ANNEX-1

ICMLBDA-2025 Special Session Proposal Template

Deadline for Submission (10/09/2025) through email to : csingh@idealizeer.com ; arpita@idealizeer.com

Important Note: Session Organizers are expected to have at least six papers accepted for their session with acceptance rate of 40% to 45%

Title	**Data-Driven Models and Analytics for Circular Economy and Sustainable Innovation**
Session Organizers	Inna Koblianska, i.koblianska@biem.sumdu.edu.ua, Sumy State University, Ukraine Borys Kuzikov, b.kuzikov@sl.sumdu.edu.ua, Sumy State University, Ukraine Anna Masłoń-Oracz, amaslon@sgh.waw.pl, Warsaw School of Economics, Republic of Poland
Abstract (max 200 words)	The shift toward circular economy and sustainability requires new ways of using data to design, manage, and optimize systems that minimize waste and maximize resource efficiency. This special session explores the role of data-driven models, machine learning, and advanced analytics in providing strategies and solutions for sustainable innovation across different fields. The session aims to highlight modern methodologies that support eco-innovation, predictive life cycle management, sustainable product design, green logistics, and quantitative evaluation of policy impacts. Particular attention is given to applied case studies and interdisciplinary research that demonstrate the potential of data-driven tools in generating actionable insights and sustainable outcomes. We invite contributions spanning statistical modeling, optimization, AI, and computational simulations applied to environmental and socio-economic challenges. By encouraging dialogue between academia, industry, and governance, the session provides a platform to exchange data-driven knowledge and best practices that foster a more resilient and sustainable future, advancing the conference's mission of showcasing impactful innovation in machine learning and big data.
Background and Justification (max 300 words)	Climate change, resource depletion, and environmental degradation – challenges the global community is facing on now – accelerate the need for sustainable innovation to be implemented in production and consumption domains. In this regard, the concept of a circular economy represents a transformative paradigm for achieving long-term sustainability. However, operationalizing these principles requires robust, data-driven approaches capable of translating complexity into concrete strategies. Machine learning, big data analytics, and optimization methods provide opportunities to address these challenges. Predictive analytics allows modeling resource flows and forecasting waste reduction, while statistical approaches ensure the rigor and transparency of results. Data-driven simulations support development of eco-innovation and sustainable product design, while AI-driven analytics optimize supply chains, logistics, and energy systems for the sustainable performance. Additionally, an integration of quantitative methods into policy elaboration and evaluation provide evidence-based decisions fostering environmental and social well-being. Despite these advances, significant gaps remain in connecting advanced analytics with domain-specific sustainability practices as many approaches still face barriers in scaling, interpretability and application. This session, by showcasing innovative models, case studies, and interdisciplinary frameworks integrating data science with sustainability, aims to bridge these gaps. Aligning with the ICMLBDA 2025's vision of advancing knowledge in machine learning and big data analytics, the session demonstrates the role and applicability

	of data-driven solutions to produce sustainable innovation supporting the circular economy movement.
Topics of interest	Relevant topics include (but are not limited to): • Modeling resource use and waste reduction • Predictive tools for managing product life cycles • Using data to support eco-innovation and green design • Machine learning for tracking environmental and social performance • Analytics for optimizing sustainable logistics or energy systems • Evaluating the impact of sustainability policies with quantitative methods
Expected Numbers of Submissions	12-14