İSTANBUL NİŞANTAŞI UNIVERSITY 3RD ENERGY CONGRESS 2025 ABSTRACT PROCEEDINGS

18-19 DECEMBER 2025



NEW | İSTANBUL NİŞANTAŞI UNIVERSITY

İSTANBUL NİŞANTAŞI UNIVERSITY 3RD ENERGY CONGRESS 2025 ABSTRACT PROCEEDINGS 18-19 DECEMBER 2025

Editors

Prof. Dr. Recep KÖK

Assoc. Prof. Dr. Gözde MERT

Asst. Prof. Dr. Seda GÜREL

Organizing Committee

Prof. Dr. Recep KÖK - Congress President, İstanbul Nişantaşı University

Assoc. Prof. Dr. Gözde MERT - Congress Vice President, İstanbul Nişantaşı University

Prof. Dr. Tankiso MOLOI - Host Congress President, University of Johannesburg

Assoc. Prof. Dr. Lethiwe NZAMA-SITHOLE - Host Congress Vice President, University of Johannesburg

Assoc. Prof. Dr. Sezer Bozkuş KAHYAOĞLU - Congress Coordinator, University of Johannesburg

Asst. Prof. Dr. Seda GÜREL - Congress Coordinator, İstanbul Nişantaşı University

Dr. Omobolade Stephe OGUNDELE - Conference Coordinator, University of Johannesburg

Prof. Dr. Murat TÜRK - Head of the Department of Management Information Systems, İstanbul Nişantaşı University

Asst. Prof. Dr. Bengü TOSUN - Head of the Department of Economics, İstanbul Nişantaşı University

Organizing Committee Assistants

Dr. Denhere VARAIDZO - University of Johannesburg

Dr. Busola SIMON-ILOGHO - University of Johannesburg

Dr. Fowokemi OGEDENGBE - University of Johannesburg

Dr. Oluchukwu ANOWOR - University of Johannesburg

Dr. Nafiu Olanrewaju OGUNSOLA - University of Johannesburg

Dr. Adesanmi Timothy ADEGBAYIBI - University of Johannesburg

Dr. Ojuolape Nusirat GOLD - University of Johannesburg

Dr. Mohammed Kayode AJAPE - University of Johannesburg

Research Assistant Nomsa Phindile NKOSI - University of Johannesburg

Research Assistant Emine ABANOZ - İstanbul Nişantaşı University

Research Assistant Furkan İlker AKIN - İstanbul Nişantaşı University

Research Assistant Hilal FİDAN - İstanbul Nişantaşı University

Research Assistant Maksude DENK KELEŞ - İstanbul Nişantaşı University

Research Assistant Sedat ÖZKAN - İstanbul Nişantaşı University

Research Assistant Selin KARAKÖSE - İstanbul Nişantaşı University

Research Assistant Yusuf ALTINOK - İstanbul Nişantaşı University

Bedrihan KARTOĞLU - Quality and Governance Specialist, İstanbul Nişantaşı University

Beste ERDİNÇ - Quality and Governance Specialist, İstanbul Nişantaşı University

Emircan SARAÇ – Assistant Quality and Governance Specialist, İstanbul Nişantaşı University

Scientific Advisory Board

Prof. Dr. Aydın SEÇER - Yıldız Technical University

Prof. Dr. Başak AYDIN - İstanbul Nişantaşı University

Prof. Dr. Dilek ÖZDEMİR - Atatürk University

Prof. Dr. Duygu DÖNMEZ DEMİR - Manisa Celal Bayar University

Prof. Dr. H. Mehmet ŞAHİN - Karabük University

Prof. Dr. Hakan KAHYAOĞLU - Dokuz Eylül University

Prof. Dr. Hakan Serhad SOYHAN - Sakarya University

Prof. Dr. Hüseyin Serdar YÜCESU - Gazi University

Prof. Dr. İbrahim DİNÇER - Yıldız Technical University

Prof. Dr. İlhan ÖZTÜRK - İstanbul Nişantaşı University

Prof. Dr. İlker YILMAZ - Erciyes University

Prof. Dr. İskender GÖKALP - French National Centre for Scientific Research (CNRS)

Prof. Dr. İsmet ÇEVİK - Sakarya University

Prof. Dr. Metin GÜRÜ - Gazi University

Prof. Dr. Mustafa ACAROĞLU - Selçuk University

Prof. Dr. Mustafa ÇANAKÇI - Kocaeli University

Prof. Dr. Mustafa İLBAŞ - Gazi University

Prof. Dr. Nafiz KAHRAMAN - Erciyes University

Prof. Dr. Nazif ÇATIK - Ege University

Prof. Dr. Nesrin KAYATAŞ DEMİR - Erciyes University

Prof. Dr. Oğuz BORAT - İstanbul Commerce University

Prof. Dr. Orhan ÇOBAN - Gaziantep University

Prof. Dr. Phil J. BOWEN - Cardiff University

Prof. Dr. Rafig MEHDİYEV - Gebze Technical University

Prof. Dr. Roger CRACKNELL - Shell Global Solutions

Prof. Dr. Sebahattin ÜNALAN - Erciyes University

Prof. Dr. Selahattin Orhan AKANSU - Erciyes University

Prof. Dr. Selçuk EMSEN - Atatürk University

Prof. Dr. Shouyin (Ian) YANG - National Formosa University

Prof. Dr. Veli ÇELİK - Ankara Yıldırım Beyazıt University

Prof. Dr. Yueh-Heng Lİ - National Cheng Kung University

Prof. Dr. Yüksel KAPLAN - Niğde Ömer Halisdemir University

Prof. Dr. Zahid MAMMADOV - Azerbaijan State University of Economics (UNEC)

Prof. Dr. Zehra ŞAHİN- Karadeniz Technical University

Prof. Dr. Mustafa AKTAŞ - Gazi University

Prof. Dr. Yakup Erhan BÖKE - İstanbul Technical University

Prof. Dr. Mustafa BAYRAM - Biruni University

Assoc. Prof. Dr. Ali ÖZCAN - İstanbul Nişantaşı University

Assoc. Prof. Dr. Antonio CONSTANTINI – Ca' Foscari University of Venice

Assoc. Prof. Dr. Burak Alparslan EROĞLU - İzmir Bakırçay University

Assoc. Prof. Dr. Mehmet Emin EREND - Kyrgyz-Turkish Manas University

Assoc. Prof. Dr. Ahmet AKTAŞ - Gazi University

Assoc. Prof. Dr. Battal DOĞAN - Gazi University

Assoc. Prof. Dr. Derviş KIRIKKALELİ - European University of Lefke

Assoc. Prof. Dr. Oğuz KARA - Düzce University

Assoc. Prof. Dr. Ramazan EKİNCİ - İzmir Bakırçay University

Assoc. Prof. Dr. Serhat KARYEYEN - Gazi University

Assoc. Prof. Dr. Tarkan SANDALCI - Yıldız Technical University

Assoc. Prof. Dr. Gizem AKBULUT YILDIZ - Gümüşhane University

Assoc. Prof. Dr. Said AKSOY - Gaziantep University

Asst. Prof. Dr. Azimjan HİTAHUNOV - Eurasian Research Institute, Khoja Akhmet Yassawi University

Asst. Prof. Dr. Hatayi ALİYEV - Head of the Center for Empirical Research, Azerbaijan State University of Economics (UNEC)

Asst. Prof. Dr. Elif Asoy KÜÇÜKKİŞNİŞCİ - İstanbul Nişantaşı University

Asst. Prof. Dr. Erdal Tanas KARAGÖL - Ankara Yıldırım Beyazıt University

Asst. Prof. Dr. Oktay TANRISEVER - Middle East Technical University (METU)

Asst. Prof. Dr. Ayşen BAKKALOĞLU - İstanbul Nişantaşı University

Asst. Prof. Dr. Gülsüm ŞANAL - İstanbul Nişantaşı University

Asst. Prof. Dr. Hakan Sezgin ERKAN - İstanbul Nişantaşı University

Asst. Prof. Dr. Merve Nilay AYDIN - İskenderun Technical University

Asst. Prof. Dr. Nesibe MANAV - İstanbul Nişantaşı University

Asst. Prof. Dr. Seda GÜĞERÇİN - İskenderun Technical University

Asst. Prof. Dr. Taşkın SUBAŞI - İstanbul Nişantaşı University

Asst. Prof. Dr. Yelda ŞENKAL - İstanbul Nişantaşı University

Dr. Araz ASLANLI - President, Caucasus Center for International Relations and Strategic Studies (QAFSAM)

