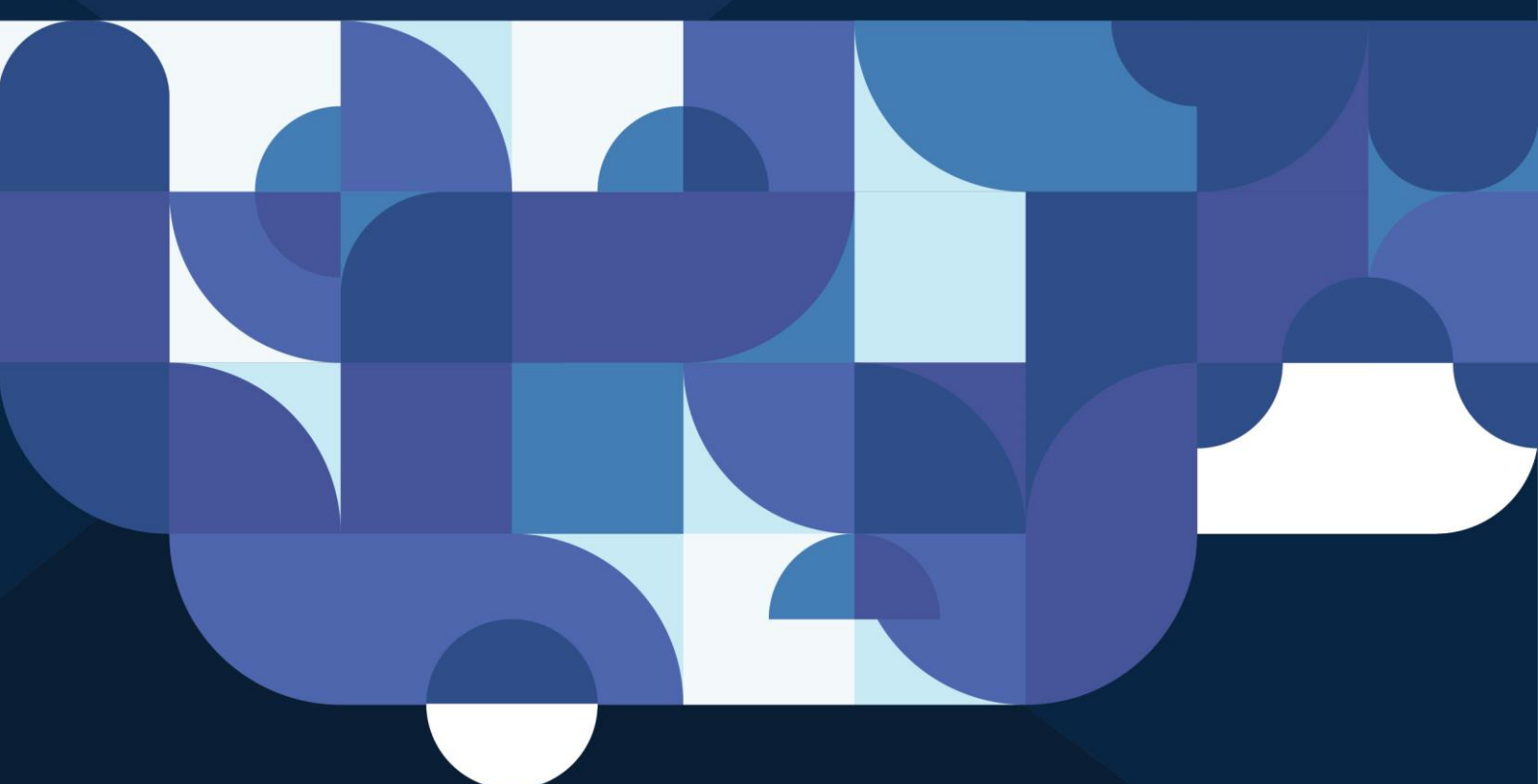


Book of Abstracts



MOTIP13 THE 13TH INTERNATIONAL CONFERENCE
IN MULTIDISCIPLINARY RESEARCH ON
TECHNOLOGY AND INNOVATION PROJECT

**Shaping Tomorrow: Innovations for
Green and Sustainable Technology**

Interdisciplinary School of Management and Technology
Institut Teknologi Sepuluh Nopember

2026

The 13th International Conference in Multidisciplinary Research on Technology and Innovation Project

July 25th, 2026 in Surabaya, Indonesia

**Interdisciplinary School of Management and Technology
Institut Teknologi Sepuluh Nopember**

MOTIP 13

The 13th International Conference in Multidisciplinary Research on Technology and Innovation Project

“Shaping Tomorrow: Innovations for Green and Sustainable Technology”

July 25th, 2026

Surabaya, Indonesia

Organized by

School of Interdisciplinary Management and Technology
Institut Teknologi Sepuluh Nopember, Surabaya, Indonesia

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About the Conference

As the world navigates an era defined by rapid technological change, environmental pressure, and the urgent need for sustainable development, **multidisciplinary research plays a pivotal role** in shaping pathways toward a greener future. From low-carbon technologies and smart systems to circular economy solutions and advanced environmental monitoring, innovation stands at the core of global efforts to achieve long-term resilience and sustainability. The **International Conference Multidisciplinary Research on Technology and Innovation Project (MOTIP)** serves as a dynamic platform that brings together researchers, academics, industry leaders, and policymakers from diverse disciplines. As a pioneering conference, MOTIP aims to bridge scientific discovery with real-world application, fostering collaboration across engineering, natural sciences, information technology, design, and socio-economic studies to address today's most pressing challenges. Carrying the theme **"Shaping Tomorrow: Innovations for Green and Sustainable Technology"**, this conference highlights cutting-edge advancements and transformative ideas that support sustainable environments, low-carbon development, and clean innovation.



Conference Focus

Multidisciplinary research, sustainable innovation, green technology, and applied solutions for global challenges.



Participants

Researchers, academics, industry practitioners, and policymakers from various disciplines and countries.



Expected Impact

Strengthening collaboration, accelerating sustainable innovation, and advancing global resilience through interdisciplinary research.

Conference Topics

1. Environmental Policy and Climate Governance in the Digital Age
2. Renewable Energy, Circular Economy, and Policy Frameworks
3. Sustainable Management and Environment
4. Sustainable Industry, Agriculture & Society
5. Urban Infrastructure and Safety
6. General Green and Sustainable Technology
7. Digital Innovation for Energy Efficiency and Green Policy Implementation

Foreword from the Dean of SIMT ITS

On behalf of the School of Interdisciplinary Management and Technology (SIMT), Institut Teknologi Sepuluh Nopember (ITS), it is my great pleasure to welcome all distinguished keynote speakers, researchers, academics, industry practitioners, policymakers, and participants to the 13th International Conference on Management of Technology, Innovation, and Project (MOTIP 13).

In an era characterized by rapid technological advancement, escalating environmental challenges, and an increasing demand for sustainable solutions, interdisciplinary approaches are no longer optional—they are essential. SIMT ITS was established with the vision of integrating technology, management, innovation, and policy perspectives to address complex global and societal problems. In this context, MOTIP stands as a strategic academic platform that embodies the spirit of interdisciplinarity and collaborative innovation.

With the theme “Shaping Tomorrow: Innovations for Green and Sustainable Technology,” MOTIP 13 highlights the critical role of research and innovation in driving low-carbon development, sustainable industrial transformation, smart systems, and environmentally responsible technologies. This conference not only facilitates the dissemination of high-quality research but also encourages meaningful dialogue between academia, industry, and government to ensure that scientific advancements translate into tangible societal impact.

I would like to express my sincere appreciation to the organizing committee, reviewers, partners, and all contributors whose dedication has made this conference possible. I also extend a warm welcome to all participants and hope that MOTIP 13 will inspire fruitful discussions, new collaborations, and impactful ideas that contribute to a more sustainable and resilient future.

Sincerely,

Prof. Dr. Tri Arief Sardjono

Dean

School of Interdisciplinary Management and Technology (SIMT)

Institut Teknologi Sepuluh Nopember (ITS)

Foreword from the Chair of MOTIP 13

It is with great honor and enthusiasm that I welcome you to the 13th International Conference on Management of Technology, Innovation, and Project (MOTIP 13). This conference serves as an international forum for scholars, researchers, professionals, and policymakers to exchange knowledge, share research findings, and explore innovative solutions to contemporary technological and sustainability challenges.

As the world faces unprecedented transitions driven by digital transformation, climate change, and sustainability imperatives, the integration of multidisciplinary research becomes increasingly vital. MOTIP was initiated to bridge the gap between scientific innovation and practical implementation, fostering collaboration across engineering, technology, management, information systems, design, and socio-economic disciplines.

The theme “Shaping Tomorrow: Innovations for Green and Sustainable Technology” reflects our collective commitment to advancing research that supports sustainable development, clean technology, circular economy practices, and smart, low-carbon solutions. Through keynote sessions, technical presentations, and scholarly discussions, MOTIP 13 aims to stimulate critical thinking and encourage collaborative efforts that address real-world problems with global relevance.

I would like to extend my deepest gratitude to the keynote speakers, authors, reviewers, sponsors, and organizing committee members for their invaluable contributions. I also thank all participants for being part of MOTIP 13. May this conference provide an inspiring and productive environment for knowledge exchange, networking, and the generation of impactful ideas for a sustainable future.

Warm regards,

Dr. rer. nat. Ruri Agung Wahyuono

Conference Chair

The 13th International Conference on Management of Technology, Innovation, and Project (MOTIP 13)

Table of Contents

About the Conference	5
Foreword from the Dean of SIMT ITS	6
Foreword from the Chair of MOTIP 13	7
Table of Contents	8
Conference Agenda	9
Conference Guideline	10
Abstract Track Section A	18
Abstract Track Section B	30
Abstract Track Section C	43
Abstract Track Section D	55
Abstract Track Section E.....	67

Conference Rundown

Time	Activities					
08.30 – 09.00	Registration					
09.00 – 09.30	Opening Remarks by Dean and Conference Chair					
09.30 – 09.45	Entering Breakout Room and Preparing Presentation					
09.45 – 10.00	Parallel Session	A1	B1	C1	D1	E1
10.00 – 10.15		A2	B2	C2	D2	E2
10.15 – 10.30		A3	B3	C3	D3	E3
10.30 – 10.45		A4	B4	C4	D4	E4
10.45 – 11.00		A5	B5	C5	D5	E5
11.00 – 11.15		A6	B6	C6	D6	E6
11.15 – 11.30		A7	B7	C7	D7	E7
11.30 – 11.45		A8	B8	C8	D8	E8
11.45 – 12.00		A9	B9	C9	D9	E9
12.00 – 12.15		A10	B10	C10	D10	E10
12.15 – 12.30		A11	B11	C11	D11	E11
12.30 – 12.45		A12	B12			
12.45 – 13.00	Closing and Awarding Ceremony					

Conference Guidelines

General Rules

1. Dress code: formal or batik (no t-shirt).
2. Participant should use the virtual background as a [Presenter](#) or an [Audience](#). The video should be always on during the presentation.
3. Rename your Zoom account with format: **Code_Full Name**, example: **A1_Ahmad Fawwaz Robi Pradana**.
4. Kindly join the sessions according to this **Schedule**.
5. To obtain certificate of presenter, you must attend the whole session, from opening session, parallel sessions, giving presentation, until closing ceremony by accessing [this Zoom link](#).
6. After the presentation session, please fill [this Attendance Report](#) by uploading your proof of attendance.
7. The proof of attendance can be a screenshot of the webinar page, containing the material slide and/or the speaker, your face, and your name.
8. Our staff will check your name anytime during conference for certificate eligibility.

Presentation Guidelines

1. Each parallel symposia session will have a moderator, with one or more committee members in attendance.
2. You must attend the webinar at least 5 minutes before the opening session starts. Kindly report to the session chair when you arrive at virtual meeting before the session starts.
3. The presentation time is 15 minutes per presenter, including question and answer. Moderator will interrupt and stop the presentation if the time is over.
4. Presentation slide and speech must be delivered in English, the presentation template can be downloaded [here](#).
5. All presenters are permitted to use their own computer/laptop to present their work by using share screen feature in Zoom.
6. Question and answer must be delivered in English.

Technical Suggestions

1. Presentation using laptop/computer is preferable.
2. You should look for comfortable and quiet place to avoid any disturbance during the session.
3. Before the conference, make sure that your connection, audio, video, and any other technical function in your Zoom application are running properly.
4. Having backup/alternative internet connection is preferable.
5. For those who are not familiar with presenting in the Zoom Platform, we facilitate you to try it in our Practice Session which will be held by request.

