

INTERNATIONAL CONGRESS ON

# Emerging Trends in Engineering, Education, Business, Economics, Social Sciences, and Humanities

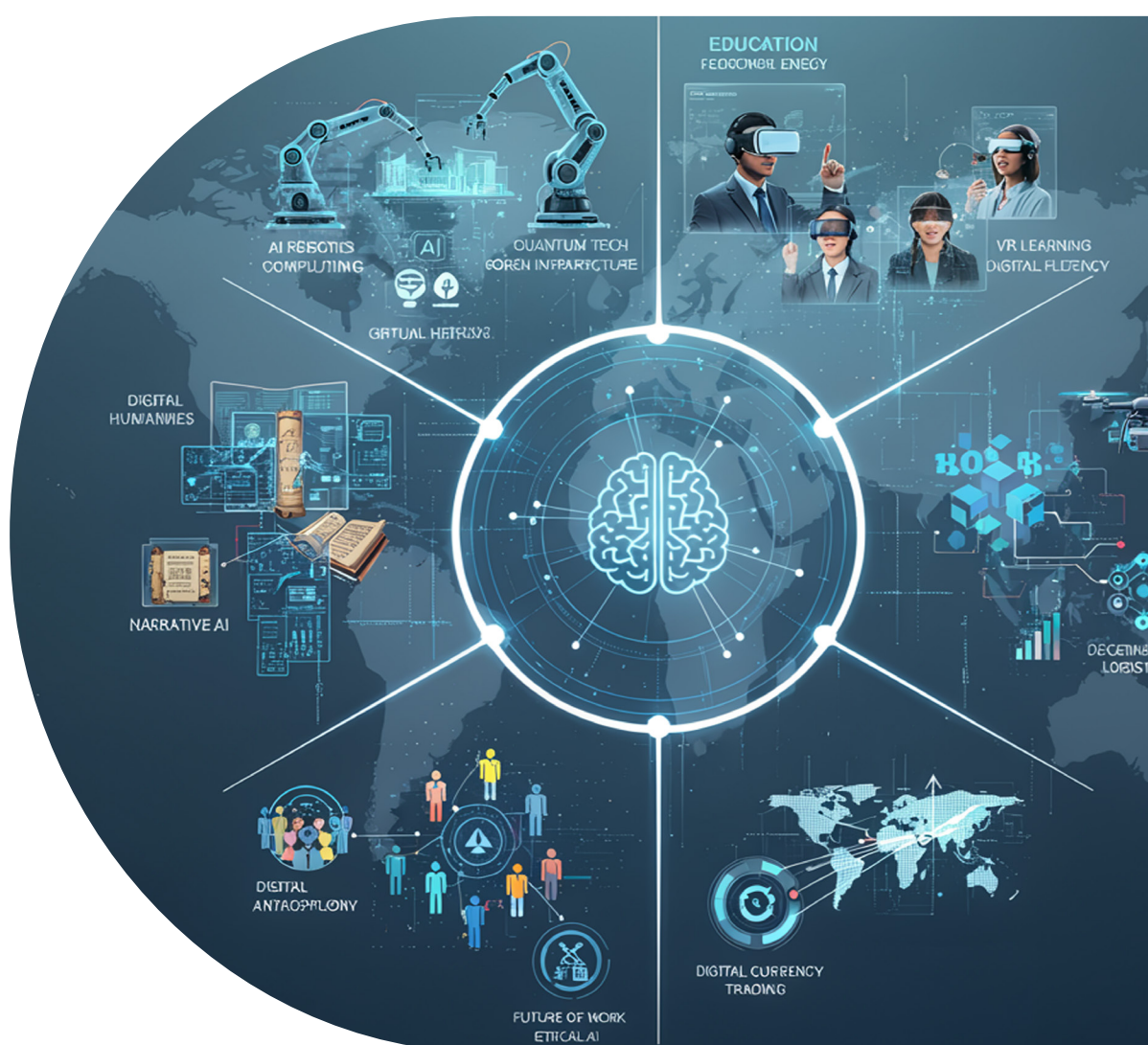


16<sup>th</sup> & 17<sup>th</sup> October, 2025



Amsterdam, Netherlands

ICET2ES-2025



Organized by: IFERP Academy



International Congress on Emerging Trends in Engineering, Education, Business,  
Economics, Social Sciences, and Humanities (ICET2ES-2025), Amsterdam, Netherland

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**Theme: “Innovations for Sustainable Development Practices: Engineering, Education, and Economic Perspectives”**



## PREFACE

We are delighted to extend a warm welcome to all participants attending International Congress on Emerging Trends in Engineering, Education, Business, Economics, Social Sciences, and Humanities (ICET2ES-2025), taking place in Amsterdam, Netherlands on 16<sup>th</sup> & 17<sup>th</sup> October – 2025. This conference provides a vital platform for researchers, students, academicians, and industry professionals from all over the world to share their latest research results and development activities in the field of Emerging Trends in Engineering, Education, Business, Economics, Social Sciences, and Humanities. It offers delegates an opportunity to exchange new ideas and experiences, establish business or research relationships, and explore global collaborations.