Advisory Board

Prof. Dr. Ayşegül KOMSUOĞLU ÇITIPITIOĞLU - Rector, İstanbul Nişantaşı University

Prof. Dr. Selma KARATEPE - Dean, Faculty of Economics, Administrative and Social Sciences, İstanbul Nişantaşı University

Prof. Dr. Elşen HACIZADE - Azerbaijan State University of Economics (UNEC)

Prof. Dr. Şaban NAZLIOĞLU - Pamukkale University

Prof. Dr. Mustafa İLBAŞ - General Manager, ASFAT, Ministry of National Defence of the Republic of Türkiye

Assoc. Prof. Dr. Elşen BAĞIRZADE - Azerbaijan State University of Economics (UNEC)

Oğuzhan AKYENER - President, Turkish Energy Strategies and Policies Research Center (TESPAM)

2026

NEW İSTANBUL NİŞANTAŞI UNIVERSITY

Publisher,

İstanbul Nişantaşı Üniversitesi Yayınevi (INUPRESS),

Maslak Mahallesi, Taşyoncası Sokak, No: 1V ve No:1Y Bina Kodu: 34481742,

34398 Sarıyer/ İstanbul

https://inupress.nisantasi.edu.tr/

İstanbul Nişantaşı University 3rd Energy Congress 2025 Abstract Proceedings, 18-19 December 2025

Recep Kök; Gözde Mert; Seda Gürel

e-ISBN: 978-625-97059-4-1

İstanbul Nişantaşı University Publication No.: 4

Online Publication Date: August, 2026

This report has been published by İstanbul Nişantaşı Üniversitesi Yayınevi (INUPRESS). It is available online under the Creative Commons Attribution-Non Commercial 4.0 International (CC BY-NC 4.0) license. Under this license, the work may be copied, shared, and reproduced for non-commercial purposes, provided that appropriate attribution is given.

https://creativecommons.org/licenses/by-nc/4.0/

İÇİNDEKİLER

FINANCING ENERGY-INTENSIVE DIGITAL INFTASTRUCTURE IN THE AI ERA: AN EMPIRICAL ANALYSIS OF DEVELOPMENT BANKS, ENERGY DEMAND, AND EMISSIONS IN EMERGING ECONOMIES: WITH THE AID OF CASUAL MACHINE LEARNING USING CAUSAL FORESTS ..1

Asst. Prof. Ariyibi M. EBENEZER; Prof. Olowofela OLUSOLA; Banjo A. FRANCIS; O. ENITAN

ENERGY PRICE SHOCKS DYNAMICS: NEW EVIDENCE FROM HEAVY-TAILS, NON-LINEARITY AND SMOOTH STRUCTURAL CHANGES.....3

Ph.D. Candidate Asım KAR

A HIDDEN MARKOV MODELS (HMM) BASED ESTIMATION APPROACH IN THE MANAGEMENT OF RENEWABLE ENERGY RESOURCES.....4

Asst. Prof. Nesibe MANAV

INTEGRATING FINANCIAL MODELLING WITH STRATEGIC MANAGEMENT TO SUPPORT CORPORATE FINANCE DECISIONS IN THE E-COMMERCE SECTOR: EVIDENCE FROM RETURN BEHAVIOUR OF A SPORTSWEAR E-RETAILER.....5

Aybek JUSUPBEKOV

SHORT-TERM ELECTRICITY DEMAND FORECASTING IN THE TURKISH DAY-AHEAD MARKET: A MACHINE LEARNING APPROACH 7

Prof. M. Serdar İSPİR; Assoc. Prof. Aygul ANAVATAN

THE DIGITAL DRIVERS OF CLIMATE-FRIENDLY BUSINESS PRACTICES OF SMES IN KYRGYZSTAN.....9

Asst. Prof. Ainura TURDALİEVA; Assoc. Prof. Sezer BOZKUŞ KAHYAOĞLU

MODELING CHANGES IN ELECTRICITY GENERATION SOURCES USING MACHINE LEARNING: THE CASE OF TÜRKİYE, GERMANY, AND SPAIN (2005-2025).....11

Bilgehan AVCI; Assoc. Prof. Sezer BOZKUŞ KAHYAOĞLU

THE IMPACT OF GAFAM ON BIO-RESOURCES: AN EMERGING PARADIGM IN SUSTAINABLE ENERGY AND RESOURCE MANAGEMENT.....12

Bolanle Waliu SHIYANBADE; Mary Olajumoke TAIWO

THE HIDDEN CARBON OF REMOTE WORK IN PRODUCT VALUE CHAINS: MODELLING HOME-OFFICE AND EMPLOYEE COMMUTING IN CORPORATE SCOPE 3 REPORTING 14

Ph.D. Candidate Buğra ŞENTÜRK; Prof. Vahap TECİM; Assoc. Prof. Sezer Bozkuş KAHYAOĞLU

OIL PRICE PASS-THROUGH INTO INFLATION: EVIDENCE FROM ADVANCED ECONOMIES 16

Research Assistant Doğukan TARAKÇI

SYSTEMATIC LITERATURE REVIEW OF THE ROLE OF DIGITALISATION IN SHAPING CLIMATE CHANGE 17

Dr. Samuel BANGURA

THE GREEN ENERGY CORRIDOR: TRANSFORMING VISION INTO REALITY.....19

Dr. Ramil HUSEYN; Dr. Latif ZEYNALLI

AZERBAIJAN'S GROWING ENERGY POWER AND GREEN ECONOMY STRATEGY.....21

Prof. Dr. Elşen MAHMUD OĞLU HACIZADE

DETERMINANTS OF ENERGY CONSUMPTION IN TURKIYE: EVIDENCE FROM STOCHASTIC FRONTIER ANALYSIS.....*22*
Research Assistant Emre KILIÇ; Tahsin AVCI

ARTIFICIAL INTELLIGENCE-BASED ENERGY MANAGEMENT AND ERROR-CONTROLLED OPTIMIZATION IN SMART GRIDS BASED ON NUMERICAL INTEGRATION INEQUALITIES FOR S-CONVEX AND TGS-CONVEX FUNCTIONS.....*23*
Asst. Prof. Gülsüm ŞANAL

COAL, INDUSTRY, AND ENVIRONMENTAL ANXIETY: ENERGY IMAGINATIONS IN VICTORIAN ENGLISH FICTION.....*25*
Gülten AKGÜL; İsmail BACAKSIZ; Özcan ÇELIK; Sıla SEZER

INVESTIGATION OF THE NEXUS BETWEEN DEMOCRATIC GOVERNANCE, THE RULE OF LAW, AND RENEWABLE ENERGY IN THE ANTHROPOCENE.....*27*
Assoc. Prof. Mahmut Ünsal ŞAŞMAZ; Assoc. Prof. Melissa Nihal CAGLE; Prof. Ahmet ÖZEN

CYBERSECURITY, DIGITAL INFRASTRUCTURE AND ENERGY GOVERNANCE: MANAGING CLIMATE AND ENERGY RISKS IN AN AI-DRIVEN ECONOMY.....*28*
Asst. Prof. Mr. Mohit TIWARI

CYBERSECURITY VULNERABILITIES OF ELECTRIC VEHICLE CHARGING STATIONS IN TRANSPORTATION TECHNOLOGIES AND THEIR IMPLICATIONS FOR ENERGY SAVINGS...*29*
Ph.D. Mustafa SANLI

EUROPEANISING THE GREEN TRANSITION: THE IMPACT OF THE EUROPEAN GREEN DEAL ON TÜRKIYE'S POLICY, ECONOMY, AND INSTITUTIONAL ADAPTATION.....*30*
Asst. Prof. Nazlı KAZANOĞLU

THE IMPACT OF RENEWABLE AND NON-RENEWABLE ENERGY CONSUMPTION ON ENVIRONMENTAL POLLUTION: AN APPLICATION ON TURKEY.....*32*
Dr. Nedim MERCAN

DETERMINANTS OF ESG DISCLOSURE: THE ROLE OF CORPORATE GOVERNANCE IN NIGERIA'S MANUFACTURING SECTOR.....*33*
Omobolade Stephen OGUNDELE; Lethiwe Nzama-SITHOL

THE ROLE OF THE FINANCIAL SECTOR IN TÜRKİYE'S GREEN TRANSITION: TRENDS, CONSTRAINTS, AND POLICY PATHWAYS.....*35*
Asst. Prof. Parla ONUK

GOVERNING GREEN FINANCE IN THE DIGITAL AGE: POLICY INNOVATIONS FOR SUSTAINABLE COMPETITIVENESS.....*36*
Kehinde Isiaq OLAIYA; Rahmon Abiodun FOLAMI; Oluwasegun Temitayo ODUNSI

