0, Lean, and Circular Economy opportunities towards operational excellence and sustainability." This special issue aimed to explore the convergence of Industry 4.0 (I4.0), Lean Management (LM), and Circular Economy (CE) practices and their implications for achieving sustainability in various domains. The papers selected for this special issue provide valuable insights into this evolving field.

The integration of I4.0, LM, and CE practices is becoming increasingly crucial in the pursuit of sustainable development, aligning with the global Agenda 2030 goals. While previous research has individually addressed these concepts, this special issue collectively investigates the synergy and integration of these practices, shedding light on how they support each other in fostering sustainability and operational excellence. Our primary objective in this special issue is to advance research in this area by offering in-depth analyses and new perspectives. The following article is included in this edition:

The first article "Assessment of Critical Barriers to Industry 4.0 Adoption in Manufacturing Industries of Bangladesh: An ISM-Based Study" (Hossain et al., 2023) address a critical research gap concerning the barriers to Industry 4.0 adoption in Bangladesh's manufacturing industries. It adopts a mixed-industry approach and uses ISM and MICMAC analysis to identify root barriers. The study provides valuable insights into the impediments faced by various industries and highlights the need for future research to explore compliance, CSR-based activities, and specific organizational-focused guidelines for Industry 4.0 adoption.

The second article "An Empirical Study on Impact of Project Management Constraints in Agile Software Development: Multigroup Analysis between Scrum and Kanban" (Sathe and Panse, 2023) explores the impact of project management constraints in Agile software development, particularly comparing Scrum and Kanban methodologies. By employing PLS-SEM and multi-group analysis, the study reveals insights into resource management and deliverable quality. Future research can further delve into the individual role of fundamental components of Industry 4.0 and their influence on firm efficiency.

The third article is looking into "BIM critical factors and benefits for the public sector: from a systematic review to an empirical fuzzy multicriteria approach" (Schery et al., 2023). This paper offers a comprehensive review of critical success factors (CSFs) and benefits associated with implementing Building Information Modeling (BIM) in the public sector. It ranks CSFs and benefits

using fuzzy group decision-making approaches, providing practical insights for operations management in the construction sector. Future research opportunities include expanding the scope to private sector stakeholders and conducting comparative studies.

The fourth article presents a "Value stream analysis of a waste picker cooperative: an approach based on sustainability and lean philosophy" (da Silva et al., 2023). This study analyzes the value stream of waste picker cooperatives with a focus on sustainability and lean philosophy, offering improvements for social, economic, and environmental sustainability. Future research may explore variations in waste demand, community involvement, and incorporate sustainability metrics into Value Stream Mapping (VSM) for a more comprehensive analysis.

The fifth article "Bridging External Stakeholders and Sustainability Literature: a review looking at a project management context" (dos Santos et al., 2023) delves into the challenges of mapping and engaging external stakeholders from a sustainability perspective during project development. Future research avenues may include case studies and questionnaires to identify best practices, especially in the social context of fringe stakeholders.

The sixth article is looking into a "Review: Prediction of external corrosion rate in Oil and Gas platforms using ensemble learning: a Maintenance 4.0 approach" (Elmas et al., 2023). This study employs ensemble learning to predict corrosion rates on offshore Oil and Gas platforms, providing insights into influential factors affecting corrosion rates. Future research can benefit from extensive databases, including system-specific information, to enhance prediction accuracy.

Finally, the last article of this Call for Papers, "Industry 4.0 adoption and firm efficiency: Evidence from emerging Giants in Asia Pacific region" (Rehman, S. U., 2023). This paper investigates the impact of Industry 4.0 adoption on firm efficiency in the Asia-Pacific region. It explores the mediating role of intangible assets (human capital and firm reputation), highlighting the importance of investments in intangible assets for maximizing benefits. Future research opportunities encompass exploring the reverse relationship and examining specific components of Industry 4.0.

Therefore, in light of the contributions made by these papers and the evolving nature of this interdisciplinary field, we also propose the following research agenda for future exploration:

- Cross-Sector Integration: Investigate how the integration of I4.0, LM, and CE practices can be tailored to specific industries and sectors, acknowledging the variations in challenges and opportunities.
- Sustainability Metrics: Develop comprehensive sustainability metrics and frameworks that consider the environmental, social, and economic impacts of I4.0, LM, and CE integration.
- Human-Centric Approach: Explore the implications of the human element in the integration process, including the development of human capital, employee well-being, and training strategies.
- Circular Economy Business Models: Investigate innovative circular economy business models enabled by I4.0 and LM that can promote sustainable practices in various industries.
- Global Perspectives: Extend research beyond the Asia-Pacific region to understand the global dynamics of I4.0 adoption and its effects on firm efficiency and sustainability.

We hope that these papers and the proposed research agenda inspire further exploration, discussions, and collaborations in this dynamic field. As we embark on this journey towards operational excellence and sustainability, we look forward to continued contributions and insights from the research community.

Sincerely,

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