Parallel Session Schedule

Section A	Digital Innovation for Energy Efficiency and Green Policy Implementation	
	Environmental Policy and Climate Governance in the Digital Age	
	General Green and Sustainable Technology	
	Urban Infrastructure and Safety	
Code	Time	Title and Author(s)
A1	09.45	<i>Margin-Aware Cross-Selling on Odoo ERP via EFIM High-Utility Itemset Mining Under a Hybrid OLTP-OLAP Architecture</i> Abdillah Wicaksana Basri
A2	10.00	<i>Strategic Drivers for Digital Transformation in Frozen Food Cold Supply Chains</i> Helmi Zakaria, Putu Dana Karningsih
A3	10.15	<i>Understanding Corrective Maintenance Process Behavior in SAP PM Optimizing User Experience Learning Management System for Frontliner Using Design Thinking Methods</i> Indrihana Kharismaning Larasati, Mahendra Wardhana
A4	10.30	<i>Improving The Acceptance Of Maintenance System Online (MSO) Applications Among Maintenance Personnel In Cement Companies By Using Change Management Model</i> Kokoh Adicaraka
A5	10.45	<i>Profitability Analysis of Thermal Spray Application on Boiler: Case Study on Steam Power Plant</i> Mefta Sulfiono, Moses Laksono Singgih
A6	11.00	<i>Determinants of electric vehicle adoption in East Kalimantan, Indonesia: integrating UTAUT2 with institutional and innovation ecosystem perspectives</i> Nyoman Suprayojana Trisna Aditya, Reny Nadlifatin
A7	11.15	<i>EVALUATION OF DIGITAL POWER PLANT IMPLEMENTATION POST-HOLDING-SUBHOLDING STRUCTURE TRANSFORMATION AT PT ABC (PERSERO) USING THE INTEGRATION OF HUMAN ORGANIZATION TECHNOLOGY FIT AND TECHNOLOGY ACCEPTANCE MODEL: AN EMPIRICAL STUDY AT PT XYZ</i> Akbar Rachmad Virgiawan, Bagus Jati Santoso

A8	11.30	<i>Integrating Design Thinking and AHP for Strategic Risk Management of Public Electric Vehicle Charging Station Placement A Case Study of PLN UID Jakarta Raya</i> Yuni Prastiyo , Hendro Nurhadi, Fadil Asqhallaniy
A9	11.45	<i>Techno-economic Analysis of Nondestructive Test Method Based on Radiography and Ultrasonic on High Pressure Pipe Welding at Construction Project of Alcohol Plantation in Indonesia Using Analytical Hierarchy Process (AHP)</i> Ahdine Windyarti , Hosta Ardhyana, Tri Arief Sardjono, Ruri Agung Wahyuono
A10	12.00	<i>Operationalizing a developer experience taxonomy into an eight-dimension audit instrument for regulated open banking API portals</i> Clint Buyung Perdana , Octaviyanti Dwi Wahyurini, Nur Aini Rakhmawati, Ellya Zulaikha
A11	12.15	<i>Comparative Time Series Forecasting for Telecommunication Infrastructure Customer Complaints: A Case Study of PT XYZ</i> Ahmadi Mohammad Syauqi , Sutikno
A12	12.30	<i>A design thinking approach to improving user experience in textile machinery spare-parts ordering</i> Rachmat Ramadhan , Hadziq Fabroyir

Section B Renewable Energy, Circular Economy, and Policy Frameworks		
Code	Time	Title and Author(s)
B1	09.45	<i>Impacts of China's Energy Structure Changes and Energy Transition Policies on Indonesia's Coal Exports: A Mixed-Method Approach</i> Agus Herdianto , Suyanto
B2	10.00	<i>AHP-Based Selection of a Hybrid PV-WTG Energy System for Improving Sustainable Energy Access in the Labuhan Coastal Area, Bangkalan</i> Andi Pradana Subianto
B3	10.15	<i>The Influence of Prices, nline Customer Reviews, and Online Customer Ratings on Purchasing Decisions Through Buying Interest</i> Arfiani Intan Algusta , Jerry Dwi Trijoyo Purnomo
B4	10.30	<i>Tugboat provisioning strategy for LNG terminal operations using a multiple attribute decision making (MADM) approach</i>

		BUDIHARDJO, KETUT BUDA ARTANA
B5	10.45	<i>An Assessment of Techno-Economic and Policy for The Implementation of Rooftop PV in Heavy Industries Using SWOT (Strength, Weakness, Opportunities & Threat)</i> Eka Setya Rouza, Suyanto
B6	11.00	<i>Selection Of Electrical Power Supply System for Indonesian Upstream Oil and Gas Facilities Using AHP & TOPSIS Method to Improve Production Reliability and Oil Lifting Performance</i> Febrian Surya Perkasa, Ruri Agung Wahyuono
B7	11.15	<i>Selection of Alternative Solar Photovoltaic (PV) Synchronization Operation Schemes for Optimizing Operational Patterns at PLN Using the AHP-TOPSIS Method</i> I Putu Sudiarta, Ruri Agung Wahyuono
B8	11.30	<i>Oil and Gas field selection using an AHP-TOPSIS approach for CO2-EOR injection based CCUS Technology Implementation</i> Jonathan Fritz Simamora, Ruri Agung Wahyuono
B9	11.45	<i>Operational Behavior of AC and DC Coupling Architecture on Battery Utilization and PV Surplus Energy in Grid-Connected PV-BESS System</i> M. Hajam Maskur, Vita Lystianingrum
B10	12.00	<i>MULTI-CRITERIA SPATIAL ASSESSMENT FOR PUBLIC EV CHARGING STATION PLACEMENT TO SUPPORT ELECTRIC PUBLIC TRANSPORT OPERATIONS IN BOGOR CITY</i> PULUNG ADE SUSANTO, RURI AGUNG WAHYUONO
B11	12.15	<i>1 Phase Residential Tariff Simplification Through Customer Segmentation and STP Marketing: A Case Study of PT PLN (Persero) UP3 Saumlaki</i> Ditya Pradana
B12	12.30	<i>An Analysis of User Switching Behavior Toward QRIS Payments: A Push-Pull Mooring Model</i> Ridha Tentiani, Reny Nadlifatin

Section C

Renewable Energy, Circular Economy, and Policy Frameworks

Sustainable Industry, Agriculture, and Society		
Sustainable Management and Environment		
Code	Time	Title and Author(s)
C1	09.45	<i>Integrated Techno-Economic and Environmental Assesment of Hybrid Diesel-PV-Battery System for Electricity Supply in Remote Island : A case study of Gili Raja Island, Indonesia</i> Ryan Juliani, Roni Seto Wibowo, Heri Suryoatmojo
C2	10.00	<i>Selection of a flare gas recovery system using the analytic hierarchy process to increase sales gas potential in an upstream gas processing facility</i> Sabdo Waluyo, Ruri Agung Wahyuono
C3	10.15	<i>Site Selection for a 10 MW Solar PV-BESS Project in Timika Using GIS-ANP for Power Generation Cost Efficiency</i> Taufiqur Rohman, AA Bagus Dinariyana
C4	10.30	<i>Inventory Strategy Selection under the Trade-off Between Lost Sales Risk and Expiration Risk in Horticultural Seed Companies</i> Andri Setiawan, Iwan Vanany
C5	10.45	<i>IMPLEMENTATION OF FUZZY AHP, PROMETHEE II, AND VIKOR METHODS IN SELECTING PRIORITY PROJECTS IN THE UTILITIES AREA OF PT ABC REFINERY</i> Dwiky Nugraha, Vita Ratnasari, Ridho Bayuaji, and Ruri Agung Wahyuono
C6	11.00	<i>The Influence of Digital Activation, Sponsorship Participation, and Theory of Planned Behavior Constructs on Customer Engagement: The Mediating Role of Brand Image Perception in Jakarta International Marathon</i> Frengky, Reny Nadlifatin
C7	11.15	<i>Business Stagnation in Aloe Vera Agroindustry SMEs: Identifying Root Causes and Structural Vulnerabilities in Pontianak City, Indonesia</i> Lidya Yacinta, Niniek Fajar Puspita
C8	11.30	<i>Dynamic Bottleneck Identification in a Labor-Intensive Make-to-Order Water Meter Production Line Using Theory of Constraints and Discrete Event Simulation</i> Rhyzalaita Adhi Sangadji, Silvanita

C9	11.45	<i>Technology Readiness and Gap Analysis of the HPMSM Industry in Indonesia Using the THIO Framework</i> Zumrotus Saadah Abaz, Udisubakti Ciptomulyono
C10	12.00	<i>Evaluation of Digital Logistics Implementation at PT XYZ Distributors</i> MEDIKA KRISTINA SIHOMBING, ANDHITA RAMADHANTI
C11	12.15	<i>Environmental, Social, and Governance Risk Management in Jetty Construction using FMEA</i> Pramaditya Ardiyanto, Haryo Dwito Armono

Section D		Sustainable Management and Environment
Code	Time	Title and Author(s)
D1	09.45	<i>Responsible digital retail in online beauty shopping: a multidisciplinary review of consumer confidence, technology-mediated evaluation, and platform accountability</i> Abdul Salam, RV Hari Ginardi
D2	10.00	<i>Data-driven facility booking efficiency for sustainable higher education asset management</i> Sulistiyo, Mukhammad Muryono, Nur Yuliyanto, Wahyu Irwansyah, Alfan Setya
D3	10.15	<i>Time-to-Churn Prediction in Telecommunication Industry using Survival Analysis and Machine Learning</i> Annisa Nathania Eka Gustha, Shofi Andari
D4	10.30	<i>A behavioral KPI model for sustainable higher education facilities management: Evaluating daily contract workers</i> Bambang Widjanarko, Ellya Zulaikha, Sabar
D5	10.45	<i>Feasibility analysis of fulfillment center location selection using the analytical network process: a case study at PT XYZ in Deli Serdang Regency</i> Bangkit Hernawantoro, Tri Arief Sardjono
D6	11.00	<i>Determining Maintenance Priorities for Medium-Voltage Overhead Lines (SUTM) Using Delphi and AHP Methods at PT PLN (Persero) UP3 Cikupa</i> Budi Ariwibowo Asri, Mohammad Isa Irawan

D7	11.15	<i>Criteria and Methods in Data Center Site Selection: A Systematic Literature Review</i> DRIE ALSI LAKSANA , RADEN VENANTIUS HARI GINARDI, HENNING TITI CIPTANINGTYAS
D8	11.30	<i>The Impact of Perceived ESG Practices on Affective Organizational Commitment: Mediation of Organizational Trust and Organizational Identification in Indonesia's Tobacco Supply Chain Industry</i> Karima , Reny Nadlifatin
D9	11.45	<i>DETERMINING THE PRIORITY SCALE OF SPECIAL TAP TRANSFORMER INSTALLATION FOR VOLTAGE DROP REPAIR IN THE WORK AREA OF PLN UP3 BANTEN SELATAN USING AHP TOPSIS METHOD</i> MOHAMMAD ISA IRAWAN , MANLAHIMA PADARIDI AS
D10	12.00	<i>MAINTENANCE MANAGEMENT STRATEGIES AN EFFECTIVE TRANSMISSION PROTECTION SYSTEM TO IMPROVE THE AVAILABILITY AND RELIABILITY OF THE BINTAN ELECTRICAL SUBSYSTEM</i> Arief Sandy , Muhammad Amarudin, Bintang Nur
D11	12.15	<i>A Hybrid Inventory Optimization Framework Integrating Spare Parts Classification and Monte Carlo Simulation for Sustainable Spare Parts Management under Stochastic Demand</i> Dinda Maurissa Hartlan

Section E		Sustainable Management and Environment
		Urban Infrastructure and Safety
Code	Time	Title and Author(s)
E1	09.45	<i>ANALYSIS OF THE IMPLEMENTATION OF MARKETING MIX 7P'S AND SERVICE QUALITY ON CUSTOMER SATISFACTION AND CUSTOMER LOYALTY AT THE HVAC CONTRACTOR COMPANY PT ABC</i> Bayuaji Ridho, Bustanul Arifin, Kusuma Firdaus
E2	10.00	<i>Workforce Dynamics in Large-Scale Infrastructure Construction: A System Dynamics Model Integrating Transformational Leadership, Emotional Intelligence, Burnout, and Voluntary Turnover</i> Muhammad Harizki Aditya , Adithya Sudiarno

E3	10.15	<i>Optimizing the weighting criteria for research mentor selection based on school partner clusters using the AHP method for sustainable management in an EdTech startup</i> Pradhikta Naufal Irfanda, A.A. BGS. Dinariyana Dwi Putranta
E4	10.30	<i>Discrete event simulation-based operational strategy optimisation for productivity of an express laundry service: a case study of Simple Day Laundry</i> Rangga Kurniawan Ladioktaviagusdi, Budi Santoso
E5	10.45	<i>Formulating a Business to Business (B2B) Marketing Strategy for Sustainable Aviation Fuel (SAF): an Empirical Study</i> Rizki Rahim, Reny Nadlifatin, Jaka Purwanto
E6	11.00	<i>Build Operate Transfer as a Financially Viable Response to Tightening Wastewater Regulations and Capital Constraints</i> Rofi Arga Hardiansyah, Nurhadi Siswanto
E7	11.15	<i>Benchmarking Cargo Handling Equipment Efficiency at Indonesian Regional Container Terminals Using Integrated Data Envelopment Analysis (DEA), Variable Returns to Scale (VRS) and Analytical Hierarchy Process</i> Suryawan Udadi Nugrahan, Raja Oloan Saut Gurning
E8	11.30	<i>Salesman Allocation and Scheduling Optimization Using Constrained K-Means Clustering: A Case Study of a Distribution Company</i> Arya Ramadhanu, Imam Baihaqi
E9	11.45	<i>A Decision-Making Framework for Evaluating Lightning Protection Systems on Transmission Towers Using Entropy Weighting and TOPSIS</i> Aditya Adiaksa, Tri Arief Sardjono
E10	12.00	<i>A Spatial Multi-Criteria Decision Framework for Planning 500 kV Underground Cable Corridors in Surabaya and Sidoarjo</i> Willyam Abraham Marisi Berlian, Raden Venantius Hari Ginardi
E11	12.15	<i>Strategic Decision-Making for PA Catalyst Vendor using Fuzzy Analytical Hierarchy Process</i> Achmad Syauqi Mahsun Latief, A.A. BGS. Dinariyana Dwi P