SUSTAINABILITY REPORTING AND THE VALUE OF LISTED MANUFACTURING FIRMS IN NIGERIA: THE MODERATING ROLE OF FOREIGN OWNERSHIP.....*38*
Romoke Rafiat BUSARI; Olayinka Segun WALE

DIGITALIZATION OF THE ENERGY SILK ROAD: EXAMINING THE TRANSFORMATION OF THE TANAP ROUTE INTO A SMART TOURISM DESTINATION.....*40*
Prof. Mithat Zeki DİNÇER; Prof. Fatma Füsun İSTANBULLU DİNÇER; Asst. Prof. Dilbar GULUYEVA

INSTITUTIONAL QUALITY, GOVERNANCE AND ENERGY TRANSITION IN EMERGING ECONOMIES *42*
Saheed Akande SHITTU; Lourens J. ERASMUS

TEACHING RENEWABLE ENERGY SOURCES IN SCIENCE EDUCATION THROUGH A DESIGN THINKING APPROACH: AN APPLIED ACTIVITY PROPOSAL FOR MIDDLE SCHOOL STUDENTS *44*
Asst. Prof. Seda USTA GEZER

THE IMPACT OF GAFAM ON BIO-RESOURCES: AN EMERGING PARADIGM IN SUSTAINABLE ENERGY AND RESOURCE MANAGEMENT *46*
Bolanle Waliu SHIYANBADE; Mary Olajumoke TAIWO

STATIONARITY ANALYSIS OF CO2 EMISSIONS IN G7 COUNTRIES: A COMPARATIVE EXAMINATION USING PANEL UNIT ROOT TESTS *48*
Research Assistant Şevket PAZARCI

BRIDGING THE HUMAN DIMENSION: THE ROLE OF SOCIAL SCIENCES IN ADVANCING SUSTAINABLE ENERGY TRANSITIONS *49*
Yinusa Olumuyiwa GANIYU; Arowona Kamildeen TUNDE; Kazeem Seun BELAU

GREEN DIGITAL FINANCE AND THE ENERGY TRANSITION IN EMERGING ECONOMIES *50*
Yinusa Olumuyiwa GANIYU; Arowona Kamildeen TUNDE; Kazeem Seun BELAU

BRIDGING SUSTAINABILITY AND ECONOMIC PROGRESS THROUGH GREEN GROWTH *52*
Prof. Saloni GUPTA; Ms. Jyoti GUPTA

FINANCING ENERGY-INTENSIVE DIGITAL INFTASTRUCTURE IN THE AI ERA: AN EMPIRICAL ANALYSIS OF DEVELOPMENT BANKS, ENERGY DEMAND, AND EMISSIONS IN EMERGING ECONOMIES: WITH THE AID OF CASUAL MACHINE LEARNING USING CAUSAL FORESTS

Asst. Prof. Ariyibi M. EBENEZER
Olabisi Onabanjo University
ariybimayowa@oouagoiwoye.edu.ng

Prof. Olowofela OLUSOLA
Olabisi Onabajo University
olowofealolusola@gmail.com

Banjo A. FRANCIS
WorldQuant University

O. ENITAN
ariybimayowa@oouagoiwoye.edu.ng; olufrank2003@yahoo.com

ABSTRACT

The rapid proliferation of artificial intelligence (AI) and cloud computing is driving an unprecedented surge in demand for energy-intensive digital infrastructure; including data centers, AI clusters, and IoT networks. This study uses secondary data to examine the evolving role of development finance institutions (DFIs) in financing such infrastructures, and the implications for energy consumption and carbon emissions, especially in emerging economies. Using data from the World Development Indicators (WDI) on electricity consumption, energy use, and CO_2 emissions; complemented by global projections from the International Energy Agency (IEA) on data-center electricity demand; and publicly available investment portfolios and climate-finance reports of major DFIs, the paper analyzes: (1) trends in electricity consumption and carbon intensity in countries receiving DFI-backed infrastructure finance; (2) correlations between DFI financing flows and national energy/emissions indicators; and (3) whether sustainability-linked instruments (e.g. carbon-reduction credit lines, performance-based financing) are associated with better energy/emission outcomes. The study aims to provide evidence-based insights into how DFIs can support digital industrialization while aligning with low-emission growth and climate commitments.

Keywords: *Development Finance Institutions (DFIs); Digital Infrastructure Financing; Data Centers, Artificial Intelligence (AI); Energy Consumption; CO_2 Emissions; Sustainability-Linked Instruments.*

ENERGY PRICE SHOCKS DYNAMICS: NEW EVIDENCE FROM HEAVY-TAILS, NON-LINEARITY AND SMOOTH STRUCTURAL CHANGES

Ph.D. Candidate Asım KAR
Department of International Trade and Finance
Pamukkale University
asimk@pau.edu.tr

ABSTRACT

The persistence of energy price shocks is an important research topic for researchers and policymakers. The main objective of this study is to examine whether the shocks in oil, natural gas, and coal prices are permanent or temporary, during the period 1984:01-2025:08. In addition to conventional unit root tests for the persistence of energy price shocks, applied for the Fourier non-linear quantile unit root (FNQKS) test developing by Bahmani-Oskooee et al. (2020). The FNQKS test series is robust against heavy-tail distributions, nonlinearity, and structural breaks. Empirical findings point to the asymmetric nature of shocks to energy commodity prices. While positive shocks to oil prices are temporary, negative shocks are permanent. However, positive shocks to coal and natural gas prices are permanent, negative shocks are temporary. The results of the research reveal that shocks to energy prices vary depending on the direction and magnitude of the shock.

Keywords: *Energy Prices, Non-normality, Non-linearity, Smooth Breaks, Quantile Unit Root.*

A HIDDEN MARKOV MODELS (HMM) BASED ESTIMATION APPROACH IN THE MANAGEMENT OF RENEWABLE ENERGY RESOURCES

Asst. Prof. Nesibe MANAV
Department of Management Information Systems
İstanbul Nişantaşı University
nesibe.manav@nisantasi.edu.tr

ABSTRACT

Integrating renewable energy sources is critical in combating climate change; however, the stochastic nature of wind energy complicates grid stability. This study proposes Hidden Markov Models (HMMs) as a mathematical approach to model fluctuations in energy production. Unlike traditional deterministic methods, this study treats weather regimes as "hidden states" and analyzes energy output in a probabilistic framework. Supported by Python-based simulations, this model aims to provide more precise predictions for optimizing energy storage systems.

Keywords: *Hidden Markov Models (HMM), Renewable Energy Management, Wind Power Forecasting, Stochastic Modeling, Energy Storage Optimization, Grid Stability.*

INTEGRATING FINANCIAL MODELLING WITH STRATEGIC MANAGEMENT TO SUPPORT CORPORATE FINANCE DECISIONS IN THE E-COMMERCE SECTOR: EVIDENCE FROM RETURN BEHAVIOUR OF A SPORTSWEAR E-RETAILER

Aybek JUSUPBEKOV

ABSTRACT

This study develops an integrated analytical framework that unites predictive modelling of product returns with financial modelling and strategic-management tools in the e-commerce sector. Drawing on detailed transaction-level sales and return records from a sportswear e-retailer, we construct a line-item return indicator to examine the drivers and financial implications of return behaviour. The empirical analysis reveals substantial heterogeneity across product categories, basket compositions, shipping-fee conditions, and customer channels. Size- and fit-sensitive apparel categories exhibit return rates more than twice the portfolio average, while high-value orders and free-shipping baskets consistently display elevated return probabilities. These findings highlight that returns are not random operational events but predictable behaviours with significant financial consequences.

To operationalise these insights, we propose a multi-model predictive pipeline incorporating logistic regression, random forests, and gradient boosting to estimate product-level return propensities. These predicted probabilities are embedded into return-adjusted financial metrics, including contribution margin (ECM), customer lifetime value (R-CLV), and scenario-based profitability simulations. By explicitly incorporating return risk into financial calculations, the framework corrects systematic profitability overestimations inherent in traditional revenue-based models.

Strategically, the framework enables managers to evaluate product assortment decisions, free-shipping thresholds, promotion design, and reverse-logistics investments through a financially grounded, data-driven perspective. The study demonstrates that integrating predictive analytics with corporate financial modelling strengthens decision quality, improves resource allocation, and supports sustainable profitability in high-volume e-

commerce environments. Overall, the research advances the understanding of how return behaviour can be quantified, forecasted, and embedded into strategic corporate finance decisions, offering a comprehensive and actionable approach for practitioners and scholars.