The proceedings for ICET2ES-2025 contain the most up-to-date, comprehensive, and globally relevant knowledge in the field of Emerging Trends in Engineering, Education, Business, Economics, Social Sciences, and Humanities. All submitted papers were subject to rigorous peer-reviewing by 2-4 expert referees, and the papers included in these proceedings have been selected for their quality and relevance to the conference. We are confident that these proceedings will not only provide readers with a broad overview of the latest research results in Emerging Trends in Engineering, Education, Business, Economics, Social Sciences, and Humanities but also serve as a valuable summary and reference for further research in this field.

We are grateful for the support of many universities and research institutes, whose contributions were vital to the success of this conference. We extend our sincerest gratitude and highest respect to the many professors who played an important role in the review process, providing valuable feedback and suggestions to authors to improve their work. We also extend our appreciation to the external reviewers for providing additional support in the review process and to the authors for contributing their research results to the ICET2ES-2025.

We would like to thank all participants at the conference for their significant contribution to its success. We express our gratitude to the keynote and individual speakers and all participating authors for their dedication and hard work. We also sincerely appreciate the efforts of the technical program committee and all reviewers, whose contributions made this conference possible. Finally, we extend our thanks to all the referees for their constructive comments on all papers, and we express our deepest gratitude to the organizing committee for their tireless work in making this conference a reality.

## ABOUT ICET2ES – 2025

ICET2ES-2025 serves as a premier platform for researchers, academicians, industry professionals, and policymakers to explore emerging trends and advancements across multiple disciplines. This congress brings together thought leaders to share groundbreaking research, discuss innovative solutions, and collaborate on sustainable development initiatives that impact engineering, education, business, economics, social sciences, and humanities.

The conference is designed to encourage cross-disciplinary dialogue and facilitate meaningful interactions between participants from diverse backgrounds. Through keynote speeches, paper presentations, workshops, and networking sessions, ICET2ES-2025 aims to inspire new ideas, foster innovation, and contribute to a more sustainable and knowledge-driven future.

### **Objective of the Conference:**

- To provide a global platform for researchers, academicians, and professionals to share cutting-edge research and innovative solutions.
- To foster interdisciplinary collaboration between engineering, education, business, economics, social sciences, and humanities.
- To explore sustainable development practices that integrate technological advancements with societal needs.
- To facilitate discussions on emerging challenges and opportunities in education, engineering, and economic growth.
- To promote knowledge exchange and networking among thought leaders, policymakers, and industry experts.

### **Benefits of the Conference:**

- Gain insights from expert keynote speakers and panel discussions.
- Present and publish research in a recognized international conference.
- Expand professional networks and collaborate with global peers.
- Explore interdisciplinary approaches to sustainability and innovation.
- Participate in workshops and interactive sessions for skill enhancement.

## ABOUT IFERP

The Institute for Educational Research and Publication (IFERP) is a professional association devoted to the advancement of the fields of engineering, science, and technology through the funding of research activities, propagation of the latest research insights, furtherance of industry trends, and other related ventures. IFERP aims to digitalize this entire process of innovation, collaboration, and knowledge-sharing through the fostering of a unified virtual scientific community worldwide. Everything from networking and joint ventures to learning, research assistance, publication, and more, will be carried out as part of this objective.

IFERP has established robust scientific, academic, and industry networks throughout Asia, the Middle East, and Europe. Some of the countries that IFERP has its presence in, include Iraq, Maldives, Thailand, Malaysia, Singapore, Philippines, Indonesia, Taiwan, Vietnam, UAE, Australia, Japan, Sri Lanka, Nepal, Ghana, and Africa.



Upskilling the knowledge hub through technological innovation and excellence for the benefit of humanity.

A Digitally equipped robust, dynamic & swift professional community integrating academics & industry for upgraded technical knowledge implementation.



IFERP values the restoration of high- level technological research, learning, collaboration, resource sharing & community-building traditions.

To serve as the foundation for all technological progress and advancement activities around the world.



## MESSAGE FROM MANAGING DIRECTOR, IFERP



**Mr. A. Siddh Kumar Chhajer**

**MD & Founder,  
IFERP, Technoarete Group**

On behalf of Institute For Educational Research and Publications (IFERP) & the organizing Committee, I express my hearty gratitude to the Participants, Keynote Speakers, Delegates, Reviewers and Researchers.

The goal of the International Congress on Emerging Trends in Engineering, Education, Business, Economics, Social Sciences and Humanities (ICET2ES-2025) is to provide knowledge enrichment and innovative technical exchange between international researchers or scholars and practitioners from the academia and industries in the field of Emerging Trends in Engineering, Education, Business, Economics, Social Sciences and Humanities.

This conference creates solutions in different ways and to share innovative ideas in the field of Emerging Trends in Engineering, Education, Business, Economics, Social Sciences and Humanities. ICET2ES-2025 provides a world class stage to the Researchers, Professionals, Scientists, Academicians and Students to engage in very challenging conversations, assess the current body of research and determine knowledge and capability gaps.

International Congress on Emerging Trends in Engineering, Education, Business, Economics, Social Sciences and Humanities (ICET2ES-2025) will explore the new horizons of innovations from distinguished Researchers, Scientists and Eminent Authors in academia and industry working for the advancements in Emerging Trends in Engineering, Education, Business, Economics, Social Sciences and Humanities from all over the world. ICET2ES-2025 hopes to set the perfect platform for participants to establish careers as successful and globally renowned specialists in the field of Emerging Trends in Engineering, Education, Business, Economics, Social Sciences and Humanities.