Abstract Track Section A

Digital Innovation for Energy Efficiency and Green Policy Implementation (A1-A6)
Environmental Policy and Climate Governance in the Digital Age (A7-A8)
General Green and Sustainable Technology (A9-A10)



SIMT ITS



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A1

Book of Abstracts

Abdillah Wicaksana Basri¹

¹Master of Technology Management Program, Interdisciplinary School of Management and Technology., Institut Teknologi Sepuluh Nopember, Surabaya, Indonesia

Abstract. Indonesian retailers increasingly use ERP platforms such as Odoo but rarely exploit their historical sales data for marketing. PT XYZ, a building-materials supermarket running Odoo 18, holds 239,736 orders and 557,266 order lines for 2024-2025 yet produces no margin-aware cross-selling insight. This study use Design Science Research Methodology to designs and evaluates an artifact that integrates Efficient High-Utility Itemset Mining (EFIM) into Odoo and isolates its analytical workload from operational traffic through a Hybrid Transactional/Analytical Processing (HTAP) architecture. The mining engine is a Odoo custom addons that implement EFIM algorithm. Results are written to Odoo's native optional-product field, so recommendations appear in the Sale Order. Validation covers unit testing, output-equivalence testing against EFIM on SPMF Java library, a runtime and workload-isolation benchmark on production-scale data, and expert feedback. On a controlled synthetic dataset the port matched SPMF exactly across four minimum-utility (minutil) thresholds. On the production data, with `max_itemset_size = 3` and `minutil 0.15%`, the module produced 108 high-utility itemsets, and concurrent mining held OLTP P95 latency at 34.8 ms versus 133.2 ms on the operational schema - a 74% reduction. The contribution is a case-based blueprint for embedding margin-aware itemset mining in Odoo ERP without disturb transactional stability.

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Interdisciplinary School of Management and Technology
Institut Teknologi Sepuluh Nopember

2026

A2

Strategic Drivers for Digital Transformation in Frozen Food Cold Supply Chains

Helmi Zakaria¹ and Putu Dana Karningsih¹

¹Master of Technology Management Program, Interdisciplinary School of Management and Technology., Institut Teknologi Sepuluh Nopember, Surabaya, Indonesia

Abstract. Digital transformation has become essential for improving operational efficiency and sustainability in frozen food cold supply chains, where maintaining product quality depends on reliable temperature control, real-time visibility, and coordinated operations. However, digital technology adoption remains challenging due to limited infrastructure, insufficient organizational readiness, and weak system integration among supply chain participants. This study investigates the causal relationships among factors influencing digital technology adoption in the cold supply chain of PT Rich Products Manufacturing Indonesia (PT RPMI). The Decision-Making Trial and Evaluation Laboratory (DEMATEL) method was applied to evaluate 23 factors grouped into five dimensions: technology, organization and people, process and external coordination, operational efficiency, and sustainability, based on expert assessments. The results identify Top Management Support as the strongest driving factor, while ERP-MES-WMS-TMS Integration emerges as the most prominent factor within the system. Other strategic enablers include Data Analytics and Artificial Intelligence, ICT Infrastructure, Cross-functional Collaboration, IoT-based Temperature and Humidity Monitoring, and Human Resource Competency and Training. Based on these findings, a phased Digital Transformation Roadmap is proposed to guide implementation by strengthening organizational readiness, establishing integrated digital infrastructure, and subsequently deploying advanced digital technologies. This study contributes to the literature by presenting an integrated causal model that explains how technological, organizational, and process factors collectively enhance operational efficiency and sustainability in frozen food cold supply chains.

A3

Optimizing User Experience Learning Management System for Frontliner Using Design Thinking Methods

Indrihana Kharismaning Larasati¹, Mahendra Wardhana¹

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²Department of Interior Design, Institut Teknologi Sepuluh Nopember (ITS), Surabaya, Indonesia

Abstract. This study examines usability issues in Bank XYZ's Learning Management System (LMS), used by Frontliner employees who have limited learning time due to strict service-hour schedules. An initial evaluation revealed that users struggled to find mandatory courses and evaluations, reflecting weaknesses in findability and information clarity. Using the Design Thinking approach (Empathize, Define, Ideation, Prototyping, Testing) with six Frontliner participants, the study identified key problem areas and translated them into design improvements guided by Andragogy and UX principles. Usability Testing showed satisfaction rising significantly from 65.42 to 90.83 after the redesign, well above Sauro's (2011) acceptable threshold of 68, along with improved task success rates and completion times. These findings confirm that Design Thinking, combined with adult-learning principles, can effectively resolve usability barriers in a corporate LMS.

A4

Improving The Acceptance Of Maintenance System Online (MSO) Applications Among Maintenance Personnel In Cement Companies By Using Change Management Model

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Abstract. Digital transformation in maintenance through the Maintenance System Online (MSO) application is intended to improve recording accuracy and decision-making quality. MSO had 1,639 registered accounts in 2024, only approximately 33% of users were recorded as active. This study examines the factors influencing MSO acceptance and actual use among maintenance personnel by applying the change management dimensions of Awareness, Desire, Knowledge, Ability, and Reinforcement (ADKAR), together with Behavioral Intention (BI) and Actual Use (AU). The study applied a quantitative explanatory approach with a cross-sectional survey design. Data were collected from 265 respondents and analyzed using validity and reliability tests and linear regression. All 21 indicators were valid, and construct-level Cronbach's Alpha values ranged from 0.7732 to 0.9033. All tested paths were positive and significant at $p < 0.001$. Reinforcement emerging as the dominant predictor ($\beta = 0.463$). BI and Reinforcement explained 37.9% of the variance in AU; the effect of Reinforcement ($\beta = 0.367$) was slightly stronger than that of BI ($\beta = 0.355$). These findings indicate that user competence and intention must be supported by consistent organizational reinforcement. The main recommendations include unit-level utilization monitoring, regular supervisory feedback, integration of MSO into procedures and evaluation of system quality.

A5**Profitability Analysis of Thermal Spray Application on Boiler:
Case Study on Steam Power Plant**

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Abstract. Degradation of waterwall tubes in Circulating Fluidized Bed boilers caused by erosion, high temperature corrosion, and abrasion is a primary contributor to elevated operation and maintenance costs in coal-fired power plants. Thermal Spray using IGS Smart Gard material has emerged as a surface protection technology capable of extending component service life and reducing forced outages, yet its adoption requires substantial capital investment that demands rigorous financial viability assessment. This study evaluates the profitability of applying Electric Arc Wire Thermal Spray with IGS Smart Gard on the waterwall tubes of CFB boiler, using a quantitative case study approach drawing on primary operational data and secondary financial records. Investment feasibility was assessed through four complementary indicators, Benefit-Cost Ratio, Net Present Value, Internal Rate of Return, and Payback Period, and was stress-tested using one-way sensitivity analysis against the discount rate, inflation rate, and energy price. The results demonstrate that the application produces a Benefit-Cost Ratio of 2.02, a Net Present Value of USD 686,034.28, an Internal Rate of Return of 54.38%, and a Payback Period of 2 years based on a discount rate of 8%, inflation of 3%, project life of five years, and energy price of USD 85/MWh. Sensitivity analysis confirms that energy price is the most influential variable, followed by the discount rate and inflation, yet the project remains financially viable across the entire tested range. The study concludes that thermal spray protection on CFB boiler waterwall tubes represents a highly profitable investment that substantially exceeds its initial outlay, enhances plant reliability, and offers a robust decision under parametric uncertainty for the power generation industry.

A6

Determinants of electric vehicle adoption in East Kalimantan, Indonesia: integrating UTAUT2 with institutional and innovation ecosystem perspectives

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Abstract. Indonesia's electric vehicle (EV) transition remains Java-centric, leaving regions such as East Kalimantan, the site of the new capital Nusantara (IKN), with high awareness but minimal adoption amid dispersed geography and scarce charging infrastructure. This study analyses the determinants of EV adoption among 200 potential adopters across five cities and regencies of East Kalimantan using an extended UTAUT2 model interpreted through a Four-Layer Integration Framework spanning behavioural, institutional, ecosystem, and economic perspectives. Data were analysed with PLS-SEM, complemented by MICOM-based Multi-Group Analysis to test boundary conditions across demographic segments. Performance Expectancy emerges as the dominant driver of Behavioral Intention ($\beta = 0.392$), followed by Price Value ($\beta = 0.257$) and Social Influence ($\beta = 0.154$), while Effort Expectancy is marginal and Facilitating Conditions non-significant, a pattern explained as a regime-level infrastructure constraint rather than irrelevance. Behavioral Intention strongly predicts Adoption Intention ($\beta = 0.712$), with the model explaining 46.5% and 50.7% of the respective variances. Region and education moderate the ease-of-use path, which vanishes for non-urban respondents preoccupied with road topography and range anxiety. The findings call for corridor-based charging deployment, home-charging incentives, and test-drive programmes that activate social proof in this nascent market.

A7

EVALUATION OF DIGITAL POWER PLANT IMPLEMENTATION POST-HOLDING-SUBHOLDING STRUCTURE TRANSFORMATION AT PT ABC (PERSERO) USING THE INTEGRATION OF HUMAN ORGANIZATION TECHNOLOGY FIT AND TECHNOLOGY ACCEPTANCE MODEL: AN EMPIRICAL STUDY AT PT XYZ

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Abstract. The Holding-Subholding transformation at PT ABC (Persero) resulted in a low acceptance level of the Digital Power Plant (DPP) system among field operators at PT XYZ due to a mismatch with new SOPs and minimal management support. This study evaluates the post-transformation implementation of the DPP system by integrating the Human-Organization-Technology Fit (HOT-FIT) framework and the Technology Acceptance Model (TAM). Employing a quantitative approach, data from 206 DPP system users were analyzed using Structural Equation Modeling-Partial Least Squares (SEM-PLS). The results confirmed that the model met validity and reliability criteria, explaining 53.8% of the variance in behavioral intention and 62.4% in net benefit. Hypothesis testing revealed that the organizational environment is the most dominant predictor of perceived usefulness (path coefficient = 0.312), while information quality is the most dominant predictor of perceived ease of use (path coefficient = 0.391). Ultimately, both perceptions significantly drive the behavioral intention to use the DPP system, which subsequently contributes to a substantial net benefit for PT XYZ.

A8

Integrating Design Thinking and AHP for Strategic Risk Management of Public Electric Vehicle Charging Station Placement

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Abstract. The acceleration of electric vehicle adoption requires public electric vehicle charging stations (SPKLU) that are reliable, accessible, and aligned with urban infrastructure constraints. In dense metropolitan areas such as Jakarta, SPKLU placement is not only a technical grid planning problem, but also a service, permitting, spatial-planning, and user-experience decision problem. This study develops an integrated decision framework that combines Design Thinking, Risk Breakdown Structure (RBS), Analytical Hierarchy Process (AHP), and a risk matrix to support strategic SPKLU site selection in the PLN UID Jakarta Raya service area. The Design Thinking stage was used to capture user needs, pain points, and perceived service risks from 52 electric vehicle users. These findings were translated into four risk categories and twelve sub risks. AHP was then used to weight risk probability and impact, followed by normalized $P \times D$ integration and location risk scoring. The results show that regulatory and permitting risks dominate the risk profile with an aggregate weight of 0.577, followed by operational risks (0.266), technical risks (0.092), and socio-economic risks (0.065). The highest priority sub risks are uncertainty of building and land permits ($R2 = 0.296$), long queue ($O2 = 0.219$), and mismatch with DKI Jakarta spatial planning ($R3 = 0.146$). Location scoring indicates that PLN Bulungan, Menteng SPKLU Center, and Kemang have the lowest risk scores, while Grand Indonesia has the highest risk score. The study contributes to a human-centered and risk-based decision model for SPKLU planning and provides practical recommendations on service standardization and PLN-local government coordination.

A9

Techno-economic Analysis of Nondestructive Test Method Based on Radiography and Ultrasonic on High Pressure Pipe Welding at Construction Project of Alcohol Plantation in Indonesia Using Analytical Hierarchy Process (AHP)

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Abstract. Nondestructive Testing (NDT) ensures the quality and serviceability of industrial components without damaging the inspected material. Radiographic Testing (RT) and Phased Array Ultrasonic Testing (PAUT) are widely used for pipeline weld inspection. During the Construction Project of an Alcohol Plantation in Indonesia, both methods produced inconsistent results for high-pressure pipe welds while inspection costs remained high, creating the need for a technical and economic evaluation. Digital Radiography (DR), an advanced form of RT, was included as an alternative. This study applied the Analytic Hierarchy Process (AHP) to compare RT, DR, and PAUT using three main criteria, nine sub-criteria, and twenty-four sub-sub-criteria. Investment feasibility was assessed through Net Present Value (NPV), Internal Rate of Return (IRR), and Payback Period, alongside a comparison between equipment rental and ownership. Results show that RT provides the strongest capability for weld defect detection, whereas PAUT is limited by lower productivity during joint inspection. Economically, DR delivers the greatest financial benefit. RT achieved the highest preference score of 52.6%, while outsourcing NDT services was more economical for projects involving fewer than 2,130 weld joints.