Keywords: *E-commerce Returns, Financial Modelling, Strategic Management, Predictive Analytics, Return-propensity Modelling, Machine Learning, Contribution Margin, Customer Lifetime Value (CLV), Reverse Logistics, Corporate Finance Decisions, Product Category Risk, Shipping-Policy Optimisation.*

SHORT-TERM ELECTRICITY DEMAND FORECASTING IN THE TURKISH DAY-AHEAD MARKET: A MACHINE LEARNING APPROACH

Prof. M. Serdar İSPİR
Department of Economics, Faculty of Business and Administrative Sciences
Pamukkale University
sispir@pau.edu.tr

Assoc. Prof. Aygul ANAVATAN
Department of Econometrics, Faculty of Business and Administrative Sciences
Pamukkale University
aanavatan@pau.edu.tr

ABSTRACT

The day-ahead electricity market constitutes the primary mechanism through which hourly electricity schedules are determined for the following day. In Türkiye's EPİAŞ-operated market, producers and distribution companies submit their bids between 09:00 and 11:00, after which the system operator conducts an optimization procedure to match supply and demand, ultimately determining the hourly market-clearing quantities. The accuracy of electricity demand forecasts is therefore critical because it directly affects operational planning and cost management. Inaccurate bids submitted by market participants lead to financial penalties, making precise day-ahead demand forecasting essential for both producers and distribution companies. Achieving the lowest possible forecasting errors plays a key role in enhancing efficiency within the electricity market.

This study aims to develop high-performance forecasting models for short-term electricity demand. The first phase of the analysis focuses specifically on predicting day-ahead consumption. The proposed framework will guide system operators and market participants seeking to increase the operational efficiency of the day-ahead electricity market. The empirical analysis provides a comparative evaluation of advanced machine learning approaches using key explanatory variables such as meteorological indicators, calendar dummy variables, lagged consumption variables.

Preliminary results indicate that tree-based models exhibit superior predictive performance compared with other approaches. Additionally, several hybrid model

configurations were tested to address the systematic errors still present in the error terms of these models, and preliminary findings indicate a partial improvement in the forecasting performance of the hybrid models. The findings also emphasize the importance of high-quality feature engineering, demonstrating that appropriate combinations of temporal, meteorological, and system-related features significantly enhance forecasting accuracy.

Keywords: *Day-Ahead Electricity Market, Electricity Demand Forecasting, Machine Learning, Tree-Based Models, Linear Regression-Based Models.*

THE DIGITAL DRIVERS OF CLIMATE-FRIENDLY BUSINESS PRACTICES OF SMES IN KYRGYZSTAN

Asst. Prof. Ainura TURDALİEVA
Kyrgyzstan-Türkiye Manas University
aynura.turdaliyeva@manas.edu.kg
ORCID: 0000-0001-5545-5561

Assoc. Prof. Sezer BOZKUŞ KAHYAOĞLU
Izmir Bakırçay University, University of South Africa
sezer.bozkus@bakircay.edu.tr
ORCID: 0000-0003-2865-3399

ABSTRACT

Although digital technologies were initially viewed as tools capable of increasing efficiency and reducing resource consumption, the widespread adoption of digitalization across all spheres of life is increasing energy consumption. Meanwhile, among SMEs, digital infrastructure can serve as a critical enabler for implementing environmentally friendly business practices. Reliable internet access, digital transparency, and the adoption of digital tools enable businesses to monitor energy consumption, optimize production processes, reduce waste, and improve overall resource efficiency. Thus, digital readiness at the micro-level remains a crucial prerequisite for companies to implement sustainable practices.

This study, using firm-level data from the World Bank Enterprise Survey 2023 in Kyrgyzstan, examines the digital factors that facilitate the adoption of climate-smart practices by firms. A variable reflecting whether firms have adopted energy management measures aimed at reducing emissions, waste, and pollution; digital infrastructure; and firm characteristics such as size, age, and management experience are used. A logistic regression model is used to estimate the likelihood of adopting climate-smart practices. The results are expected to demonstrate that stronger digital infrastructure and higher digital visibility significantly increase the likelihood of adopting climate-smart measures among small and medium-sized enterprises.

The study contributes to the growing body of literature on digital transformation and environmentally friendly business practices. Its insights are valuable for policymakers,

development agencies, and financial institutions seeking to strengthen the digital ecosystem and foster a more enabling business environment in Kyrgyzstan.

Keywords: *Digital Infrastructure, Climate-Oriented Actions, SME, Kyrgyzstan.*

MODELING CHANGES IN ELECTRICITY GENERATION SOURCES USING MACHINE LEARNING: THE CASE OF TÜRKİYE, GERMANY, AND SPAIN (2005-2025)

Bilgehan AVCI
Intecon Information Technology and Consulting, Türkiye
ba.bilgehanavci@gmail.com

Assoc. Prof. Sezer BOZKUŞ KAHYAOĞLU
Department of Business Administration,
Bakırçay University
sezer.bozkus@bakircay.edu.tr
ORCID: 0000-0003-2865-3399

ABSTRACT

The widespread adoption of renewable energy sources is of critical importance for achieving sustainable development goals and improving environmental outcomes. However, one of the primary factors influencing decision-making in energy investments continues to be the economic return on investment. Macroeconomic and spatial factors, including inflation, economic fluctuations, geopolitical risks, population density, and geographical conditions, play a significant role in shaping both the direction of energy investments and the distribution of electricity generation sources. This study aims to analyze changes in the electricity generation portfolios of Türkiye, Germany, and Spain during the period 2005-2025 by considering these countries' inflation rates, demographic structures, and geographical characteristics. The relationships between these variables and changes in electricity generation sources are examined through the application of machine learning techniques. By adopting a comparative cross-country perspective, the study seeks to reveal the effects of economic and geographical factors on the transition toward renewable energy systems.

Keywords: *Sustainability, Energy Transition, Machine Learning, Panel Data Analysis, Geospatial Data Analysis.*

THE IMPACT OF GAFAM ON BIO-RESOURCES: AN EMERGING PARADIGM IN SUSTAINABLE ENERGY AND RESOURCE MANAGEMENT

Bolanle Waliu SHIYANBADE
bwshiyanbade@oauife.edu.ng
ORCID: 0000-0002-4770-5484

Mary Olajumoke TAIWO
Department of Public Administration
Obafemi Awolowo University

ABSTRACT

Big Tech corporations like Google, Amazon, Facebook (Meta), Apple and Microsoft (commonly referred to as GAFAM) have grown exponentially and has completely changed the consumption styles and resource use paradigms of the world. Although much focus has been thrown towards their direct energy needs via data centers and digital infrastructures, there is a knowledge gap that is crucial since there is a lot of understanding about their radical influence on bio-resources and biological systems that form the foundation of sustainable energy changes. The study explores the multidimensional impact of GAFAM companies on bio-resource management, usage and conservation in the context of global energy changes. This paper integrates both quantitative analysis of the supply chain bio-resource footprints of GAFAM and qualitative analysis of their investments in agricultural technologies, their biotechnology projects and their use of the circular economy strategies. There are several areas of interest such as how the artificial intelligence and machine learning platforms of GAFAM can be used to streamline biomass production and bio-energy conversion processes; how they are investing in synthetic biology and bioengineering projects that have the potential to transform the development of renewable energy feedstock; and the impact their huge land holdings on data centers have on the sustainability of bio-resource accessibility and ecosystem services. The innovations of GAFAM can increase the efficiency of bio-resources by 23-35% in pilot farmer agricultural projects, increase the transparency existing in the renewable biomass supply chain, and increase the democratic access of smallholder farmers to precision agricultural tools. This study contribute to the growing discussion on

the intersection between digital platform capitalism and the governance of biological resources.

Keywords: *GAFAM, Bio-Resources, Sustainable Energy, Digital Agriculture, Resource Governance.*

THE HIDDEN CARBON OF REMOTE WORK IN PRODUCT VALUE CHAINS: MODELLING HOME-OFFICE AND EMPLOYEE COMMUTING IN CORPORATE SCOPE 3 REPORTING

Ph.D. Candidate Buğra ŞENTÜRK
Internal Audit and Risk Management Executive
Dokuz Eylul University
ORCID: 0000-0002-2950-2616
bugra.senturk@ogr.deu.edu.tr

Prof. Vahap TECİM
Head, Department of Management Information Systems
Dokuz Eylul University
ORCID: 0000-0001-5319-5241
vahap.tecim@deu.edu.tr

Assoc. Prof. Sezer Bozkuş KAHYAOĞLU
Accounting and Finance Department
Bakırçay University
ORCID: 0000-0003-2865-3399
sezer.bozkus@bakircay.edu.tr

ABSTRACT

The EU Green Deal and related disclosure requirements increasingly expect companies to report product-level carbon footprints that cover not only direct emissions, but also upstream emissions embedded in purchased goods and services across multi-tier value chains. In practice, however, most corporate Scope 3 inventories still omit the electricity and heating consumed by employees working remotely in home-office settings, both within the focal company and at its suppliers. This omission is particularly relevant in knowledge-intensive and service-oriented activities, where remote work has become structurally embedded in product value creation.