## MESSAGE FROM CHIEF EXECUTIVE, IFERP



**Mr. Rudra Bhanu Satpathy**

**CEO & Founder,  
IFERP, Technoarete Group**

IFERP is hosting the International Congress on Emerging Trends in Engineering, Education, Business, Economics, Social Sciences and Humanities (ICET2ES-2025) this year in month of 16<sup>th</sup> & 17<sup>th</sup> October - 2025, Amsterdam, Netherlands. The main objective of ICET2ES-2025 is to grant the amazing opportunity to learn about groundbreaking developments in modern industry, talk through difficult workplace scenarios with peers who experience the same pain points and experience enormous growth and development as a professional. There will be no shortage of continuous networking opportunities and informational sessions. The sessions serve as an excellent opportunity to soak up information from widely respected experts.

Connecting with fellow professionals and sharing the success stories of your firm is an excellent way to build relations and become known as a thought leader. I express my hearty gratitude to all my Colleagues, Staffs, Professors, Reviewers and Members of Organizing Committee for their hearty and dedicated support to make this conference successful. I am also thankful to all our delegates for their painstaking effort to make this conference successful.

## BIOGRAPHY OF KEYNOTE SPEAKER



**Dr. Tan Fee Yean**

**Associate Professor, School of  
Business Management, College  
of Business, Universiti Utara  
Malaysia, Malaysia**

Dr. Tan Fee Yean is an Associate Professor at the School of Business Management, Universiti Utara Malaysia (UUM). She earned her PhD in Human Resource Management from the same university. Her postdoctoral fellowship was completed at the University of Nottingham Malaysia Campus. Additionally, she has served as a visiting lecturer at the Southampton Business School, University of Southampton, UK, for a three-month period. Dr. Tan Fee Yean's primary teaching and research interests lie in organizational behavior and human resource management, with a particular focus on career planning and development, leadership, change management, employee engagement, and topics related to employees' work attitudes and behaviors. She has received eight Best Paper Awards from international conferences and several Excellent in Reviewing Awards from renowned international journals, in recognition of her significant research contributions. Notably, she has been recognized by Emerald Publishing as an Outstanding Reviewer in the 2021 and 2022 Emerald Literati Awards. Besides that, she serves as a Section Editor for the International Journal of Management Studies (IJMS), a university-owned journal, and frequently contributes as an Article Editor for SAGE Open. Her research has been published in some high-impact, peer-reviewed journals indexed in the International Web of Science (WoS) and Scopus. Furthermore, she has received research grants from the Research Acculturation Grant Scheme (RAGS) and the Fundamental Research Grant Scheme (FRGS) to support research on issues related to employee work engagement and counterproductive work behaviors.

## BIOGRAPHY OF KEYNOTE SPEAKER



**Dr. Rohit Bansal**

**Adjunct Faculty, Rockford  
College, Sydney, Australia**

Dr. Rohit Bansal is working as an Adjunct Faculty in Rockford College, Sydney, Australia. He obtained Ph.D. in Management from Maharshi Dayanand University, Rohtak. With a rich experience of 17 years, he has achieved growth through robust and proactive academic initiatives. He has authored & edited many books with renowned national & international publishers including Springer Nature, IGI Global, Scrivener-Wiley Publishing, De Gruyter etc. He has published 180 research papers and chapters in national and international journals of repute including Scopus indexed as well as edited books. His research work is published in leading publishers like Springer, MDPI, Hindawi, IGI Global, Cell Press, De Gruyter, Elsevier, Inderscience, Wiley etc. He has also presented papers in 60 conferences and seminars including IIM Indore, IIM Ranchi, IIM Jammu and IIM Kozhikode. He is on Editorial Advisory Board as a member in many national and international peer reviewed journals. He has served as member of technical committee in many international conferences. He has acted as Session Chair and speaker in many international conferences. He has been awarded many times for contribution to academics and research.

## BIOGRAPHY OF INVITED KEYNOTE SPEAKER



**Dr. Mssel Namaki**

**Professor, Dean, AIT (Artificial  
Intelligence Technologies),  
South Holland, Netherlands**

Teaching and consulting of Strategic Management, Artificial intelligence, Corporate restructuring, Chinese business, Cross cultural management and Top management profiling. Entrepreneurship training and consulting.. MBA and DBA level teaching of Strategy, artificial intelligence, International business and entrepreneurship, Management of business schools. Think tank writings on contemporary issues i.e. artificial intelligence, strategic thinking, Chinese economic policies and global finance.. Specialties: Introducing and applying strategic thinking concepts and operations in organizations. Introducing Artificial Intelligence principles and applications in organisations. Restructuring of corporations. Competency enhancement at top management level. Writing on strategy, international business and entrepreneurship. Company restructuring. Business school accreditation. AI subjects teaching and instruction.