A10

Operationalizing a developer experience taxonomy into an eight-dimension audit instrument for regulated open banking API portals

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Abstract. Open banking mandates have secured the technical foundations of application programming interface (API) exchange, yet the quality of developer interaction stays weakly addressed in regulated markets. Current developer experience (DEX) knowledge offers a validated 27-factor taxonomy, but those factors remain theoretical and resist direct use in portal inspection. This gap leaves practitioners without a concrete instrument to diagnose onboarding friction on open banking API portals. This paper develops an eight-dimension DEX audit instrument that translates the 27-factor taxonomy into observable evaluation criteria for regulated business-to-business API portals. Each dimension binds two or three DEX factors and rests on established API and usability literature, which yields an explicit crosswalk between theoretical factors and inspectable portal areas. The instrument is demonstrated through a heuristic audit of the SNAP Developer Site, the reference portal operated by the Indonesian Payment System Association (ASPI), scored across thirteen documented checkpoints. This audit returns an aggregate score of sixteen out of forty and exposes five barriers to developer self-sufficiency. The instrument gives researchers and practitioners a transferable diagnostic tool that supports a more inclusive and sustainable open banking ecosystem.

A12

A design thinking approach to improving user experience in textile machinery spare-parts ordering

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Abstract. Spare-parts ordering for textile machinery is error-prone when machine configurations, digital part books, part-number revisions, and ordering channels are disconnected. At an Indonesian machinery distributor, 7 of 18 orders recorded from 2024 to June 2025 contained incorrect, incompatible, or obsolete parts. This study applied the five-stage Design Thinking process to design and formatively evaluate an integrated ordering experience. Six customer and internal stakeholders were interviewed; the findings were synthesized into affinity themes, personas, journey and empathy maps, problem statements, and a value proposition. A Figma prototype linked machine selection, a digital part book, component imagery, revision notices, validation, a cart, checkout, estimated arrival, and engineer messaging. Ten respondents from six customer companies completed nine unmoderated Maze tasks and then answered the System Usability Scale (SUS) and User Experience Questionnaire (UEQ). Every task reached 100% success with 0% drop-off; SUS was 78.25, and all UEQ scales were positive. However, Add to cart produced 64.3% misclicks because the quantity-plus control was interpreted as the cart action. The study shows how a human-centred process can integrate fragmented ordering information while revealing interaction risks before implementation. Actual error reduction must still be validated in production.

Abstract Track Section B

Renewable Energy, Circular Economy, and Policy Frameworks (B1-B11)

B1

Impacts of China's Energy Structure Changes and Energy Transition Policies on Indonesia's Coal Exports: A Mixed-Method Approach

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Abstract. China's energy transition, characterized by changes in its energy mix and the accelerated deployment of renewable energy, has the potential to reshape global coal trade, particularly for Indonesia as one of the world's largest coal exporters. This study examines the impacts of China's evolving energy structure and energy transition policies on Indonesia's coal exports and assesses their implications for economic dependence, fiscal revenue, national energy security, and Indonesia's policy responses. A mixed-method approach was employed by integrating quantitative and qualitative analyses. The quantitative analysis utilized time-series data from 2012–2024 and applied an independent-samples *t*-test, dummy variable regression, log-linear regression, and scenario analysis. The qualitative analysis was conducted through a review of policy documents and a policy gap analysis. The findings reveal a structural shift in Indonesia–China coal trade since 2021, marked by a substantial increase in Indonesia's export concentration toward the Chinese market. Furthermore, Indonesia's vulnerability is driven not only by its growing export concentration but also by its specialization in lignite (HS 2702), whereas the hard coal (HS 2701) market remains relatively more diversified. The results also indicate a strong relationship between coal exports and both the coal sector's gross domestic product and non-tax state revenue, suggesting that changes in China's coal demand could have significant implications for Indonesia's national economy. The study concludes that Indonesia–China energy relations reflect a pattern of asymmetric interdependence, highlighting the need for market diversification, economic transformation, and stronger policy governance to enhance Indonesia's energy security amid the global energy transition. These findings contribute to the literature on the interactions between energy transition, trade dependence, and policy responses in energy commodity-exporting countries.

B2

AHP-Based Selection of a Hybrid PV-WTG Energy System for Improving Sustainable Energy Access in the Labuhan Coastal Area, Bangkalan

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Abstract. This study evaluates the performance of an existing hybrid Photovoltaic–Wind Turbine Generator (PV–WTG) system and proposes a development strategy using the Analytical Hierarchy Process (AHP) for the coastal tourism area of Taman Wisata Laut (TWL) Labuhan, Bangkalan, Indonesia. Climatological data from BMKG Juanda Station (2022–2024) indicate an average Global Horizontal Irradiance (GHI) of 5.37 kWh/m²/day and an average wind speed of 5.19 m/s, with Weibull parameters of $k = 18.68$ and $c = 5.34$ m/s. Before the system was implemented, the community relied on diesel generators, resulting in high electricity costs and limited tourism and micro, small, and medium enterprise (UMKM) activities. System performance was evaluated using the Performance Ratio (PR) and Capacity Factor (CF), while development alternatives were prioritized through AHP based on technical, economic, social, Corporate Social Responsibility (CSR), and environmental criteria. The PV system achieved a PR of 35.1%, whereas the WTG achieved a CF of 11.7%, indicating a design intended to meet peak electricity demand rather than maximize energy production. AHP ranked the alternatives with the capacity-upgrade option (A2) as the highest priority (0.4679). Since 2022, the hybrid system has reduced household energy expenditure by 65–71% and increased beneficiaries' average monthly income by approximately 273%, supporting A2 as the preferred strategy for sustainable energy development.

B3

The Influence of Prices, Online Customer Reviews, and Online Customer Ratings on Purchasing Decisions Through Buying Interest

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Abstract. The purpose of this study is to look into how price, online customer reviews, and online customer ratings affect consumer's decisions to buy on the Shopee marketplace. To explain the position of the variables under investigation and their impact on one another, a quantitative approach to explanatory research is employed. Using purposive sample and nonprobability sampling procedures, the study's population consists of Shopee customers who make purchases and live in East Java. This method takes into account factors like gender, age (13–28 years), Shopee account ownership, and Shopee transactions. One hundred people are chosen as the number of responders. An online survey administered through the Google Form application is used to gather data. Respondent names and questionnaire answers make up the primary data used. Partial Least Squares (PLS) is used in data analysis. The study's findings indicate that while online customer ratings do not significantly affect purchasing decisions, price, online customer reviews, and purchase intentions do; price, online customer reviews, and online customer ratings have a significant impact on purchase intentions; and price, online customer reviews, and online customer ratings have a significant impact on purchasing decisions through purchase intentions.

B4

Tugboat provisioning strategy for LNG terminal operations using a multiple attribute decision making (MADM) approach

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Abstract. An LNG processing terminal in Papua, Indonesia, operates four tugboats to support the berthing and unberthing of LNG carriers. The fleet has been in service since 2012, and several units are now more than 15 years old, resulting in performance degradation caused by wear and ageing. Under the current operating arrangement, at least three tugboats must remain available for vessel service while one unit is kept on standby, making fleet reliability a critical operational constraint. This study develops a tugboat provisioning strategy by combining a Reliability-Centered Maintenance (RCM) perspective with a Multiple Attribute Decision Making (MADM) framework. Fleet-level availability results are used as one of the main decision criteria, together with technical, safety, economic, and operational attributes, to evaluate four provisioning scenarios ranging from retaining the existing fleet to full fleet replacement. The Analytical Hierarchy Process (AHP) is applied to weight the criteria and rank the alternatives, and a sensitivity analysis tests the robustness of the ranking. Results show that reliability and safety are the dominant criteria, and that adding one new tugboat while retaining the existing fleet is the most balanced alternative and remains top-ranked across all tested weight scenarios.

B5

An Assessment of Techno-Economic and Policy for The Implementation of Rooftop PV in Heavy Industries Using SWOT (Strength, Weakness, Opportunities & Threat)

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Abstract. Heavy-industry fabrication yards have large roof areas and substantial daytime electricity demand, but rooftop photovoltaic (PV) projects in this setting must be evaluated against structural constraints, coastal exposure, investment risk, and Indonesia's revised rooftop-PV regulation. This study presents a strategic pre-feasibility assessment for a fabrication yard in Batam. The operating mode is defined consistently as a grid-connected, behind-the-meter system prioritizing self-consumption; exported electricity is assigned no revenue. Site screening, PVsyst modelling, life-cycle cash-flow analysis, policy review, and quantified Internal Factor Evaluation (IFE) and External Factor Evaluation (EFE) matrices are integrated into one decision framework. The selected design comprises 3,540 JA Solar 410 Wp modules (1,451.4 kWp DC), ten 125 kW string inverters, and one 1,500 kVA transformer. The final design basis yields 1,785.711 MWh in the first year, equivalent to 1,230 kWh/kWp-year, with a reported performance ratio of 74.7%. Under explicitly stated assumptions - IDR 16.549 billion CAPEX, first-year O&M equal to 1% of CAPEX, 0.55% annual module degradation, 4.29% O&M escalation, a 4.75% discount rate, an IDR 1,115/kWh avoided tariff, and inverter replacement in year 13 - the recalculated base case gives an LCOE of IDR 835/kWh, NPV of IDR 6.86 billion, IRR of 8.80%, and discounted payback of 13.3 years. Sensitivity analysis confirms that CAPEX and the avoided electricity tariff are the dominant financial drivers. The IFE score of 2.80 and EFE score of 2.76 support a growth-oriented strategy, subject to quota and interconnection approval, daytime load verification, roof structural assessment, and corrosion-resistant coastal design.

B6

Selection Of Electrical Power Supply System for Indonesian Upstream Oil and Gas Facilities Using AHP & TOPSIS Method to Improve Production Reliability and Oil Lifting Performance

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Abstract. Indonesia's upstream oil and gas companies conduct exploration and production activities in both onshore and offshore operating areas. One of these operating regions is the SKW area located in Bojonegoro, East Java. The SKW area employs several oil lifting methods, including natural flow and artificial lift systems. Based on report, operational failures were identified in the Electrical Submersible Pump (ESP), primarily caused by failures in the electricity supply from diesel power generation units. These operational disruptions resulted in significant production losses and financial impacts, as substantial costs were required for well repair and restoration before production could resume. Several alternative power supply systems have the potential to improve the reliability of electricity supply in the SKW area. Therefore, the Analytical Hierarchy Process (AHP) and Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) methods were applied to evaluate alternative power supply systems for the SKW power plant. This study aims to identify feasible alternative systems and evaluation criteria for power supply systems that can be implemented in the upstream oil and gas industri within the constraints of technology availability in Indonesia. Based on AHP, the Cost parameter was identified as the highest-priority criterion, and the consistency test confirmed that the pairwise comparisons were acceptable. Furthermore, the results of the TOPSIS analysis indicate that Alternative 5—the PLN electricity supply system with Premium Super Ultima service combined with a DRUPS—achieved the highest overall ranking, making it the preferred alternative.

B7

Selection of Alternative Solar Photovoltaic (PV) Synchronization Operation Schemes for Optimizing Operational Patterns at PLN Using the AHP-TOPSIS Method

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Abstract. The development of renewable energy, particularly solar photovoltaic (PV) systems, has become a strategic priority in strengthening Indonesia's energy security. PLN UP3 Bontang, a regional distribution unit of the Indonesian state-owned electricity company, is responsible for providing an efficient, reliable, and environmentally sustainable electricity supply. Selecting an appropriate synchronization operation scheme for customer-owned PV systems, including ground-mounted and rooftop installations, is therefore essential. Available alternatives include On-Grid, Off-Grid, and Hybrid schemes, each with different advantages and limitations depending on customer needs and operating conditions. This study aims to determine the most suitable synchronization operation scheme for customer-owned PV systems at PLN UP3 Bontang to optimize operational patterns. A Multi-Criteria Decision-Making (MCDM) approach was applied by integrating the Analytic Hierarchy Process (AHP) and the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS). AHP was used to determine the weights of the evaluation criteria, while TOPSIS ranked the operational alternatives based on their closeness to the ideal solution. The proposed approach provides an objective recommendation for selecting the most efficient and sustainable synchronization operation scheme, supporting renewable energy integration and Indonesia's energy transition.