This paper proposes an analytical model to quantify the "hidden carbon" of remote work in product value chains by jointly considering home-office energy use and employee commuting within Scope 3, Category 7 (employee commuting), as defined by the GHG Protocol Corporate Value Chain (Scope 3) Standard. The model expresses per-product emissions as a function of annual working days, the share of working time allocated to a given product, remote versus on-site work ratios, commuting distance and transport

mode, household energy intensity and grid emission factors. Building on the distance-based calculation methods recommended by the GHG Protocol, the model defines an underreporting ratio for home-office emissions and derives threshold conditions under which this ratio becomes material for product-level disclosures.

Using publicly available emission factors and energy statistics, we conduct scenario analyses for representative roles in manufacturing and service value chains. For each scenario, we estimate the magnitude of underreported carbon when home-office energy is excluded, and we discuss how this bias interacts with corporate assessments of materiality. The study contributes to the literature on corporate carbon accounting and ESG reporting by (i) formalising a transparent, auditable framework for integrating remote work into Scope 3 product footprints, and (ii) linking the robustness of this integration to firms' digital maturity in data governance, system integration and reporting capabilities. From an internal audit perspective, the model is used to suggest practical diagnostic questions and simple approximation formulas that can be applied even when detailed household energy data are not available, thereby strengthening assurance over Scope 3 disclosures in remote work-intensive organisations.

Keywords: *Remote Work, Scope 3 Emissions, Product Value Chains, Home-Office Energy Use, Digital Maturity.*

OIL PRICE PASS-THROUGH INTO INFLATION: EVIDENCE FROM ADVANCED ECONOMIES

Research Assistant Doğukan TARAKÇI
International Trade and Finance
İstanbul Aydin University
ORCID: 0000-0003-2634-9318
dogukantarakci@aydin.edu.tr

ABSTRACT

Fluctuations in oil prices play a decisive role in inflationary pressures, particularly in energy-importing advanced economies. OPEC's production decisions, political instability in oil-exporting regions, and disruptions in supply chains drive energy prices upward and create both direct cost-push pressures and secondary effects through expectations on consumer prices. In this context, the extent to which oil price shocks are transmitted to domestic prices has become an important research question in terms of monetary policy effectiveness.

This study examines the pass-through effects of oil price shocks on inflation in selected advanced economies. The analysis employs the Global Vector Autoregression (Global VAR-GVAR) method, which takes both domestic and international economic interactions into account. This approach enables a more comprehensive modelling of the transmission of external shocks to domestic prices by incorporating spillover effects and simultaneous interdependencies across countries.

The findings indicate that oil price shocks are statistically significant in all advanced economies and generate substantial pass-through effects on consumer prices. Moreover, the magnitude of these effects varies significantly across countries. In this regard, the effective management of energy-related shocks constitutes a key policy priority for advanced economies implementing inflation-targeting regimes.

Keywords: *Pass-Through, Global VAR, Inflation, Oil Prices.*

SYSTEMATIC LITERATURE REVIEW OF THE ROLE OF DIGITALISATION IN SHAPING CLIMATE CHANGE

Dr. Samuel BANGURA
Department of Human Resource Management, Faculty of Management Science
Mangosuthu University of Technology
ORCID: 0009-0007-2942-0198
Bangura.samuel@mut.ac.za

ABSTRACT

Climate change poses an existential threat, with global temperatures rising 1,1°C above pre-industrial levels as of 2020, exacerbating extreme weather, biodiversity loss, and socioeconomic disparities (IPCC, 2023). Digitalization encompassing technologies like artificial intelligence (AI), Internet of Things (IoT), big data analytics, and blockchain has emerged as a double-edged sword in this crisis. While it enables efficient resource management and innovation, it also amplifies energy demands and e-waste, contributing to emissions. This systematic literature review (SLR) synthesizes evidence on how digitalization shapes climate outcomes, addressing gaps in understanding its dual direct (e.g., data center energy use) and indirect (e.g., dematerialization via smart systems) impacts. The primary aim is to map the multifaceted role of digitalization in mitigating and adapting to climate change, evaluating its contributions to environmental sustainability across sectors like energy, agriculture, and urban planning. Secondary objectives include identifying barriers such as rebound effects where efficiency gains spur increased consumption and proposing a research agenda for equitable, low-carbon digital transitions. By consolidating fragmented studies, this review informs policymakers and practitioners on leveraging digital tools for net-positive climate action, aligning with UN Sustainable Development Goals (SDGs) 9 (industry innovation) and 13 (climate action). This SLR adhered to PRISMA 2020 guidelines for transparent reporting. A comprehensive search across Web of Science, Scopus, PubMed, and Google Scholar (2011-2024) used keywords: (“digitalization” OR “digital transformation” OR “ICT”) AND (“climate change” OR “carbon emissions” OR “environmental sustainability”). Initial yields totaled 1,200 records; after deduplication (n=850), title/abstract screening excluded 700 irrelevant items. Full-text assessment of 150 studies retained 102 peer-

reviewed articles (quantitative: 60%; qualitative: 40%). Risk of bias was assessed via RoB 2.0 for RCTs and Newcastle-Ottawa for observational studies. Thematic synthesis via NVivo categorized findings into mitigation, adaptation, and governance themes, ensuring rigor and reproducibility.

Findings revealed that digitalization reduces emissions by 10-20% in optimized sectors: IoT enables precision agriculture, cutting water use by 30% and methane via smart livestock monitoring (SDG 2/13 nexus); AI-driven predictive analytics in energy grids minimize waste, as seen in EU smart cities averting 15% peak loads. Blockchain enhances supply-chain transparency, curbing deforestation-linked trade. However, ICT's carbon footprint data centers alone consume 200 TWh annually (1% global electricity) offsets gain through rebound (e.g., streaming surges). Heterogeneity prevails high-income contexts show U-shaped emission curves, with initial spikes from infrastructure yielding long-term declines; low-income areas face digital divides exacerbating vulnerabilities. Gaps include lifecycle assessments and gender-inclusive tech adoption. Future research should prioritize "green digitalization" policies, like renewable-powered AI, to harness synergies for 1,5°C pathways.

Keywords: *Climate Change, Digitalization, Artificial Intelligence (AI), Internet of Things (IoT), Environmental Sustainability, Systematic Literature Review (SLR).*

THE GREEN ENERGY CORRIDOR: TRANSFORMING VISION INTO REALITY

Dr. Ramil HUSEYN
Center for Analysis of Economic Reforms and Communication of the Republic of Azerbaijan
ramil.huseyn@ereforms.gov.az

Dr. Latif ZEYNALLI
Center for Analysis of Economic Reforms and Communication of the Republic of Azerbaijan
latif.zeynalli@ereforms.gov.az

ABSTRACT

The Republic of Azerbaijan has taken important initiatives to create green energy corridors. Indeed, the works on the establishment of “Caspian-Black Sea-Europe”, “Azerbaijan-Georgia-Türkiye-Bulgaria” and “Azerbaijan-Türkiye-Europe” energy corridors have been ongoing. Thus, Azerbaijan aims to realize the export potential of the "green energy”. It is planned to export 1 GW of green energy generated in Azerbaijan—including the Nakhchivan, Karabakh, and Eastern Zangezur economic zones—to Türkiye and Europe through the “Azerbaijan-Türkiye-Europe Energy Corridor”. To achieve this objective, Azerbaijan is currently advancing the implementation of the Gabriel Energy Junction Project, which will enhance cross-border energy connectivity. At the same time, Azerbaijan plays a pivotal role in the initiative to establish the “Caspian-Black Sea-Europe” Green Energy Corridor through the construction of a 4 GW subsea transmission cable across the Black Sea, further strengthening regional energy integration and sustainability.

At the same time, Azerbaijan also supports initiatives aimed at increasing export and exchange opportunities for green energy produced in Central Asian countries. In pursuit of this purpose, the idea of building an energy cable connecting the shores of the Caspian Sea was introduced. Therefore, preliminary negotiations were held with Kazakhstan and Uzbekistan. In other words, the green energy produced in the countries of Central Asia in the next years can be transferred to Azerbaijan through an electric cable pulled from the Caspian Sea. Azerbaijan can create export opportunities to Central Asian countries through its green energy corridors.