## BIOGRAPHY OF INVITED KEYNOTE SPEAKER



**Dr. Aida Mehrad**

**Associate Professor, Faculty  
of Bioengineering, Faculty  
of Educational Sciences,  
International University of  
Catalonia (UIC), Barcelona, Spain**

Specialist in Conflict Management Styles, Leadership Styles, Organizational Support, Work Engagement, Job Satisfaction, Emotional Intelligence, Personality Factors, Self Efficiency, Job Burnout , Human Behavior, Organizational Behavior, Team Psychology Double Doctorate (PhDs) in organizational & industrial, and social psychology and a master's degree in General Psychology, with 15 years of national and international teaching experience in different subjects, mainly Leadership, Business Management, Strategic Marketing, Strategic Management, Team Psychology, Industrial and Organizational Behavior, Research Methodology, Statistical Analysis, etc. I published 74 research papers in organizational behavior, leadership, and management, distributed in scientific journals and international conferences. Additionally, I have eight years of experience leading the academic department in higher education institutions. Likewise, I am the author of for SIX, organizacional, psychological, motivational and personal empowerment books.



## BIOGRAPHY OF INVITED KEYNOTE SPEAKER



**Dr. Bob de Wit**

**Associate Professor, Professor of  
Strategic Leadership,  
Nyenrode Business University,  
Netherlands**

Prof. Dr. Bob de Wit is Emeritus Professor of Strategic Leadership at Nyenrode Business University. He is part of Nyenrode's Faculty Research Center for Strategy, Organization & Leadership. His main research topic is the transformation of companies, sectors and societies, driven by various digital technologies and solutions in the fields of biotechnology and sustainable energy. De Wit is (co-)author of 20 books and numerous articles, chapters, cases and educational notes in the field of strategic management. His books *Strategy Synthesis* (1994, 1998, 2005, 2010, 2014, 2017) and *Strategy: An international perspective* (1994, 1998, 2005, 2010, 2014, 2017, 2020) are used in universities and business schools in more than 70 countries worldwide. The eighth edition of *Strategy: An international perspective* is scheduled for spring 2023. His latest book is *Society 4.0: Resolving eight key issues to build a citizens society* (2021). De Wit has a Bachelor's degree in Psychology from Utrecht University, a Master's degree from IIB Delft and a PhD in Management Science from Erasmus University Rotterdam. From 1986 to 1996 he was Assistant Professor of Strategic Management at the Rotterdam School of Management, and from 1996 to 2012 Professor of Strategy and Associate Dean for Research at the Maastricht School of Management. He is a member of the review committee of the Strategic Management Society Conference.

## BIOGRAPHY OF SESSION SPEAKER



**Dr. Tesfaye Hailu GK**

**CEO, EcoCore Trading  
PLC, Kotebe University of  
Education, Addis Ababa,  
Ethiopia**

Tesfaye Hailu Gk is an accomplished academic, researcher, and entrepreneur with over ten years of experience in education, leadership, and community service. He holds a BA in Management from Mekelle University, an MBA from Dilla University, and is currently pursuing a PhD in Management at Addis Ababa University. Tesfaye has shown exceptional academic performance with a cumulative GPA of 3.72 and 3.97. As an educator, Tesfaye has worked at Jimma University and Kotebe University of Education. He has mentored students, coordinated ICT and e-learning projects, and contributed to strategic planning. His skills include leadership, statistical analysis, and qualitative research. He also has certifications in digital transformation, data analysis, and entrepreneurship from respected institutions like the University of Virginia, Udacity, and YALI. Tesfaye is a dedicated volunteer. He spends his time with the Ethiopian Red Cross Society and mentors young entrepreneurs. His research appears in multiple publications, and he has presented at national conferences on subjects like entrepreneurial ecosystems and industrial parks. Tesfaye speaks English, Amharic, French, and Tigrinya. He is committed to promoting sustainable development and innovative leadership in changing environments. With a goal of making a lasting impact, Tesfaye aims to connect academia, research, and community service to promote positive change.

## BIOGRAPHY OF SESSION SPEAKER



**Dr. Kelvin Lee Yong Ming**

**Senior Lecturer & Programme  
Director (Banking & Finance/  
Finance & Economics Programme)  
School of Accounting, Taylor's  
University, Malaysia**

Dr. Kelvin Lee is a Senior Lecturer and Programme Director at Taylor's University, Malaysia. He earned a First-Class Degree Honours in Bachelor of Finance (Hons) in 2014, followed by a Master of Science in Finance, supported by the prestigious Zamalah and MyBrain Scholarships in 2016. Dr. Kelvin also completed his Ph.D. in Finance from 2017 to 2021 and was honored with the Best Postgraduate Award at the end of his Ph.D. program. In 2023 and 2024, Dr. Kelvin showcased his commitment to financial education by conducting webinars and workshops for over 500 SMEs across Malaysia. These sessions focused on enhancing SME's financial literacy and contributing to their long-term success and sustainability. Beyond teaching, Dr. Kelvin is actively engaged in research and publication. He consistently contributes to scholarly literature with papers published in reputable Scopus and WOS indexed journals, showcasing his dedication to advancing knowledge in the field of finance. In 2023, Dr. Kelvin also achieved a major milestone by securing a national research grant for his project titled "Revolutionizing Climate Finance for Malaysian SMEs in the Food and Beverage Manufacturing Sector". This project reflects Dr. Kelvin's commitment to addressing crucial issues at the crossroads of finance and climate. His success in obtaining the grant underscores his expertise and contributions to cutting-edge research in the field. Dr. Kelvin also plays a significant role in promoting responsible management education and sustainability initiatives at Taylor's University. He serves as a committee member for TBS UNPRME (Taylor's Business School - Principles for Responsible Management Education), which focuses on reporting annual Sharing Information on Progress (SIP) and advancing sustainability management activities across the university. Additionally, Dr. Kelvin contributes his expertise as part of the