B8

Oil and gas field selection using an AHP-TOPSIS approach for CO₂-EOR injection based CCUS technology implementation

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Abstract. Company A operates mature oil and gas fields affected by reservoir pressure depletion, rising water cut, and declining productivity. Carbon Capture, Utilization, and Storage (CCUS) integrated with Carbon Dioxide Enhanced Oil Recovery (CO₂-EOR) can raise oil production while reducing carbon emissions, but selecting the most suitable field requires weighing interrelated technical and non-technical factors. This study determines the priority field for CO₂-EOR implementation at Company A using a Multi-Criteria Decision Making (MCDM) approach. Five alternatives - Prabu, Lima, Ades, Pendekar, and Rambo - were assessed against five criteria and thirteen sub-criteria obtained from a Focus Group Discussion with subject matter experts. The Analytical Hierarchy Process (AHP) weighted the criteria and sub-criteria, while the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) ranked the alternatives by their closeness to the ideal condition. Reservoir Properties obtained the highest weight (0.438), whereas Production Realization (0.215) and Permeability (0.183) were the most influential sub-criteria. TOPSIS placed Ades first, followed by Prabu, Lima, and Pendekar, with Rambo last. Applying the model to a second operator (Company B) identified Sukowan as the most feasible of three alternatives, matching the actual project decision. The model therefore provides an objective, systematic, and consistent decision-support tool for CCUS project planning.

B9

Operational Behavior of AC and DC Coupling Architecture on Battery Utilization and PV Surplus Energy in Grid-Connected PV-BESS System

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Abstract. Battery Energy Storage Systems (BESS) are increasingly integrated with photovoltaic (PV) power plants to improve renewable energy utilization and reduce energy curtailment. Among the available integration architectures, AC-coupling and DC-coupling configurations exhibit different energy flow pathways that may influence battery utilization and system performance. This study investigates the operational impact of AC-coupling and DC-coupling architectures on battery utilization and renewable energy performance in a grid-connected PV-BESS system. The Sumenep power system in Indonesia was selected as a case study due to its high solar energy potential and planned 50 MW PV development. Simulations were conducted using HOMER Pro and verified against Global Solar Atlas data, resulting in deviations below 10%. Battery utilization was evaluated using annual throughput and equivalent full cycles, while renewable energy performance was assessed through renewable fraction and excess electricity. The results show that the DC-coupling configuration achieved an annual throughput of 2.95 GWh/year, approximately 18 times higher than the AC-coupling configuration (0.16 GWh/year), corresponding to 59 and 2.8 equivalent full cycles per year, respectively. Despite this substantial increase in battery utilization, the renewable fraction remained relatively similar at 15.8% and 16.2%. Sensitivity analysis further revealed that PV capacity and solar irradiance have a greater influence on battery utilization than BESS capacity. These findings indicate that battery utilization is primarily driven by surplus PV energy availability and coupling architecture, while higher battery throughput does not necessarily result in proportional improvements in renewable energy contribution.

B10

Multi-Criteria Spatial Assessment for Public EV Charging Station Placement to Support Electric Public Transport Operations in Bogor City

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Abstract. The transition toward electric public transportation requires the availability of strategically located charging infrastructure to ensure operational efficiency and service reliability. ALIBO (Angkutan Listrik Bogor), the first electric public transport service operating in Bogor City, Indonesia, faces operational challenges due to limited accessibility to Public Electric Vehicle Charging Stations (SPKLU). This study proposes a GIS-based multi-criteria spatial assessment framework to determine the most suitable charging infrastructure location for supporting ALIBO operations. The framework consists of literature review and policy review, problem identification, GIS-based spatial screening of candidate locations, criteria identification and alternative determination, decision-making model development, and multi-criteria assessment using Fuzzy Analytical Hierarchy Process (Fuzzy AHP) and Technique for Order Preference by Similarity to Ideal Solution (TOPSIS). GIS was employed to identify feasible charging station candidates along the operational corridor, while Fuzzy AHP was used to determine criteria importance based on expert judgment and TOPSIS was applied to prioritize location alternatives. Seven evaluation criteria were considered, namely travel distance and travel time, supporting personnel availability, rental and retribution cost, investment and grid connection requirements, parking availability, security and social vulnerability, and traffic congestion. The weighting results indicate that travel distance and travel time (0.2085), security and social vulnerability (0.1934), and parking availability (0.1837) are the most influential criteria. Among eleven candidate locations, PMI Hospital achieved the highest preference value of 0.8084, followed by Baranangsiang Terminal (0.6492) and Bakorwil (0.6178). The proposed framework provides a practical decision-support approach for EV charging infrastructure planning supporting sustainable urban electric public transportation systems.

B12

**An Analysis of User Switching Behavior Toward QRIS Payments:
A Push-Pull Mooring Model***Ridha Tentiani¹, Reny Nadlifatin¹*

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Abstract. In the financial sector, digital transformation has been implemented by the banking industry through the adoption of digital payment systems such as QRIS. Since 2023, debit card transaction volumes have continued to show a declining trend over the past two years. Bank Indonesia reported that ATM/debit card transaction volume in Indonesia decreased by 13% year-on-year (YoY) in April 2025. Meanwhile, Asosiasi Sistem Pembayaran Indonesia (ASPI) recorded a 169% year-on-year (YoY Q1 2025 – Q1 2024) increase in QRIS transaction volume in Indonesia. This study aims to identify the factors influencing switching behavior from debit card payments to QRIS using the Push-Pull-Mooring (PPM) framework. The study was conducted on 223 Millennial respondents, and the data were analyzed using Structural Equation Modeling – Partial Least Square (SEM-PLS). The results show that Pull Factors (Transaction Convenience and Perceived Usefulness) have a positive and significant effect on Switching Intention and Mooring factors (Inertia and Low IT Innovativeness) have a negative and significant effect on Switching Intention. Meanwhile, Push factors (Dissatisfaction and Perceived Risk) do not have a significant effect on Switching Intention. In addition, Mooring factors do not significantly moderate the relationship between either Push factors or Pull factors on Switching Intention. This study also shows that Switching Intention has a positive and significant effect on switching behavior. Theoretically, this study enriches the literature on the application of the Push-Pull-Mooring framework in the context of switching behavior toward QRIS digital payments. Practically, the findings provide recommendations for regulator to enhance transaction security, strengthen consumer protection, develop services through the utilization of Artificial Intelligence (AI) technologies, and improve digital literacy education.

B11

1 Phase Residential Tariff Simplification Through Customer Segmentation and STP Marketing: A Case Study of PT PLN (Persero) UP3 Saumlaki

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Abstract. Residential electricity customers represent the largest customer group served by PT PLN (Persero) UP3 Saumlaki, where multiple adjacent contracted power categories exhibit similar electricity consumption characteristics despite only minor tariff differences. This study proposes a data-driven framework to support residential tariff simplification by integrating customer segmentation, the Segmentation–Targeting–Positioning (STP) marketing framework, and financial feasibility analysis. Secondary customer data were analyzed using K-Means clustering to identify homogeneous customer segments based on contracted power, monthly electricity consumption, subsidy category, and billing scheme. The analysis identified three distinct customer segments: Low Customer (450–900 VA), Mid Customer (1,300–2,200 VA), and High Customer ($\geq 3,500$ VA), with contracted power and electricity consumption emerging as the primary differentiating variables. The STP analysis identified the Mid Customer segment as the most attractive target market due to its balanced market size, electricity consumption potential, and growth opportunity. Financial evaluation indicates that a focused implementation strategy targeting this segment achieves a break-even period of 3.36 months, while a comprehensive strategy covering all customer segments has the potential to increase electricity sales by approximately 1.70 GWh per month with a break-even period of 8.24 months. The proposed framework provides a practical decision-support approach for designing targeted residential electricity marketing strategies and improving electricity sales in utility companies.

Abstract Track Section C

Renewable Energy, Circular Economy, and Policy Frameworks (C1-C3)
Sustainable Industry, Agriculture, and Society (C4-C10)
Sustainable Management and Environment (C11)

C1

Integrated Techno-Economic and Environmental Assessment of Hybrid Diesel-PV-Battery System for Electricity Supply in Remote Island : A case study of Gili Raja Island, Indonesia

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Abstract. Reliable electricity supply remains a critical challenge for remote islands that rely on isolated diesel power systems, resulting in high fuel consumption, operating costs, and greenhouse gas emissions. This study presents an integrated techno-economic and environmental assessment of a Hybrid Diesel– Photovoltaic–Battery (Diesel–PV–Battery) system to improve electricity supply on Gili Raja Island, Indonesia. The hybrid system was modelled and optimized using HOMER Pro based on local electricity demand, solar resource availability, and economic and technical parameters. System performance was evaluated using key indicators, including Net Present Cost (NPC), Levelized Cost of Energy (LCOE), renewable energy contribution, fuel consumption, and carbon emissions. The optimized configuration significantly enhanced system performance by reducing annual diesel fuel consumption by approximately 87%, lowering NPC and LCOE, and decreasing annual carbon emissions by more than 2,400 tCO₂e while ensuring reliable 24-hour electricity service. These results demonstrate that integrating photovoltaic generation and battery energy storage with existing diesel generation provides a technically feasible, economically competitive, and environmentally sustainable solution for remote island electrification. The proposed approach offers a practical reference for planning hybrid microgrids in isolated island power systems.

C2

Selection of a flare gas recovery system using the analytic hierarchy process to increase sales gas potential in an upstream gas processing facility

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Abstract. Flare gas is a by-product of oil and gas processing that is routinely burned for safety and pressure-stability reasons, causing energy losses, greenhouse-gas emissions and lower hydrocarbon utilisation. This study determines the most suitable flare gas recovery (FGR) technology for the Central Processing Plant of Field ABC using the Analytic Hierarchy Process (AHP). Three alternatives were evaluated: LPG extraction (T1), blending into the high-pressure fuel gas network (T2) and recycle compression (T3). Five criteria and fifteen sub-criteria covering Cost, Time, Operability, Recovered Condensate and Manpower were assessed. Data were obtained from literature, Aspen HYSYS process simulation, company technical notes, historical operating data and two-stage focus group discussions with eight experts (one decision maker, seven technical staff). All pairwise matrices satisfied the consistency limit ($CR < 0.1$). The decision-maker model validated using Super Decisions assigned the highest normalised priority to recycle compression (0.4070), followed by LPG extraction (0.3315) and HP fuel gas blending (0.2615). Sensitivity analysis showed the decision is robust. The selected recycle compression configuration was projected by the Aspen HYSYS simulation to recover approximately 1.594 MMSCFD of gas and 72.67 bbl/d of condensate., and supports low-carbon operation.

C3

Site Selection for a 10 MW Solar PV-BESS Project in Timika Using GIS-ANP for Power Generation Cost Efficiency

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Abstract. The Timika electricity system in Central Papua remains highly dependent on diesel-based power generation; therefore, its generation production cost is strongly affected by fuel costs and logistical risks. PLN plans to develop a 10 MW solar photovoltaic power plant integrated with a battery energy storage system (BESS) in Timika. This study aims to determine a spatially feasible and cost-efficient PLTS-BESS location by integrating the geographic information system (GIS) and analytic network process (ANP). Expert judgment was used to develop the ANP weights, while ArcGIS Pro was used to process the spatial parameters. The ANP results indicate that the technical aspect is the most dominant criterion. At the subcriterion level, distance to the 20 kV network, flood susceptibility, and distance to roads are the main factors. The spatial overlay produced three priority candidates, with Location A selected as the final recommendation because it has the highest suitability score, the largest effective area, and the best proximity to the 20 kV network and road access. Ampacity analysis confirmed that the Express SP6 feeder (utilizing 3x240 mm² conductors) is suitable as the outlet for the 10 MW Timika PV-BESS plant, accommodating a PV injection current of approximately 356 A with estimated technical losses of around 1.00 MW. The PV-BESS facility supplies 38.52 MW of power daily to the Timika system. Based on an equivalent fuel cost of IDR 4,027.81/kWh, the 10 MW Timika PV-BESS plant yields generation cost savings of IDR 155.15 million per day (or IDR 56.63 billion per year) by reducing fuel consumption at leased diesel power plants.

C4

Inventory Strategy Selection under the Trade-off Between Lost Sales Risk and Expiration Risk in Horticultural Seed Companies

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Abstract. Horticultural seed companies face a critical trade-off between maintaining sufficient inventory to prevent lost sales and minimizing expiration risk due to the limited shelf life of seeds. A case study at an Indonesian seed company managing 1,215 SKUs revealed a severe operational paradox: a lost sales rate equivalent to 7.5% of total sales occurring simultaneously with a product expiration rate of 8.5% of total sales. To address this issue, this study develops a decision framework by integrating the Decision Making Trial and Evaluation Laboratory (DEMATEL) and the Analytic Network Process (ANP). Eight decision factors and three inventory strategy alternatives were identified through literature review and validated by industry experts. DEMATEL was applied to analyze the causal relationships among the decision factors, while ANP was used to determine their priority weights and evaluate the inventory strategy alternatives. The results indicate that Information Visibility, Supplier Reliability, and Service Level Target are the three highest-priority decision factors. The Differentiation Strategy achieved the highest priority score by balancing this trade-off. Sensitivity analysis confirmed the robustness of the proposed framework, providing systematic guidance for inventory strategy selection in horticultural seed companies.