The paper indicates the importance of Azerbaijan as the host of COP29, attributes the production of green energy and discusses the advantages of establishing green energy corridors. In the coming years, it is emphasized that the creation of "Azerbaijan-Türkiye-Europe", "Azerbaijan-Georgia-Türkiye-Bulgaria" and "Caspian-Black Sea-Europe" green energy corridors along with the laying of an electric cable connecting the shores of the Caspian Sea are essential in the context of the integration of the energy systems of the members of the Organization of Turkic States. The significance of this idea is highlighted with its advantages in terms of the realization of the "Turkish World 2040 Vision". Analysis is being conducted about a geostrategic role of green energy projects aimed at integrating the energy systems of Türkiye and Central Asian countries through Azerbaijan in the future.

Keywords: *Energy Corridor, Green energy, Organization of Turkic States, Eastern Zangezur, Central Asia.*

AZERBAIJAN'S GROWING ENERGY POWER AND GREEN ECONOMY STRATEGY

Prof. Dr. Elşen MAHMUD OĞLU HACIZADE
Head of the Center for Energy Economics
Azerbaijan State University of Economics
Baku, Azerbaijan
ORCID: 0000-0001-5447-9676
elshan@hajizada.com

ABSTRACT

The Republic of Azerbaijan, which has significant natural energy resources, has built an appropriate infrastructure to ensure the development of these resources, and its growing energy capacity has opened up opportunities for large-scale exports. Initially, along with crude oil and natural gas resources, a wide range of petrochemical products and electricity are currently exported from the country. The country's green energy potential is also adequately assessed. Meanwhile, the green energy resources of the liberated territories are of greater importance. Based on this, these areas have been declared a green energy zone and major projects have been launched here. All this, in turn, becomes the basis for building a green economy, and important strategic steps are being taken in this direction in the country. This issue, which is of actual importance, expands research in the scientific circle. From this point of view, priority issues such as assessment of Azerbaijan's growing energy power from the circle of new realities, provision of the country with natural resources, energy insecurity, national oil strategy, new energy policy, green economy, national green energy potential, green growth concepts have become the object of research.

The methodological apparatus of the conducted research reflects scientific logic, comparative analysis methods in a systematic and situational approach. Its research work covers congressional topics such as "development problems of oil and natural gas rich countries" and "Energy Economics".

***Keywords**: Oil Strategy, Energy Security, Green Economy, Green Growth.*

DETERMINANTS OF ENERGY CONSUMPTION IN TURKIYE: EVIDENCE FROM STOCHASTIC FRONTIER ANALYSIS

Research Assistant Emre KILIÇ
Department of Capital Markets and Portfolio Management
İstanbul Nişantaşı University
emre.kilic@nisantasi.edu.tr
ORCID: 0000-0003-2900-5123

Tahsin AVCI
Department of International Trade and Logistics
Pamukkale University
tavci@pau.edu.tr
ORCID: 0000-0002-7243-8541

ABSTRACT

The aim of this study is to examine the macroeconomic factors affecting Turkiye's energy consumption for the period 1994-2024. Stochastic frontier analysis is used as the analysis method, which allows for the ranking of performance by year as well as the magnitude and direction of the relationship between variables. The empirical model includes the variables of oil price, natural gas price, real exchange rate, gross domestic product, and inflation. The findings show that economic growth, natural gas price, and reel exchange rate increase energy consumption, while inflation and oil price decrease. When examining performance rankings by year, the most three effective years are 2018, 2000, and 1996, respectively, while the least three effective years are 1998, 2020, and 2021. Energy consumption is sensitive to changes in macroeconomic indicators, growth and price dynamics.

Keywords*: Energy Consumption, Stochastic Frontier Analysis, Efficiency Measurement.*

ARTIFICIAL INTELLIGENCE-BASED ENERGY MANAGEMENT AND ERROR-CONTROLLED OPTIMIZATION IN SMART GRIDS BASED ON NUMERICAL INTEGRATION INEQUALITIES FOR S-CONVEX AND TGS-CONVEX FUNCTIONS

Asst. Prof. Gülsüm ŞANAL
Department of Management Information Systems
İstanbul Nişantaşı University
gulsum.sanal@nisantasi.edu.tr
ORCID: 0000-0002-9828-6427

ABSTRACT

This study presents a theoretical and computational framework that relates perturbed trapezoidal integral inequalities for n-times differentiable s-convex and tgs-convex functions to AI-based energy management in smart grids. Based on improved residual term estimates for Hermite-Hadamard-type inequalities and trapezoidal/midpoint rules obtained in our previous work, we derive new a priori error bounds for integral functionals such as operating cost, emission cost, and battery wear cost, which are widely used in microgrid and smart grid optimization.

These error bounds are then integrated into a deep reinforcement learning (DRL)-based energy management scheme for a grid-connected microgrid with renewable generation and battery storage. The proposed method theoretically controls the numerical integration error in the learned policy evaluation by using the convex and tgs-convex error estimates to adapt the time step and adjust the total reward function. Theoretical results demonstrate the impact of time step and convexity parameters on the resulting upper bounds for the difference between the continuous-time cost functional and its numerical approximation.

Numerical experiments on a realistic microgrid scenario demonstrate that the proposed error-controlled DRL framework provides similar or better cost performance than baseline DRL and deterministic optimization approaches, while requiring fewer time steps and lower computational overhead. The findings demonstrate that perturbed trapezoidal integral inequalities for convex functions in numerical integration can be

effectively used in the design of energy-efficient and reliable decision-making algorithms in smart grids.

Keywords: *S-Convex Function, Tgs-Convex Perturbed Trapezoid Inequality, Numerical Integration, AI, Optimization, Energy Management.*

COAL, INDUSTRY, AND ENVIRONMENTAL ANXIETY: ENERGY IMAGINATIONS IN VICTORIAN ENGLISH FICTION

Senior Teacher Gülten AKGÜL
Kütahya/Simav Special Education Practice School, Ministry of National Education, Republic of Türkiye

Senior Teacher İsmail BACAKSIZ
Kütahya/Simav Special Education Practice School, Ministry of National Education, Republic of Türkiye

Senior Teacher Özcan ÇELIK
Kütahya/Simav Special Education Practice School, Ministry of National Education, Republic of Türkiye

Teacher Sıla SEZER
Kütahya/Simav Special Education Practice School, Ministry of National Education, Republic of Türkiye

ABSTRACT

19th-century England witnessed one of the most intense periods of energy consumption in history with industrialization. Coal not only became central to economic growth but also became a power source that transformed social life, class relations, environmental perception, and cultural memory. Writers such as Charles Dickens, Elizabeth Gaskell, Thomas Hardy, and Benjamin Disraeli addressed issues such as coal-related pollution, air pollution, worker health, environmental destruction, and social inequality with literary sensitivity, thus laying the groundwork for early environmental awareness. The cultural representations of energy-based social transformations provide insights into the origins of modern energy ethical debates. An examination of the imagery of coal in Victorian literature allows for parallel readings with contemporary energy crises. The aim of this paper is to examine how coal and energy themes were represented in Victorian English literature and how these representations intersected with modern environmental criticism, energy policies, and sustainability concepts. The study, conducted with a qualitative research approach, used Dickens' *Hard Times*, Gaskell's *North and South*, and Hardy's *The Return of the Native* as the data sources. The texts were examined in terms of themes, metaphors, and environmental imagery within the scope of the qualitative analysis, and an interpretive approach was used to evaluate how the themes of coal, energy, and

industry are treated within the context of characters, plot, and setting. In *Hard Times*, coal smoke is used as a metaphor for the environmental degradation and capitalist mechanization. In *North and South*, coal mines represent the physical exhaustion of the working class. The cost of energy production is associated with social and class inequalities. In Hardy's novels, pre-industrial pastoral areas are threatened by the expansion of the coal economy. 19th-century texts contain early images of today's energy-resource crisis, climate change, and environmental injustice debates. Victorian English literature is an early warning literature addressing the social and ecological impacts of energy sources. The cultural representations of coal can be re-evaluated in today's discussions of the transition to renewable energy.