## BIOGRAPHY

Taylor's University Environmental, Social, and Governance (TU-ESG) committee, where he actively engages in fostering a culture of sustainability within Taylor's University. Through his involvement in these committees, Dr. Kelvin demonstrates his commitment to integrating sustainability principles into teaching and learning, research, and community engagements, contributing to the university's efforts towards responsible management practices and environmental stewardship. Recently, Dr. Kelvin has also been invited to deliver a keynote speech at three conferences, including: (i) the International Conference on Increased Use of Artificial Intelligence (AI) & Its Impact (21 March 2024); and (iii) the 2024 Annual International Conference on "Harmony in Innovation" (3 April 2024 to 5 April 2024).

## BIOGRAPHY OF SESSION SPEAKER



**Dr. P. Bindu Swetha**

**Professor, Department of  
Electronics and Communication  
Engineering G Pullaiah College  
of Engineering and Technology,  
Andhra Pradesh, India**

Dr. Bindu Swetha Pasuluri holds a Ph.D. in Microelectronics & VLSI Design from Sathyabama Institute of Science & Technology, Chennai, India. She earned her B.Tech. in Electronics and Communication Engineering from JNTU Hyderabad in 2006 and her M.Tech. in VLSI Design in 2012.

With over 17 years of experience in teaching, research, and academic leadership, Dr. Bindu Swetha currently serves as a Professor in the Department of ECE at G. Pullaiah College of Engineering and Technology, Kurnool. Her areas of expertise include Microelectronics, VLSI Design, and Innovation Mentorship, with a particular focus on guiding innovation-driven UG and PG scholars.

She has authored 24 research papers, 10 book chapters, and 4 textbooks in the fields of *Digital Electronics*, *Digital Signal Processing*, *VLSI with Verilog HDL*, and *Electronic Devices & Circuits*. Additionally, she has filed 10 patents with the Indian Patent Office and has served as Editor for two textbooks published by IOR International Press.

A passionate educator and multidisciplinary researcher, Dr. Bindu Swetha has delivered numerous guest lectures, webinars, and keynote talks at AICTE-ATAL-sponsored FDPs, STTPs, IFERP events, and reputed international conferences. She has also completed over 42 online certifications through NPTEL (IITs), Coursera, Udemy, Publons Academy (Clarivate Analytics), and Springer Research Academy.

Her excellence has been recognized with several honors, including the Young Researcher Award from ESN Research Group and the Best Teacher Award from Lead India, Vision Digital India, and ESN Publications.

Beyond academia, Dr. Bindu Swetha is deeply committed to social impact and women's empowerment. For the past six

## BIOGRAPHY

years, she has actively mentored economically disadvantaged students, particularly supporting girl children pursuing education through scholarships.

She is a professional member of IEEE, ISTE, IEI, UACEE, IAENG, and IFERP. In addition to her academic role, she is the Managing Director of PS Group of Polishing Industries & Natural Marbles, Bethamcherla, a 22-year entrepreneurial venture specializing in Kadapa stone products with a national clientele.

Awarded as both a Best Teacher and a Young Innovator, Dr. Bindu Swetha continues to bridge academia, industry, and social responsibility, striving to inspire innovation and lifelong learning among students and peers alike.



## BIOGRAPHY OF SESSION SPEAKER



**Ts. Dr. Nur Azaliah BT Abu Bakar**

**Associate Director of UTM  
International Kuala Lumpur |  
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Associate Professor, Ts. Dr. Nur Azaliah Abu Bakar is the Associate Director at UTM International Kuala Lumpur and a faculty member at the Faculty of Artificial Intelligence, Universiti Teknologi Malaysia (UTM). With 25 years of experience spanning academia, government, and industry, she specialises in enterprise architecture, artificial intelligence, business analytics, and cybersecurity. She is a consultant in enterprise architecture and digital transformation initiatives, actively shaping research, policy development, and innovation strategies. A member of the IEEE Society, the Malaysian Board of Technology (MBOT), and several international associations, she is also a sought-after speaker at global forums. Passionate about student engagement and leadership, she drives international collaboration and mobility programs in higher education.