C5

IMPLEMENTATION OF FUZZY AHP, PROMETHEE II, AND VIKOR METHODS IN SELECTING PRIORITY PROJECTS IN THE UTILITIES AREA OF PT ABC REFINERY

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Abstract. The Utilities Plant at the PT ABC LNG refinery faces a decline in reliability due to aging. Data from the 2019–2024 period shows that 8 out of 13 cases of Process Train operational failures were triggered by the utility area, causing losses of hundreds of billions of rupiah. Capital investment (CAPEX) evaluations have so far been dominated by financial indicators without non-financial parameters. This study applies a three-stage hybrid multi-criteria decision-making model: Fuzzy AHP (FAHP) Buckley, PROMETHEE II, and VIKOR to optimize the selection of 8 strategic project alternatives. The FAHP results determine Safety (35.06%) and Reliability (22.48%) as the highest criteria. The PROMETHEE II method places HV Transformer Replacement (A3) in first place ($= +0.5308$) and DCS Upgrade (A2) in second place ($= +0.5223$). However, the Acceptable Advantage test on VIKOR shows a very close difference in the compromise index ($\Delta Q = 0.0469 < 0.1429$). Sensitivity analysis within the $\pm 5\%$ range triggers a shift in peak ratings, confirming the interdependence between power supply and control automation. This study recommends Alternatives A3: Transformer Replacement and A2: DCS Upgrade as co-winners.

C6

The Influence of Digital Activation, Sponsorship Participation, and Theory of Planned Behavior Constructs on Customer Engagement: The Mediating Role of Brand Image Perception in Jakarta International Marathon

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Abstract. Competition in the banking industry in the digital era demands innovative marketing strategies to build customer engagement, particularly among the younger generation, who are increasingly critical and active in digital spaces. Digital activation serves as a strategic approach that delivers interactive experiences through social media, live streaming, gamification, and mobile applications, while sponsorship adds value through emotional association and brand legitimacy via collaboration with strategic partners. Brand Image Perception represents the perception formed both before and after recognizing the BTN brand. This study aims to examine and analyze the integration of these strategies, which are believed to strengthen customer engagement at the 2025 BTN Jakarta International Marathon (JAKIM) event, selected as a case study due to BTN's role as one of the main sponsors. This study employs a quantitative approach involving participants who have participated in the 2025 JAKIM event in Jakarta. Data were collected via questionnaires and subsequently analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The findings indicate that Attitude, Subjective Norm, Perceived Behavioral Control, and Brand Image Perception have a direct, positive, and significant influence on Customer Engagement. Conversely, Digital Activation was found to have no effect on Customer Engagement, while Sponsorship Participation exerted a positive but statistically non-significant influence. Furthermore, Brand Image Perception mediates the effect of Digital Activation and acts as a partial mediator for the effects of Attitude, Sponsorship Participation, and Perceived Behavioral Control. The managerial implications of these findings suggest that participant engagement in the 2025 Jakarta International Marathon is driven more by internal psychological factors and social norms rather than digital exposure or passive sponsor presence. Organizers and sponsors are advised to strengthen two-way communication strategies and experiential marketing to transform brand awareness into deeper emotional attachment.

C7

Business Stagnation in Aloe Vera Agroindustry SMEs: Identifying Root Causes and Structural Vulnerabilities in Pontianak City, Indonesia

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Abstract. Aloe vera is a flagship commodity of Pontianak City, Indonesia, processed by at least sixteen active micro, small, and medium enterprises (MSMEs). However, official statistics indicate that citywide production declined by 89.2% between 2019 and 2024, suggesting that business stagnation has become a systemic industry-wide issue. This study investigates the root causes of stagnation in a purposively selected aloe vera processing MSME that has operated for more than two decades. A qualitative single-case study approach was employed using in-depth interviews, field observations, and document analysis. Data were analyzed through Root Cause Analysis (RCA) across market, product, marketing, financial, and competitive dimensions, supported by Porter's Five Forces to assess the external business environment. The findings reveal that the enterprise's workforce declined from 33 to 10 employees after the COVID-19 pandemic, while sales recovered to only about 30% of pre-pandemic levels. The principal causes of stagnation include dependence on a single tourism-based sales channel, weak digital market presence, seasonal raw material constraints, and limited product differentiation. Comparative evidence from a more resilient peer enterprise indicates that diversified distribution channels play a more decisive role in business recovery than the pandemic itself. The study concludes that stagnation reflects structural vulnerabilities in business model design, providing implications for MSME development policy and future business model innovation.

C8

Dynamic Bottleneck Identification in a Labor-Intensive Make-to-Order Water Meter Production Line Using Theory of Constraints and Discrete Event SimulationRhyzalaita Adhi Sangadji, Silvianita¹¹Interdisciplinary School of Management and Technology, Institut Teknologi Sepuluh Nopember, 60111 Surabaya, Indonesia

Abstract. Labor-intensive make-to-order (MTO) manufacturing systems face lumpy demand that destabilizes capacity and causes bottlenecks to shift dynamically across workstations. This study analyzes the actual condition of a water meter production line at an Indonesian manufacturer and identifies its dynamic bottleneck phenomena using the Theory of Constraints (TOC) as the diagnostic framework and Discrete Event Simulation (DES) as the measurement instrument. An as-is Arena model comprising two parallel component lines, a synchronization point, a probabilistic quality gate with a 10% reject rate, a rework loop, and a batch-of-ten packing rule was executed for 30 replications of one 480-minute shift. The diagnosis reveals a layered constraint structure: (1) an administrative (policy) constraint in the serial-number batch grouping mechanism, generating the longest waiting time in the system (7.073 min/unit); (2) an operational near-constraint at the Welding Cover station (61.15% utilization) aggravated by the rework loop; and (3) a latent dynamic bottleneck at the parallel-line synchronization point. The three constraints occupy different structural positions and interact, which explains why the system bottleneck migrates with order composition and resource configuration. The findings establish a diagnostic basis for capacity interventions that require no additional machinery, supporting resource-efficient and sustainable manufacturing.

C9

Technology readiness and gap analysis of the HPMSM industry in Indonesia using THIO framework

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Abstract. The global transition towards electric vehicles has created significant supply challenges for High Purity Manganese Sulphate Monohydrate (HPMSM), a critical cathode precursor. While Indonesia possesses abundant manganese reserves, its domestic midstream processing industry remains in the conceptual pre-construction phase. This study aimed to evaluate the plant-level internal technology readiness of the Indonesian HPMSM industry using the Technometrics approach. Data were collected through expert judgments to determine the degree of sophistication and the state-of-the-art (SOTA) for each component. The results revealed a technology contribution coefficient (TCC) of 0.707, placing the aggregate industrial capability at the lower boundary of the high technology readiness category. The gap analysis highlighted a critical deficit in the infoware (0.503 gap) and technoware (0.477 gap) components, indicating a severe lack of proprietary technological information and precision infrastructure. The study concludes that before proceeding to the commercial construction phase, the domestic industry must prioritize knowledge acquisition and technological modification. This approach is an absolute prerequisite to validate and calibrate the complex reductive acid leaching parameters specifically required for processing local manganese oxide ores.

C10

Evaluation of Digital Logistics Implementation at PT XYZ Distributors

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Abstract. PT XYZ Indonesia has implemented a Digital Logistics system through the Locus application to improve delivery performance, service quality, and operational efficiency across its distributor network. As the system is relatively new, an evaluation was conducted to assess its effectiveness and impact on user satisfaction and delivery performance. This study examines the effects of service quality and information quality on user satisfaction and delivery performance using the SERVQUAL framework and Structural Equation Modeling–Partial Least Squares (SEM-PLS). Data were collected through questionnaires distributed to store owners, delivery personnel, distributors, and management teams, and analyzed using IBM SPSS 25 and SmartPLS 3. The results show that service quality has a positive and significant effect on user satisfaction ($p = 0.014$) and delivery performance ($p = 0.020$). Information quality significantly affects delivery performance ($p = 0.032$) but has no significant effect on user satisfaction ($p = 0.097$). User satisfaction also has a significant positive effect on delivery performance ($p = 0.001$). The model explains 76.5% of the variance in user satisfaction and 87.5% of the variance in delivery performance. The findings indicate that the Locus application improves delivery performance mainly through enhanced service quality and user satisfaction, while information quality contributes directly to better delivery performance.

C11

Environmental, Social, and Governance Risk Management in Jetty Construction using FMEA

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Abstract. The development of the New Jetty I at the Manggis Integrated Terminal is intended to increase loading and unloading capacity and improve the reliability of fuel distribution across Bali and surrounding islands. Executing onshore and marine construction in a coastal setting creates risks that affect cost, quality, schedule, the environment, workers, local communities, regulatory compliance, and project reputation. This paper proposes a structured assessment to identify the Environmental, Social, and Governance (ESG) risks arising during construction and to determine their priority. Candidate risks are compiled from recent studies, project documents, field observations, and semi-structured interviews, then expressed in cause-event-consequence form with affected stakeholders and existing controls. An expert panel screens the applicability and clarity of the risk items before rating severity, occurrence, and detection. Risk Priority Numbers are computed and ranked through Failure Mode and Effects Analysis, while high-severity, legal, fatal, or irreversible environmental risks remain priorities even when their RPN is not the highest. The expected outputs are a project-specific ESG risk register and a transparent priority list that support balanced control of sustainability objectives in coastal energy-infrastructure projects.



Abstract Track Section D

Sustainable Management and Environment (D1-D11)

D1

**Responsible digital retail in online beauty shopping:
a multidisciplinary review of consumer confidence, technology
mediated evaluation, and platform accountability**

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Abstract. Online beauty shopping requires consumers to assess product fit, sensory qualities, safety, authenticity, and claim credibility without direct inspection. This study maps the development and conceptual structure of open-access Scopus research on online beauty shopping from 2019 to 2025. Bibliometric performance analysis, author-keyword co-word mapping, and article-level interpretive synthesis were applied to 40 English-language articles. Publication output rose unevenly from two articles in 2019 to fourteen in 2024, followed by nine in 2025. The corpus covered 35 sources and was dominated by structural equation modelling. Of 186 Author Keywords, 19 met the minimum occurrence threshold of two and 15 formed the largest connected component. Three streams emerged: relational outcomes and social commerce; technology-mediated evaluation and recommendation; and product-domain risk in online shopping. Themes broadened from purchase intention, trust, perceived risk, and service quality toward eWOM, social commerce, augmented reality, personalization, authenticity, value claims, and post-purchase outcomes. Interpretive synthesis identified seven confidence mechanisms and seven conceptual tensions relevant to responsible digital retail and sustainable platform management.

D2

Data-driven facility booking efficiency for sustainable higher education asset management

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Abstract. University facilities are shared assets whose operational value depends on timely approval, balanced scheduling, and traceable service data. This study evaluates facility-booking efficiency and use intensity at Institut Teknologi Sepuluh Nopember using 8,005 facility-date-time records from 2023-2025. A quantitative case-study design combined descriptive statistics, temporal and categorical tabulation, service-level analysis, one-way analysis of variance, Levene's test, and Kruskal-Wallis testing. Of all records, 6,284 (78.50%) were approved and 1,721 (21.50%) were cancelled. Demand was concentrated on Fridays and Saturdays and on six major facilities that accounted for 61.55% of all records. Among 1,303 records with complete administrative timestamps, the median approval time was two days, 68.46% were completed within three days, and 88.10% within seven days. Processing-time distributions differed significantly across ten facilities with adequate observations ($H = 178.352$, $p < 0.001$), although facility type explained only 6.5% of the variation. The findings show that operational logs can support asset-management decisions when linked to standardized master data, cancellation reasons, service-level agreements, real-time availability, and facility-readiness checks. The study proposes a phased governance framework for data-driven, reliable, and sustainable campus facility services.

D3

Time-to-Churn Prediction in Telecommunication Industry Using Survival Analysis

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Abstract. Customer churn in the telecommunications industry should be understood not merely as a binary event but as a time-dependent process. This study proposes a sequential approach that combines extended Cox time-dependent regression with Survival XGBoost to predict customer time-to-churn using the IBM Telco Customer Churn dataset comprising 7,032 customers. Since 14 of 16 predictor variables violated the proportional hazards assumption, an extended Cox model was constructed using Heaviside functions with cut-off points at 24 and 40 months and interactions with the natural logarithm of time. Backward elimination yielded a final model of 13 significant parameters derived from eight variables, achieving a concordance index of 0.964. The eight selected variables were subsequently used as inputs for Survival XGBoost, which attained an average concordance index of 0.8595 (± 0.0050) under five-fold cross-validation. Feature importance comparison revealed consistent rankings for internet service, dependents, and streaming TV, while exposing complementary perspectives between statistical significance and predictive contribution for monthly charges and online security. The findings demonstrate that the extended Cox model identifies which variables matter and when their effects apply, whereas Survival XGBoost validates their predictive power on unseen data, thereby providing a robust empirical basis for targeted customer retention strategies.