***Keywords**: Literature, Energy, Coal, The Industrial Revolution, The Victorian Era.*

INVESTIGATION OF THE NEXUS BETWEEN DEMOCRATIC GOVERNANCE, THE RULE OF LAW, AND RENEWABLE ENERGY IN THE ANTHROPOCENE

Assoc. Prof. Mahmut Ünsal ŞAŞMAZ
Department of Public Finance, Uşak University, Türkiye
mahmut.sasmaz@usak.edu.tr
ORCID: 0000-0001-9485-3933

Assoc. Prof. Melissa Nihal CAGLE
Department of Business Administration, Dokuz Eylül University, Türkiye
melissa.cagle@deu.edu.tr
ORCID: 0000-0003-0480-5626

Prof. Ahmet ÖZEN
Department of Public Finance, Dokuz Eylül University, Türkiye
ahmet.ozen@deu.edu.tr
ORCID: 0000-0002-9635-5134

ABSTRACT

This study investigates the causal relationships between democratic governance, the rule of law (ROL), and renewable energy consumption (REC) across 19 emerging market economies during 2010-2021. Applying rigorous panel data techniques, including cross-sectional dependence (CSD) tests, CADF unit root tests, and Emirmahmutoglu-Köse causality analysis, the study reveals strong bidirectional causal linkages among democratic governance, legal institutional quality, and renewable energy adoption. Findings demonstrate that democratic governance and strong legal institutions significantly enhance renewable energy use by promoting transparency, accountability, and stability. Conversely, renewable energy initiatives strengthen democratic processes and legal integrity. These results underscore the essential role of governance quality in achieving sustainable energy transitions in the Anthropocene. Policy implications emphasize the need for institutional reforms, transparency, and participatory governance to support long-term decarbonization and environmental resilience.

Keywords: *Democratic Governance, Rule of Law, Renewable Energy, Energy Transition, Governance, Sustainability.*

CYBERSECURITY, DIGITAL INFRASTRUCTURE AND ENERGY GOVERNANCE: MANAGING CLIMATE AND ENERGY RISKS IN AN AI-DRIVEN ECONOMY

Asst. Prof. Mr. Mohit TIWARI
Computer Science & Engineering
Bharati Vidyapeeth's College of Engineering (BVCOE), India
mohit.t.bvcoe@gmail.com

ABSTRACT

The rationale for this study emerges from the rapid global expansion of digital infrastructures—data farms, cloud clusters, AI computing environments and IoT networks—that consume large amounts of energy and expose national systems to significant cyber risks. As developing economies accelerate their digital transformation, the intertwined challenges of energy vulnerability and cybersecurity threats demand systematic examination.

This research investigates how digital infrastructure growth shapes national energy governance, climate commitments and critical infrastructure resilience. The research topic focuses on identifying the cybersecurity weaknesses within energy-dependent digital systems and analysing their implications for energy stability and climate risk. Methodologically, the study employs a qualitative framework combining policy analysis, review of cybersecurity incidents, assessment of energy-consumption datasets, and cross-country comparisons of digital infrastructure governance.

The suitability of this work to the congress themes is clear: it addresses geopolitics of digital infrastructures, climate-energy interactions, cybersecurity risks, technological transformation and sustainable energy governance. Findings reveal that without cyber-resilient energy systems, countries risk increased energy losses, disrupted climate targets and heightened exposure to digital threats. The study proposes a governance roadmap integrating cybersecurity controls, renewable-powered data infrastructures and energy-efficient AI systems to support national resilience.

Keywords: *Cybersecurity, Digital Infrastructure, Energy Governance, Climate Risk, Smart Resilience.*

CYBERSECURITY VULNERABILITIES OF ELECTRIC VEHICLE CHARGING STATIONS IN TRANSPORTATION TECHNOLOGIES AND THEIR IMPLICATIONS FOR ENERGY SAVINGS

Ph.D. Mustafa SANLI
Department of Electrical and Electronics Engineering
Bilkent University, Ankara
msanli@bilkent.edu.tr

ABSTRACT

While the proliferation of electric vehicle charging stations accelerates the sustainable transformation in transportation technologies, it also introduces new cybersecurity risks. This study examines the security vulnerabilities of the communication protocols, software components, and energy management infrastructures used in charging stations and evaluates the impact of these vulnerabilities on energy efficiency and system availability. The research created an OCPP-based testbed and analyzed system behavior under different attack scenarios (DoS, MITM, unauthorized access, load manipulation). The findings indicate that some weak configurations not only put user data at risk but also negatively impact grid load balance, leading to energy consumption losses of up to 8%. The study demonstrates that strengthening secure authentication, encryption mechanisms, and implementing anomaly-based monitoring models both increase system security and save energy. Consequently, considering the relationship between cybersecurity and energy efficiency is critical to the sustainability of future smart transportation infrastructures.

Keywords: *Cybersecurity, Vehicle Charging Station, Smart Energy Management, Cyber Threat, Energy Efficiency.*

EUROPEANISING THE GREEN TRANSITION: THE IMPACT OF THE EUROPEAN GREEN DEAL ON TÜRKIYE'S POLICY, ECONOMY, AND INSTITUTIONAL ADAPTATION

Asst. Prof. Nazlı KAZANOĞLU
Department of Political Science and Public Administration
İstanbul Nişantaşı University
ORCID: 0000-0003-4870-6435
nazli.kazanoglu@nisantasi.edu.tr

ABSTRACT

The European Green Deal (EGD), announced in 2019, represents the most ambitious transformation agenda in the European Union's history, aiming to make the continent climate-neutral by 2050. Beyond its environmental objectives, the EGD restructures core policy domains—energy, industry, agriculture, transportation, finance, and trade—through an integrated regulatory and economic framework. While designed for the EU, its implications extend far beyond the Union's borders, deeply affecting countries with strong economic, regulatory, and institutional linkages to the EU. Türkiye, as both a Customs Union partner and the EU's fifth-largest trading partner, stands among the non-EU countries most directly exposed to this new green governance architecture.

This paper analyses the EGD's implications for Türkiye through the lens of Europeanisation theory, conceptualising the Green Deal as a powerful mechanism of external normative, regulatory, and economic diffusion. From this perspective, the EGD functions as an external governance tool that reshapes domestic incentives, policy trajectories, and institutional alignments in non-member states. Europeanisation dynamics are particularly visible in areas such as carbon border adjustments, emissions trading, circular economy regulations, sustainable finance taxonomy, and supply-chain due-diligence obligations—all of which require Türkiye to recalibrate its regulatory frameworks to maintain market access and competitiveness.

For Türkiye, the EGD generates a dual impact. On one hand, it presents significant challenges—including adaptation costs for carbon-intensive industries, the risk of trade diversion under the Carbon Border Adjustment Mechanism (CBAM), and the need for

rapid institutional capacity-building. On the other hand, it offers strategic opportunities for accelerating green industrial transformation, expanding renewable energy deployment, strengthening climate governance, and enhancing integration with European value chains.

By applying Europeanisation framework, this paper aims to analyse how the European Green Deal (EGD) functions as a mechanism of Europeanisation and how it shapes Türkiye's economic, institutional, and climate-policy transformation. Relying on an extensive literature review and policy analysis, this paper demonstrates that the Green Deal operates as both a structural constraint and an enabling force in Türkiye's climate and economic governance. It highlights that Türkiye's alignment with the EGD should not be viewed solely as an external compliance burden but as a transformative window through which the country can modernise its production model, attract sustainable investments, and position itself competitively within the emerging low-carbon global economy.

Keywords: *Europeanisation, European Green Deal, Türkiye, Climate Policy, CBAM, Green Transformation.*

THE IMPACT OF RENEWABLE AND NON-RENEWABLE ENERGY CONSUMPTION ON ENVIRONMENTAL POLLUTION: AN APPLICATION ON TURKEY

Dr. Nedim MERCAN
Independent Researcher
nedimmercann@gmail.com
ORCID: 0000-0002-7604-6828

ABSTRACT

The rapid growth of the world's population increases the importance of environmental studies. One of the major causes of environmental pollution is energy consumption. In this context, the impact of renewable and non-renewable energy sources on the environment has gained importance. Therefore, demand for renewable energy sources has increased and efforts in this area have intensified in order to reduce environmental damage worldwide. The aim of this study is to examine the relationship between energy consumption and environmental pollution in Turkey for the period 1986-2024. The ARDL method is used as the analysis method. The findings indicate that the increase in renewable energy consumption reduces environmental pollution, while other energy consumption (coal, oil, natural gas) increases environmental pollution. Coal is seen to have the highest impact compared to other energy consumption. The study shows that the shift towards renewable energy sources is important. It also highlights that policies prioritizing environmental protection require the controlled use and gradual reduction of fossil fuel consumption.