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# Abstract



# Advancing Educational Innovation in Vocational Education through Artificial Intelligence: Educator Insights and Future Directions

**Dr. Sameera Lqbal**

Department of Industrial Engineering, Higher Colleges of Technology, Abudhabi, UAE

## Abstract:

This research aims to examine the changing effects of artificial intelligence (AI) on vocational education and training (VET) organized around functionality, user experience, and institutional capacity with a focus on educator attitudes, implementation choices, and institutional readiness. This research explores the advantages and disadvantages of the VET integration of AI technologies such as virtual simulations, adaptive learning environments, and audio-visual assessments within the discussion of the usefulness of AI in competency currency, engagement, and personalization. The study design uses a mixed-methods research approach with 100 vocational educators across an array of fields. Available quantitative data indicates positive adoption responses (currently 42% use AI tools; 30% are considering adopt AI tools) and highlighted advantages including efficiencies and personalized learning experiences. However, significant barriers remain including lack of professional training (61%), challenges with infrastructure (40%) challenges regarding ethics in AI assessments (30%). To facilitate responsible AI integration, thematic analysis of qualitative responses emphasizes the need for institutional support, ethical frameworks and organized professional development. By comparing global best practices, the study identifies policy and implementation gaps across regional contexts. We conclude that a holistic approach including infrastructure investment, ethical policy development, and educator capacity building is required for the sustainability of AI integration in VET. Future studies must assess how AI could impact inclusiveness, employment, and culturally relevant vocational training in the future.

## Keywords:

Artificial Intelligence (AI), Vocational Education and Training (VET), Educational Innovation, Personalized Learning, Virtual Simulations, AI Assessment, Educator Perceptions, Professional Development, Ethical AI, Infrastructure Readiness, Adaptive Learning Systems, Technical Skills Development, Digital Education Policy.



# The Future of Roll-Ups: Business Innovation, Ethics, and Sustainable Growth in Fragmented Industries

**Elena Korol**

MA in Economics, Tver State Agricultural Academy; Executive Manager, Classical Management LLC, FL, USA

**Sofiya Korol**

Pre-law Student, Miami Dade College, Miami

## Abstract:

This article explores the ethical and sustainability-related risks and opportunities associated with the roll-up business model: a model where private investors acquire small firms in fragmented markets, consolidate operations, and leverage technology and capital market access to rapidly scale. Roll-ups have been associated with efficiency, cost savings, and shareholder value creation; but there is less research on their wider societal impacts related to ethics, community, and sustainability. We review cross-industry and cross-country cases, including in craft breweries (US/Europe), funeral services (North America), edtech (India), and waste management (Latin America) to analyze both opportunities and risks. Roll-ups can enable resource and capital efficiency, bring professionalization to fragmented markets, and accelerate digital adoption, but also present challenges related to equity, labor practices, and consumer welfare. The article presents a “responsible consolidation” framework with a focus on ethical leadership, transparent reporting, and alignment with the UN Sustainable Development Goals (SDGs).

## Keywords:

Business ethics, roll-up strategy, responsible consolidation, sustainability, UN SDG.

# AI-Blockchain Integrated Automated ESG Verification Platform

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**Gladlin Shiny Mascarenhas**

UG Student, St. Joseph Engineering College, Mangalore, Karnataka, India

**Chrisyl Ann Gomes**

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## Abstract:

The Environmental, Social, and Governance (ESG) authentication in financial technology faces severe challenges, along with issues like information asymmetry, data opacity, manual valuation processes, and a lack of real-time transparency, reducing trust of the stakeholders and regulatory compliance. Conventional ESP reporting systems suffer from data integrity concerns, delays in verification that often surpass 30-60 days, and inadequate scalability for the growing sustainable finance markets. This paper presents a novel AI-blockchain integrated automated ESG authentication platform that addresses these essential limitations via intelligent automation and distributed ledger technology. The proposed system combines machine learning algorithms for real-time ESG grading, along with automated compliance reporting and blockchain-based smart contracts for the authentication of immutable data. Our methodology employs collaborative machine learning models, including LSTM and XGBoost networks, for multidimensional ESG valuation, integrated with a blockchain architecture that utilizes Practical Byzantine Fault Tolerance consensus mechanisms. The platform integrates IoT sensors for data collection from the surroundings, natural language processing for supervisory document analysis, and automated smart contracts for acquiescence verification. Experimental authentication validates 95% accuracy in ESG grading when compared to conventional manual assessments, a 75% drop in processing time during authentication, and a 99% enhancement in data integrity via blockchain immutability. The system attains real-time ESG updates with sub-second latency, which reduces operational cost by 80% while maintaining regulatory compliance across several jurisdictions. Performance assessment exposes significant enhancements in stakeholder trust, transparency, and automated compliance capabilities compared to the existing Mayuk Preston Sequeira Visvesvaraya Technological University solutions. The platform effectively addresses data asymmetry in bearable finance markets, enabling scalable ESG authentication for financial institutions. Our solution demonstrates the potential of AI-blockchain integration for sustainable FinTech operations, serving as a foundation for transparent, automated, and efficient ESG authentication systems that support the growing demand for accountable investment and regulatory compliance in digital financial services.

## Keywords:

Artificial Intelligence, Automated Compliance, Blockchain Technology, Digital Finance, ESG Authentication, Machine Learning, Sustainable FinTech, Smart Contracts.