D4

A behavioral KPI model for sustainable higher education facilities management: Evaluating daily contract workers

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Abstract. Daily contract workers sustain campus cleanliness, waste handling, and facility readiness, but their performance is often assessed through attendance and informal supervisory judgement. This study develops a behavioral-focused Key Performance Indicator (KPI) model for sustainable higher education facilities management. The Behavioral, Emotional, and Social (BES) Framework is retained as the overarching competency architecture, while the Behavioral dimension is emphasized because its outputs are observable and verifiable. A descriptive qualitative case study was conducted at the Asset Management Bureau of State University in East Java, Indonesia. Data were collected through interviews with six organizational stakeholders, field observations, document analysis, and group discussion with worker representatives. Critical Incident Technique matrices and thematic analysis were followed by triangulation and stakeholder refinement. Five Behavioral KPIs were identified: attendance, punctuality, initial-area cleanliness, cleanliness maintenance during operating hours, and scheduled waste handling and segregation. These indicators received a tentative pilot weight of 70%, with Emotional and Social dimensions retained as supporting factors at 20% and 10%. The model links traceable worker-level evidence to service readiness, environmental quality, and waste-management continuity, providing an operational basis for more accountable and sustainable campus facilities management.

D5

Feasibility analysis of fulfillment center location selection using the analytical network process: a case study at PT XYZ in Deli Serdang Regency

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Abstract. Selecting a fulfillment center location is a strategic decision that affects a company's operational performance and investment feasibility. This study integrates the Analytical Network Process (ANP) with financial feasibility analysis to determine the optimal fulfillment center location for PT XYZ, a logistics operator facing declining demand and rising warehouse rental costs in Deli Serdang Regency, North Sumatra. Three candidate warehouses were identified and evaluated against six interdependent criteria – cost, infrastructure, facilities, health-safety-environment (HSE), environmental security, and legal documents – weighted through pairwise comparisons by five experienced practitioners and processed with Super Decisions software. The highest-priority alternative was then tested for financial feasibility using Net Present Value (NPV), Internal Rate of Return (IRR), Payback Period (PP) and Profitability Index (PI), followed by sensitivity analysis. Warehouse C obtained the highest global priority (0.436), ahead of Warehouse A (0.290) and Warehouse B (0.273), driven mainly by rental price, floor area, distance to the nearest hub, roof height and floor strength. Warehouse C was found financially feasible, with an NPV of IDR 452,464,720, an IRR of 26.80%, a Payback Period of 1.9 years and a PI of 1.33, although feasibility is highly sensitive to a decline in handling revenue. The integration of ANP and financial feasibility analysis provides a comprehensive, replicable decision framework supporting PT XYZ's relocation decision.

D6

Determining Maintenance Priorities for Medium-Voltage Overhead Lines (SUTM) Using Delphi and AHP Methods at PT PLN (Persero) UP3 Cikupa

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Abstract. Maintenance of Medium Voltage Overhead Lines (SUTM) is a crucial factor in maintaining the reliability of electric power distribution systems. Limited maintenance resources necessitate objective priority setting to ensure maintenance activities are carried out effectively and efficiently. This study aims to identify the criteria and sub-criteria that most significantly influence SUTM reliability and to determine maintenance priorities at PT PLN (Persero) UP3 Cikupa by integrating the Delphi method and the Analytical Hierarchy Process (AHP). The Delphi method was employed to reach expert consensus on maintenance criteria and sub-criteria—based on PLN Board of Directors Circular No. 0018 of 2014—using parameters of Median > 5 and Interquartile Range (IQR) < 1 . Subsequently, the criteria that achieved consensus were analyzed using AHP through pairwise comparisons and consistency testing, utilizing a Consistency Ratio (CR) ≤ 0.10 . The results indicate that out of 4 criteria and 26 sub-criteria, 3 criteria and 9 sub-criteria achieved a high level of consensus: Right of Way (ROW) Cleanliness, Visual Equipment Inspection, and Infrared Thermography. AHP weighting results show that the "Bamboo" sub-criterion within the ROW Cleanliness criterion is the top priority, with a global weight of 0.4171, followed by "Jumper" (0.1149) and "Trees" (0.1129). Sensitivity analysis demonstrates that the model possesses good stability, as the rankings of most alternatives remained unchanged across various weight-change scenarios. These findings confirm that integrating the Delphi and AHP methods is effective for determining SUTM maintenance priorities in a manner that is systematic, objective, and adaptive to the actual conditions of the distribution network.

D7

Criteria and Methods in Data Center Site Selection: A Systematic Literature Review

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Abstract. Electricity is a fundamental infrastructure supporting economic and social development. As power systems increasingly rely on digital technologies, data centers have become essential for ensuring the reliable operation of Distribution Main Control Centers (DMCC), and Disaster Recovery Centers (DRCs). However, selecting an appropriate data center location for DMCC and DRCs is a complex decision-making challenge problem involving multiple, often conflicting, criteria. Although numerous studies have proposed various site selection criteria and decision-making frameworks, a comprehensive synthesis identifying the most widely adopted criteria and methodological approaches remains absent from the existing literature. To address this gap, this study conducts a Systematic Literature Review (SLR) following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Relevant articles published between 2013 and 2025 were systematically identified, screened, and analyzed across multiple dimensions, including publication trends, geographical distribution, evaluation criteria and sub-criteria, decision-making methods, and sensitivity analysis approaches. The findings indicate that natural disasters, infrastructure, and transportation are the most frequently adopted main criteria, while multi-natural hazards, electricity availability, telecommunications infrastructure, and airport accessibility are the dominant sub-criteria. The integration of Geographic Information Systems (GIS) with Multi-Criteria Decision Making (MCDM) methods such as VIKOR, TOPSIS, EDAS, and DEMATEL represents the most widely applied framework in the selection of data center sites. However, the integration of GIS with AHP, which is the most widely used MCDM techniques, has not been used. Interestingly, only few studies actually perform sensitivity analysis, reveal a significant research gap in evaluating the robustness of site selection outcomes. The findings offer a comprehensive reference for researchers and practitioners in selecting appropriate criteria and methods for data center site selection, while also supporting the planning of critical infrastructures such as DMCCs and DRCs in disaster-prone regions.

D8

The Impact of Perceived ESG Practices on Affective Organizational Commitment: Mediation of Organizational Trust and Organizational Identification in Indonesia's Tobacco Supply Chain Industry

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Abstract. This study examines how employees' perceived Environmental, Social, and Governance (ESG) practices shape affective organizational commitment (AOC) through organizational trust (OT) and organizational identification (OI), modelled as parallel mediators. Perceived ESG practices were specified as a second-order reflective–formative construct. Survey data from 235 employees of a business-to-business manufacturing firm and its affiliated suppliers in Indonesia's tobacco supply chain were analyzed using partial least squares structural equation modelling (PLS-SEM). Perceived ESG practices significantly predicted both trust ($\beta = 0.782$) and identification ($\beta = 0.639$); both mediators in turn predicted commitment, with identification considerably stronger ($\beta = 0.662$) than trust ($\beta = 0.154$). The direct ESG–commitment effect was non-significant ($\beta = 0.020$, $p = 0.370$), indicating full mediation through both routes. Together the two indirect paths accounted for 96.3% of the total effect, with identification as the dominant pathway (VAF = 75.0%) and trust contributing only marginally (VAF = 21.3%). The Governance and Social dimensions dominated the ESG construct, while the Environmental dimension was non-significant. The pronounced asymmetry between the two routes indicates that, in this stigmatized industry, identity-based rather than trust-based mechanisms carry most of the explanatory burden in translating ESG perceptions into employee commitment.

D9

Optimization of idle gas turbine generator asset utilization using AHP for CO₂ emission reduction and operational efficiency in an oil and gas processing plant

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Abstract. The reliability of the electric power grid is a crucial factor influencing the quality of electricity distribution services, primarily a stable electricity supply and the absence of voltage drops, especially in the operational area of PLN UP3 South Banten. To serve electricity supply needs, PLN UP3 South Banten is supplied by 63 feeders. Of the 63 feeders, there are 5 feeders that supply 859 distribution substations, of which there are 84 distribution substations that experience voltage drops resulting in a loss of 188,242.18 kWh. One effort that can be done to improve the quality of the distribution network voltage is by installing special Tap Transformer devices at strategic points in the distribution network. However, with a very large number of assets and a limited number of transformers that can be installed, an appropriate optimization strategy is needed to determine the priority scale for installing special tap transformers in the distribution network using a combination method, namely Analytic Hierarchy Process (AHP) and Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS). AHP is used to weight relevant criteria, while TOPSIS is used to determine the best alternative based on proximity to the ideal solution. With this approach, the study is expected to produce the right decision in prioritizing the installation of Special Tap Transformers to improve the quality of the distribution network voltage in the South Banten Customer Service Implementation Unit (UP3). The results of this study are also expected to help companies in improving optimal services to customers and provide practical and strategic recommendations for PLN UP3 South Banten in optimally allocating the installation of Special Tap Transformers.

D10

MAINTENANCE MANAGEMENT STRATEGIES AN EFFECTIVE TRANSMISSION PROTECTION SYSTEM TO IMPROVE THE AVAILABILITY AND RELIABILITY OF THE BINTAN ELECTRICAL SUBSYSTEM

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Abstract. The reliability and availability of transmission protection systems are essential for ensuring the continuity of electricity supply in the Bintan Power Subsystem. The existing maintenance strategy is primarily based on periodic maintenance, which contributes to maintenance outages and affects the Circuit Availability Factor (CCAF). This study aims to evaluate the current maintenance strategy and develop a reliability-based maintenance approach to improve transmission system availability. The proposed methodology integrates Reliability-Centered Maintenance II (RCM II), Failure Modes and Effects Analysis (FMEA), and Fault Tree Analysis (FTA). Historical operational data from 2020-2025, including maintenance outage records, fault history, equipment testing results, and asset information, were analyzed. The FMEA results identified trip circuit failure as the most critical failure mode with the highest Risk Priority Number (RPN), followed by intertrip communication failure, relay setting errors, DC power supply loss, and binary output failure. FTA was subsequently applied to determine the root causes of these critical failures, while RCM II was used to develop appropriate maintenance tasks based on equipment criticality and failure consequences. The proposed maintenance strategy is expected to reduce maintenance outages, optimize maintenance resources, and maintain the Circuit Availability Factor (CCAF) above 99.5%. The findings demonstrate that integrating RCM II, FMEA, and FTA provides an effective framework for improving the reliability and availability of transmission protection systems.

D11

A Hybrid Inventory Optimization Framework Integrating Spare Parts Classification and Monte Carlo Simulation for Sustainable Spare Parts Management under Stochastic DemandHartlan Dinda¹¹School of Interdisciplinary Management and Technology, Institut Teknologi Sepuluh Nopember (ITS), Surabaya, Indonesia

Abstract. Effective spare parts inventory management is essential for maintaining heavy equipment availability while minimizing inventory-related costs. This study proposes an integrated inventory management approach by combining XYZ–FSN classification, Safety Stock, Reorder Point (ROP), and Monte Carlo simulation to optimize spare parts inventory policies. Historical demand data for Preventive Maintenance (PM) and Corrective Maintenance (CM) spare parts were first classified using the XYZ–FSN method to identify demand characteristics. Safety Stock and ROP were then calculated using a 93% service level. Subsequently, Monte Carlo simulation was applied to evaluate multiple ROP alternatives for representative spare parts selected from different XYZ–FSN categories. The optimal ROP was determined based on the lowest Total Inventory Cost (TIC) while considering ordering cost, holding cost, stockout cost, Fill Rate, and Cycle Service Level (CSL). The results indicate that the manually calculated ROP remained optimal for all representative CM spare parts, whereas alternative ROP values produced lower Total Inventory Costs for several representative PM spare parts. These findings demonstrate that integrating analytical inventory calculations with Monte Carlo simulation provides a systematic approach for validating and refining inventory policies under demand uncertainty, thereby supporting more cost-effective and reliable spare parts inventory management

Abstract Track Section E

**Sustainable Management and Environment (E1-E9, E11)
Urban Infrastructure and Safety (E10)**

E1

ANALYSIS OF THE IMPLEMENTATION OF MARKETING MIX 7P'S AND SERVICE QUALITY ON CUSTOMER SATISFACTION AND CUSTOMER LOYALTY AT THE HVAC CONTRACTOR COMPANY PT ABC

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Abstract. This study aims to analyze the effect of the implementation of Marketing Mix 7P's and Service Quality on Customer Satisfaction and Customer Loyalty at the HVAC contractor company PT ABC. The method used in this study is a quantitative method through a purposive sampling approach with data collection through a Likert scale-based questionnaire. Data analysis was carried out using descriptive statistical techniques and multiple regression analysis to test the relationship between the variables studied. The results of the study are expected that all elements of the Marketing Mix 7P's, namely product, price, place, promotion, people, process, and physical evidence, have a significant positive influence on customer satisfaction. On the other hand, good Service Quality also contributes to increasing Customer Satisfaction. In addition, Customer Satisfaction also has a strong relationship with Customer Loyalty. It is also expected that companies need to pay attention to and optimize the implementation of Marketing Mix 7P's and Service Quality to increase Customer Satisfaction and Customer Loyalty in the HVAC contractor industry.

E2

Workforce dynamics in large-scale infrastructure construction: a system dynamics model integrating transformational leadership, emotional intelligence, burnout, and voluntary turnover

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Abstract. Construction projects are high-complexity socio-technical systems in which human resource dynamics profoundly affect project outcomes, yet no study has modelled the joint dynamic effects of transformational leadership (TL) and emotional intelligence (EI) on HR effectiveness (EFF), burnout (BO), and voluntary turnover (VT) using a system dynamics (SD) framework calibrated from field data. This study models these effects in a large-scale Indonesian infrastructure construction project. Survey data from 60 formal workers on the Balikpapan-IKN Toll Road project were analysed via multiple regression to calibrate a Vensim-based SD model comprising four subsystems and five stock variables, validated through behaviour reproduction, expert judgment, and extreme condition testing. Both TL ($\beta = 0.639$, $p < 0.01$) and EI ($\beta = 0.577$, $p < 0.001$) significantly predicted EFF. A 60-month baseline simulation projected EFF declining 26.6 percent and burnout escalating 74.3 percent, leaving only 8 effective workers from 341 cumulative departures. Over a subsequent 100-month policy projection, workload control alone proved most effective (EFF +50.3 percent, BO -66.0 percent), while comprehensive simultaneous intervention produced superior synergistic outcomes (EFF +65.7 percent, BO -80.3 percent, VT -56.7 percent) with full workforce recovery to 263 persons. Burnout functions as an exponentially accumulating stock variable requiring structural workload management as the primary leverage point.

E3

Optimizing the weighting criteria for research mentor selection based on school partner clusters using the AHP method for sustainable management in an EdTech startup

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Abstract. The rapid growth of the Education Technology (EdTech) industry demands operational efficiency and service accuracy, especially in assigning research mentors. Science Hunter Indonesia faces inefficiencies in its school partnership division, where allocating mentors for numerous institutions is still conducted manually. This approach risks academic mismatches and inflates transportation costs, which contradicts the principles of sustainable management and green policy. This study formulates priority weights for mentor selection criteria across three school partner clusters: priority, executive, and regular. Employing the Analytic Hierarchy Process (AHP), we extracted evaluations from seven management experts via pairwise comparison questionnaires, aggregated using the geometric mean. Five criteria were evaluated: transportation cost, academic relevance, mentoring experience, success portfolio, and mentor performance index. The results indicate shifting priorities per cluster. The priority cluster emphasizes the success portfolio, the executive prioritizes academic relevance, while the regular cluster strongly focuses on minimizing transportation costs to achieve logistical sustainability. This weighting model provides a foundation for EdTech companies to transform human resource management into a data-driven decision support system that balances operational efficiency, logistical sustainability, and mentoring quality.

E4

Discrete event simulation-based operational strategy optimisation for productivity of an express laundry service: a case study of Simple Day Laundry

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Abstract. Small laundry businesses that promise same-day completion operate under tight service level agreements (SLA), yet many of their operational decisions still rest on intuition. This study builds a discrete event simulation (DES) model of the per-kilogram (kiloan) service at Simple Day Laundry, an express laundry SME in Sangatta, Indonesia, to evaluate baseline performance, locate bottlenecks, and test workforce reconfiguration scenarios. The model was developed in AnyLogic from November 2025 operational records and validated against actual output, with mean absolute percentage errors of 0.96% for completed orders and 1.73% for completed kilograms. Across 30 replications, the baseline produced an average lead time of 15.85 hours and SLA attainment of 92.73%; ironing and the combined folding and packaging process were confirmed as bottlenecks. Four improvement scenarios were then compared operationally and economically through cost-benefit analysis. Extending the availability of one folding and packaging staff member (S1) reduced average lead time to 10.41 hours, raised SLA attainment to 98.87%, and returned the highest benefit-cost ratio of 1.50 at an additional cost of IDR 975,000 per month. S1 is recommended under current demand, while a combined schedule extension (S4) is positioned as a strategic option for future capacity growth.

E5

Formulating a Business to Business (B2B) Marketing Strategy for Sustainable Aviation Fuel (SAF): an Empirical Study

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Abstract. Restrictions on the export of Used Cooking Oil (UCO) under Ministry of Trade Regulation No. 2 of 2025 have forced PT XYZ to transform from a raw material exporter into a producer of Sustainable Aviation Fuel (SAF). This study formulates PT XYZ's SAF marketing and distribution strategies using a qualitative approach with a single-case study design (Yin, 2018). Primary data were collected from interviews with seven expert informants via purposive sampling, supplemented by secondary data in the form of industry reports and internal company documents. The analysis was conducted thematically and then synthesized using the Positioning, Differentiation, and Branding (PDB) framework (Rua & Santos, 2022). The research results reveal three main findings. The international airline segment is a priority target because it is directly subject to the ReFuelEU Aviation and CORSIA mandates, supported by PT XYZ's locational advantages and logistical connectivity. Differentiation is achieved through raw material traceability, market-linked pricing, distribution integration with Pertamina Patra Niaga, and a relationship marketing approach. The company's branding is still in a transitional phase from recognition toward market credibility, thus requiring reinforcement through international certification.

E6

Build Operate Transfer as a Financially Viable Response to Tightening Wastewater Regulations and Capital Constraints

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Abstract. Tightening environmental regulations, exemplified by Indonesia's Ministry of Environment and Forestry Regulation No. 14 of 2024, are pushing food and beverage manufacturers toward compliant wastewater management. However, the capital expenditure required for advanced in-house treatment, such as Membrane Bioreactor (MBR) systems, is often prohibitive for companies outside the water business. This study examines whether a Build Operate Transfer (BOT) model can resolve this regulation-versus-capital dilemma. A case study of a ten-year BOT contract for a 600 m³/day MBR reuse system between a BOT provider and an end user in the food and beverage industry in West Java, Indonesia, was evaluated using SWOT/IFE-EFE analysis, FMEA-based risk assessment, and discounted cash flow analysis. The model occupies a Grow and Build strategic position (IFE 3.28, EFE 3.40), carries a manageable risk profile across thirteen identified risks, and yields positive returns for both parties (NPV IDR 2,197.29 million and IRR 16.98% for the BOT provider; annual net benefit of IDR 1,664.8 million for the end user). Sensitivity analysis across three tariff scenarios confirms the model remains bankable under conservative assumptions. The findings position BOT as a capital-light, low-risk pathway for industrial wastewater compliance in emerging economies.

E7

Benchmarking Cargo Handling Equipment Efficiency at Indonesian Regional Container Terminals Using Integrated Data Envelopment Analysis (DEA, Variable Returns to Scale (VRS) and Analytical Hierarchy Process

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Abstract. Container terminals are required to improve operational efficiency while optimizing limited resources to accommodate increasing cargo demand and maintain service competitiveness. However, the performance of container handling equipment is often assessed using productivity indicators alone, without simultaneously considering multiple operational inputs and outputs. This study evaluates the operational efficiency of container handling equipment at the Perawang, Kendari, and Pantoloan Container Terminals in Indonesia by integrating input-oriented Data Envelopment Analysis under Variable Returns to Scale (DEA-BCC) with the Analytical Hierarchy Process (AHP). A total of 24 Decision Making Units (DMUs) were evaluated using seven input variables and four output variables. The results indicate that 15 DMUs (62.5%) were technically efficient, while 9 DMUs (37.5%) remained inefficient, with an average efficiency score of 0.8987. Pantoloan achieved 100% efficiency throughout the observation period, whereas Perawang recorded the lowest efficiency score (0.4428) and exhibited the greatest improvement potential. The AHP analysis identified maintenance cost (0.3544) as the most influential input criterion and equipment availability (0.5265) as the highest-priority output criterion. The consistency tests for both AHP input and output comparison matrices yielded consistency ratios (CR) below the 10% threshold, ensuring the validity of expert judgments. These findings demonstrate that DEA-BCC and AHP provides a robust decision-support framework for benchmarking equipment performance, prioritizing operational improvements, and supporting evidence-based asset management in container terminals.

E8

Salesman Allocation and Scheduling Optimization Using Constrained K-Means Clustering: A Case Study of a Distribution Company

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Abstract. Efficient and effective sales territory management is crucial for distribution companies. Suboptimal salesman allocation and scheduling result in uneven workloads, which can consequently decrease field productivity. This paper addresses salesman allocation and scheduling by utilizing Constrained K-Means Clustering. Utilizing a fast-moving consumer goods (FMCG) distribution company as a case study, the proposed algorithm was applied to a dataset of 2,479 customer locations across a two-stage process: first, geographical customer allocation, followed by sequential scheduling. Cluster quality before and after the implementation of Constrained K-Means Clustering was evaluated and compared using the Silhouette Coefficient and the Davies-Bouldin Index (DBI). Additionally, standard deviation was employed to measure variations in salesman workload. The results indicate that the Constrained K-Means Clustering approach significantly improves both customer allocation and scheduling quality. This is validated by an increase in the Silhouette Coefficient from 0.174 to 0.356, a sharp decline in the DBI from 22.55 to 0.87, a reduction in the standard deviation of customer quantities per salesman from 29.8 to 0.4, and a decrease in the average customer-to-centroid distance from 6.3 km to 4.6 km. From a managerial perspective, the implementation of this cluster-based decision support system successfully structures distribution territories, balances personnel workloads, and minimizes travel distances.

E9

A Decision-Making Framework for Evaluating Lightning Protection Systems on Transmission Towers Using Entropy Weighting and TOPSIS

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Abstract. Lightning strikes are one of the primary causes of disturbances in power transmission systems, potentially reducing the reliability of electricity supply and increasing maintenance costs. Ensuring the effectiveness of lightning protection systems on transmission towers is therefore essential for maintaining the operational reliability of transmission networks. However, the evaluation of lightning protection systems often involves multiple technical and economic criteria, making the decision-making process complex and challenging. This paper proposes a multi-criteria decision-making framework for evaluating the effectiveness of lightning protection systems on transmission towers by integrating the Entropy Weighting and Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) methods. Entropy Weighting is employed to determine objective criterion weights based on data variability, while TOPSIS is utilized to rank alternative protection systems according to their relative performance. The proposed framework is designed to support systematic, objective, and transparent decision-making in selecting the most appropriate lightning protection system. The proposed methodology is developed as a conceptual framework and will be validated through a case study at PT PLN (Persero) UPT Tanjung Karang, Indonesia. It is expected that the proposed approach will contribute to improving asset management strategies and support more effective maintenance planning for power transmission infrastructure.

E10

A Spatial Multi-Criteria Decision Framework for Planning 500 kV Underground Cable Corridors in Surabaya and Sidoarjo

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Abstract. Planning a 500 kV underground cable corridor in a metropolitan area requires balancing engineering feasibility, regulatory compliance, construction risk, and cost. This paper proposes a spatial decision-support framework for screening a 500 kV underground cable route between Kalanganyar and South Surabaya, Indonesia. Expert consensus was obtained through Delphi discussions to define four criteria and twelve sub-criteria. Their priorities were calculated using the Analytic Hierarchy Process (AHP) and embedded as segment-level impedances in a Geographic Information System (GIS) road-network model. Seven feasible corridors were generated after restricted areas had been excluded, then compared using the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) based on spatial suitability, accumulated impedance, and construction time. Technical considerations received the largest criterion weight (0.4658). Although Alternative 1 achieved the lowest suitability score (3.046) and Alternative 6 the lowest cost-time value (4373.396), Alternative 7 produced the lowest network impedance (1495.391) and the highest TOPSIS closeness coefficient (0.835). The results show that the preferred corridor emerges from balancing multiple dimensions rather than optimizing one indicator. The framework provides a basis for route screening and can guide feasibility studies, surveys, and detailed engineering for underground transmission projects.

E11

Strategic Decision-Making for PA Catalyst Vendor using Fuzzy Analytical Hierarchy ProcessLatief Achmad¹, Dwi P. Dinariyana¹¹Master of Technology Management, Interdisciplinary School of Management and Technology, Institut Teknologi Sepuluh Nopember (ITS), Surabaya, Indonesia

Abstract. The petrochemical industry is one of the strategic industrial sectors that plays a vital role in the national economy. One of its key products is Phthalic Anhydride (PA), which is manufactured by PT. XYZ. The demand for PA in Indonesia has continued to increase over the years, reaching 75,215 tons in 2025 (BPS, 2026). Consequently, companies are required to maintain sustainable production processes by improving operational efficiency, product quality, and the reliability of production facilities. One of the key strategic initiatives is the selection of a catalyst vendor, as catalyst procurement involves substantial investment costs and significantly affects production performance and business sustainability. Currently, catalyst vendor selection is still carried out using conventional decision-making approaches, which are considered insufficient in ensuring objectivity and supporting systematic and measurable strategic decision-making. This study propose to identify and implement the criteria for selecting a PA catalyst vendor using the Fuzzy Analytical Hierarchy Process (Fuzzy AHP) method, which is capable of addressing uncertainty and reducing conflicts of interest in the vendor selection process. A total of fourteen sub-criteria were identified and classified into four main criteria: catalyst performance, vendor capability, service, and cost. The results indicate that the three most influential criteria in the PA catalyst vendor selection process are catalyst purchase cost with a global weight (GW) of 0.1913, catalyst lifetime (GW = 0.1866), and product quality (GW = 0.1783). These criteria have the greatest influence on the vendor selection decision. In contrast, the quality certification sub-criterion under the vendor capability criterion received the lowest global weight (GW = 0.0043), indicating that it has a relatively insignificant influence on the selection process. Furthermore, the evaluation of vendor alternatives shows that Vendor C is the most preferred alternative compared with the other candidate vendors. The findings of this study are expected to provide a systematic, objective, and measurable decision-making framework for PT. XYZ in selecting PA catalyst vendors.