## **Green TVET, Green Jobs and Green Economy – Three Together Makes for Sustainable Economic Development in Bangladesh**

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### **Abstract:**

Bangladesh has started to develop a green paradigm in line with the world. Although the green paradigm is currently a challenging issue for Bangladesh in the field of Technical and Vocational Education and Training (TVET), it is time to transform TVET in Bangladesh to meet the challenges of a green economy as the foundation of a sustainable economy. Because education, awareness raising about green skills and encouraging its widespread use can lead to sustainable practices in the employment sector. The world population is facing environmental deficits due to pollution, regulation and pollutant selection. In this regard, it is possible to create and integrate an ecological environment by filling the environmental deficit through the use of technology and economic investment. This paper aims to establish Bangladesh as a sustainable development model in terms of green mindset, lifestyle, economy, education, training, employment and sustainability. This paper explores the possibility of implementing environmentally friendly initiatives by incorporating advanced technology and creative thinking in TVET colleges in Bangladesh. Thematic analysis was conducted using qualitative and quantitative methods of document analysis. Thematic analysis revealed that incorporating green policies in TVET in Bangladesh can encourage the use of technology and innovation in a more sustainable manner. This can result in a workforce that can demonstrate technical skills and, where necessary, a strong ethical commitment to sustainable principles.

### **Keywords:**

Technical and Vocational Education and Training (TVET), green economy, employment, sustainability.

# A Deep Learning Framework using CNN-Based for Detecting the Botnet Attacks in IoT Networks

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## Abstract:

The quick growth of the Internet of Things (IoT) has broadened the perimeter for network attacks and has enabled the creation of large-scale botnets capable of performing DDoS attacks, exfiltrating data, and stealing credentials. Network intrusion signature systems continue to face challenges with new attack patterns, which is why learning-based systems have been adopted. This research develops a deep learning-based Intrusion Detection System (IDS) targeted toward IoT botnets using a one-dimensional Convolutional Neural Network (1D-CNN) architecture. The constructed pipeline encompasses data cleansing, z-score normalization, feature selection, stratified partitioning, a compact CNN model, and threshold-based decisions. The experiments were executed within Jupyter (Anaconda) and utilized TensorFlow 3.0.1/Keras with a contemporary IoT botnet traffic dataset consisting of 733,705 labelled flows. The proposed model, which has been layered with a test set, yielded an accuracy of 99.984%, precision of 99.985%, recall of 99.998%, F1-score of 99.991%, and ROC-AUC/PR-AUC of 1.0, which indicates excellent separation of botnet activities to benign traffic. These results demonstrate the efficiency of CNNs for flow-based IoT intrusion detection and underscore the need for future research on class rebalancing, model explainability, and real-time implementation on IoT gateways/edge devices.

# AI Model for Improving Pregnancy Outcomes and Preventing Adverse Events

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## Abstract:

Adverse pregnancy outcomes, including small-for-gestational-age (SGA), pre-eclampsia, preterm birth, gestational diabetes, and stillbirth, remain major contributors to maternal and neonatal morbidity and mortality. Current detection methods, often reliant on conventional risk assessments and serial ultrasounds, are limited by low sensitivity, high false positive rates, and significant variability in clinical practice. This contributes to missed opportunities for timely intervention and increases both patient anxiety and healthcare burden.

This project introduces a clinically driven, data-rich Artificial Intelligence (AI) model designed to improve pregnancy outcomes by predicting complications early and equitably. The model integrates maternal demographic data, medical history, biochemical markers, imaging results, and social determinants of health to generate personalised risk profiles. Using supervised machine learning techniques, it aims to identify women at high risk for adverse events, supporting clinicians in tailoring antenatal care pathways and empowering women with knowledge to optimise health before and during pregnancy.

The AI model moves beyond traditional centile-based thresholds, applying advanced pattern recognition to enhance predictive accuracy. By addressing challenges in data quality, interoperability, and fairness, it seeks to minimise bias and ensure robust performance across diverse populations. Anticipated benefits include earlier identification of high-risk pregnancies, reduced unnecessary interventions, fewer iatrogenic preterm deliveries, and improved allocation of healthcare resources.

Ultimately, this project demonstrates how AI can transform maternity care from reactive management to proactive, personalised prevention, offering a scalable model that aligns with NHS priorities to reduce stillbirths and improve perinatal outcomes nationally.

# Performance Evaluation of a Hybrid Solar Electric Thermal Energy Storage System with Automatic Control for Hot Water Radiator Heating in the Highland Region of Puno

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## Abstract:

This research aimed to evaluate the effectiveness of a system that integrates a thermal storage tank powered by solar and electric energy, equipped with an automatic regulation system for heating using hot water radiators in the highland region of Puno. The system incorporates an evacuated tube solar collector to harness the available solar resource during the day with the objective of reducing electrical consumption. Hot water is stored in a thermally insulated tank. An automatic control system regulates the internal temperature of the system, maintaining it within ranges that ensure the desired indoor comfort levels, while also managing the hot water flow to the radiators. This optimizes the use of solar energy and relies on electricity only when necessary.

The results demonstrated that the hybrid system maintains acceptable comfort conditions and reduces electricity consumption compared to conventional heating systems. Furthermore, the cost analysis revealed that, although the initial investment is high, the energy savings enable investment recovery in the medium term, particularly in areas with high solar irradiance.

In conclusion, the hybrid system represents a viable solution for heating in Puno, combining energy efficiency and economic savings. However, challenges related to maintenance and the required infrastructure must be addressed in order to maximize its performance under variable climatic conditions.

## Keywords:

Hybrid system, Thermal energy storage, Solar energy, Heating, Automatic control.



# **Drive Towards Sustainability: Identifying the Barriers and Opportunities of Building Research Establishment Environmental Assessment Method (BREEAM) Certification in the Philippines**

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## **Abstract:**

Construction has been one of the most dynamic industries, and this has helped in the evolution of communities around the world. In response to global sustainability challenges, green building certifications like the Building Research Establishment Environmental Assessment Method (BREEAM) offer a structured framework for reducing environmental impact and promoting sustainable practices. However, in the Philippines, the adoption of BREEAM remains limited, hindered by factors such as high initial costs, limited public awareness, and a shortage of trained professionals. To address these issues, engineers should look for more green practices to lessen carbon footprint and promote sustainability. Developers integrate these green practices during the construction stage. To guarantee that the projects meet sustainable standards, green certifications such as the Building Research Establishment Environmental Assessment Method (BREEAM) provide a checklist of guidelines wherein criteria are laid out and points are given based on the environmental categories. However, in the construction industry in the Philippines, green certifications like BREEAM are not yet known.

This study aims to determine the disposition of the construction industry in the country towards green certifications, particularly identifying the barriers and opportunities of BREEAM certification in the Philippine construction sector. Through survey and qualitative analysis, the research highlights industry perceptions, revealing that while developers recognize the long term-benefits of green certification. The findings emphasize the need for greater government support, educational initiatives, and financial incentives to encourage wider adoption of sustainable practices. By addressing these barriers, the Philippines has the potential to align its infrastructure development goals and the evolution of a more resilient construction industry.

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### **Keywords:**

green building certification, Building Research Establishment Environmental Assessment Method (BREEAM), sustainable practice, construction industry.

# The Synergistic Triangle: Engineering Innovation, Educational Reform, and Economic Policy as Catalysts for Sustainable Development

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## Abstract:

This paper examines the profound and reciprocal relationships among engineering innovation, educational reform, and economic policy. It posits that these three domains do not operate in isolation but form a powerful, synergistic triangle critical for achieving national competitive advantage and sustainable development. Engineering innovation drives productivity and opens new markets, but its pace is fundamentally constrained by a workforce equipped through relevant educational reforms. Simultaneously, economic policies—such as R&D tax credits, intellectual property laws, and infrastructure spending—either accelerate or impede the translation of both education and innovation into tangible economic growth. This analysis advocates for a cohesive, long-term policy framework that recognizes and optimizes these interconnections to foster a dynamic, resilient, and future-proof economy.

## Keywords:

R&D tax credits, Intellectual property laws, Infrastructure spending, Economic growth, Policy framework, Resilient economy, Future-proof economy.

# A Conceptual AI-Driven CRM Framework for Real-Time Personalization in Digital Commerce Practices

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## Abstract:

Digital commerce operates at a scale that outpaces traditional CRM stacks limited by static rules and siloed data. Advances in Generative AI, LLMs, RAG, and Agentic AI enable a shift from reactive case handling to proactive, explainable, and adaptive CRM. The paper proposes a multi-layered AI-driven CRM framework that integrates data, intelligent processing, orchestration, and governance. While validated through expert surveys in the digital commerce domain, its principles of personalization, trust, and scalability extend to industries such as healthcare, finance, and public services, positioning it as a blueprint for enterprise-wide AI adoption.

## Keywords:

Generative AI, LLMs, RAG, Agentic AI, CRM, Digital Commerce, Personalization, Governance.

# Immersive Virtual Lab for Mastering Distributed Systems

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## Abstract:

Understanding Distributed Systems is challenging for students due to their abstract ideas and complex algorithms. This project introduces an interactive web-based Virtual Lab designed to enhance the learning process by making it more engaging and practical. It uses React for the frontend, Spring Boot for the backend, and MySQL for data management. The platform combines theoretical resources, algorithm simulations, and assessment tools into one environment. It includes detailed learning modules with notes, handwritten materials, video lectures, animated explanations, and quizzes. The most notable feature is the algorithm simulation module, which allows users to see how key distributed algorithms are executed. An admin interface lets instructors manage content, upload materials, and track student performance. By blending interactive visuals with structured academic content, this Virtual Lab helps connect theory and practice, promoting hands-on learning and a deeper understanding for students.

## Keywords:

Distributed Systems, Virtual Lab, Algorithm Simulation, Educational Technology, Interactive Learning.

# Elevator AI: Transforming Urban Mobility Through Intelligent Lift Systems

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## Abstract:

The rapid urbanization of modern cities has intensified the demand for efficient and intelligent vertical transportation systems. Elevator AI presents a comprehensive approach to transforming conventional elevators into adaptive, intelligent lift systems using artificial intelligence and data-driven insights. The proposed model leverages real-time sensor data, passenger flow analytics, and machine learning algorithms to optimize elevator scheduling, reduce waiting times, and enhance energy efficiency. Predictive maintenance powered by AI ensures system reliability by detecting potential faults before failures occur, thereby minimizing downtime. Additionally, the system incorporates user-centric features such as accessibility assistance for differently-abled individuals and intelligent response mechanisms for emergency situations. By integrating Elevator AI within smart building ecosystems, this research envisions a sustainable and responsive urban infrastructure that improves passenger safety, comfort, and operational efficiency while supporting the broader goals of smart-city development.

## Keywords:

Artificial Intelligence, Elevator System, Predictive Maintenance, Smart Buildings, Energy Optimization, Passenger Safety, Intelligent Transport.