Keywords: *Renewable Energy, Non-Renewable Energy, Environmental Pollution, Time Series.*

DETERMINANTS OF ESG DISCLOSURE: THE ROLE OF CORPORATE GOVERNANCE IN NIGERIA'S MANUFACTURING SECTOR

Omobolade Stephen OGUNDELE
Department of Commercial Accounting, College of Business and Economics
University of Johannesburg, South Africa
omoboladeo@uj.ac.za

Lethiwe Nzama-SITHOLE
Department of Commercial Accounting, College of Business and Economics
University of Johannesburg, South Africa
lethiwen@uj.ac.za

ABSTRACT

In recent years, the significant of Environmental, Social and Governance (ESG) disclosure has grown, propelled by increase in stakeholder demand for greater accountability and transparency in corporate practices. The disclosure incorporates a broad spectrum of non-financial information that mirrors company's commitment to ethical practices and sustainable development. The corporate governance role in shaping ESG disclosure practices has gathered considerably significant attention, as governance mechanism are pivotal in ensuring reliability, comprehensiveness and accuracy of disclosed information. Manufacturing firms operate in sectors that influence carbon emission, waste generation, energy consumption and community well-being, yet still provide shallow or limited ESG information especially in Nigeria. The gap threatens Nigeria's progress towards global sustainability benchmarks and hampers transition to a more resilient industrial ecosystem. Hence, the study explored how corporate governance influences ESG disclosure in the Nigeria's manufacturing sector. Thirty-five manufacturing firms listed on the Nigerian Exchange Group as of 2023, whose financial instruments are actively traded on the financial market throughout the sample period and for whom the required information is accessible, were selected using the purposive sampling technique. Panel regression analysis is be explored to analyse the data alongside other descriptive and inferential statistical techniques. The study revealed that Board meeting, Board Ownership and Board Gender Diversity shows significant and positive

effect on ESG disclosure. The findings of this study provide valuable insights to regulatory authorities, energy advocates, policymakers and other stakeholders regarding the role of corporate governance in enhancing ESG disclosure within the Manufacturing sector. This study advances knowledge by providing empirical evidence that specific corporate governance mechanisms significantly enhance ESG disclosure among manufacturing firms in Nigeria.

Keywords: *Corporate Governance, ESG Disclosure, Manufacturing Sector, Sustainability Reporting.*

THE ROLE OF THE FINANCIAL SECTOR IN TÜRKİYE'S GREEN TRANSITION: TRENDS, CONSTRAINTS, AND POLICY PATHWAYS

Asst. Prof. Parla ONUK
Department of Economics and Finance
İstanbul Nişantaşı University
ORCID: 0000-0003-0475-8284
parla.onuk@nisantasi.edu.tr

ABSTRACT

This paper provides a comprehensive analysis of the role and performance of the financial sector in Türkiye's transition toward a green economy within the energy sector. Although technical and sectoral roadmaps for achieving the 2053 net-zero emissions target have largely been shaped by the Climate Law enacted in July 2025, the financial architecture required to support this transformation has received limited scholarly attention. Drawing on a holistic assessment of statistical evidence and historical political-economic dynamics, the study highlights Türkiye's continuing increase in per capita greenhouse gas emissions and underscores the importance of integrating climate objectives into financial governance frameworks. The findings reveal that the domestic financial system, including the banking sector, continues to provide substantial support to carbon-intensive industries, predominantly through short-term lending practices. The analysis further indicates that public banks allocate a greater share of resources to green finance initiatives than foreign-owned banks operating in Türkiye. In addition, the historical trajectory of Türkiye's climate policy demonstrates a persistent growth-oriented "defensive mechanism" that prioritizes aggregate economic expansion, thereby delaying and constraining the implementation of green reforms. In this context, the study discusses the restructuring of the financial system—including the central bank—in line with the requirements of the green transition. It also offers concrete policy recommendations, including the expansion of sustainable long-term credit allocation mechanisms and the establishment of an effective national Emissions Trading System (ETS) to facilitate the achievement of climate goals.

Keywords: *Green Growth, Green Finance, Sustainable Development, Financial Dependency.*

GOVERNING GREEN FINANCE IN THE DIGITAL AGE: POLICY INNOVATIONS FOR SUSTAINABLE COMPETITIVENESS

Kehinde Isiaq OLAIYA
Department of Banking and Finance
Olabisi Onabanjo University, Nigeria
olaiya.kehinde@oouagoiwoye.edu.ng

Rahmon Abiodun FOLAMI
Department of Accounting
Olabisi Onabanjo University, Nigeria
folami.rahmon@oouagoiwoye.edu.ng

Oluwasegun Temitayo ODUNSI
Department of Accounting
Olabisi Onabanjo University, Nigeria
odunsi.oluwasegun@oouagoiwoye.edu.ng

ABSTRACT

Digital technologies are reshaping how green finance is mobilized and governed, and Nigeria presents a compelling context as the country seeks to channel capital toward sustainable development. Despite growing adoption of green bonds, ESG disclosure frameworks, and fintech-enabled green financial products, gaps remain in transparency, traceability, and efficiency. This study investigates how digital technologies including blockchain, artificial intelligence, and big-data analytics are influencing the governance of green finance in Nigeria.

The study employs a quantitative firm-level data for Nigerian financial institutions and listed companies from 2010 to 2024. Data sources include ESG disclosure scores from the Nigerian Exchange (NGX), green bond issuances and investment flows reported by the Central Bank of Nigeria and the Debt Management Office, and digital-finance adoption indicators from fintech platforms. Panel-data regression techniques are applied to examine the dynamic relationship between digital technology adoption and green investment outcomes across firms over time, accounting for both temporal trends and cross-sectional heterogeneity.

Results indicate that firms with higher adoption of digital tools exhibit greater transparency in sustainability reporting and attract more green-oriented investment

capital. Blockchain-enabled traceability and AI-driven environmental risk scoring are positively associated with green investment flows, though the impact is stronger among larger financial institutions than smaller firms. The analysis further reveals that regulatory clarity and digital infrastructure are significant moderators of technology effectiveness. These findings demonstrate that digital tools can materially improve governance and investment efficiency in Nigeria's formal green-finance sector.

The study concludes that policy innovations are necessary to fully harness digital technologies for sustainable competitiveness in Nigeria. The study recommends establishing standardized digital ESG reporting frameworks, investing in firm-level digital infrastructure for verification and traceability, and creating regulatory sandboxes to encourage responsible fintech innovation. By addressing these challenges, Nigerian policymakers and regulators can strengthen the role of digital green finance in supporting sustainable economic growth and positioning the country as a leading formal-sector green-finance hub.

Keywords: *Green Finance, Digital Technologies, ESG, Blockchain, Artificial Intelligence, Sustainable Competitiveness, Policy Innovation.*

SUSTAINABILITY REPORTING AND THE VALUE OF LISTED MANUFACTURING FIRMS IN NIGERIA: THE MODERATING ROLE OF FOREIGN OWNERSHIP

Romoke Rafiat BUSARI
Department of Accounting, Faculty of Economics and Management Sciences
University of Ibadan
romokeb@yahoo.com; rr.busari@ui.edu.ng

Olayinka Segun WALE
Department of Accountancy, The Polytechnic, Ibadan
walesamuel52@yahoo.com

ABSTRACT

The relationship among sustainability reporting, foreign ownership and firm value remains an unresolved issue in emerging economies, especially within the Nigerian manufacturing sector, where sustainability practices and foreign investment are important. This study examined the interactive effect of sustainability reporting and foreign ownership on the value of listed manufacturing firms in Nigeria. Employing an ex-post facto research design, the study utilized 46 listed manufacturing firms using purposive sampling technique from 2015 to 2024. The Least Square Dummy Variable (LSDV) regression model is applied to analyze the panel data, with Tobin's Q and Market-to-Book Value (MTBV) as proxies for firm value. Independent variables include environmental reporting (ENVD), social reporting (SOCD) and governance reporting (GOVD), with foreign ownership (FOWN) as the moderating variable; firm size (FSIZ), earnings per share (EAPS), market capitalization (MCAP) and leverage (DETA) are the control variables. The findings reveal that the interaction between environmental reporting and foreign ownership significantly enhance firm value (Tobin's Q) while the interaction effect was insignificant for MTBV. The interactive effect of social reporting and foreign ownership has an adverse effect on firm value when measured as MTBV and does not have significant influence on Tobin's Q. Furthermore, the interactive effect of governance reporting and foreign ownership show no significant impact on firm value when measure as Tobin's Q and MTBV. Thus, managers are advised to align sustainability

strategies with global reporting standards, while policymakers should strengthen regulatory frameworks to enhance transparency and investor confidence.

Keywords: *Sustainability Reporting, Foreign Ownership, Tobin's Q, Market Capitalization, Policy Makers.*

DIGITALIZATION OF THE ENERGY SILK ROAD: EXAMINING THE TRANSFORMATION OF THE TANAP ROUTE INTO A SMART TOURISM DESTINATION

Prof. Mithat Zeki DİNÇER
Department of Tourism Management
İstanbul Nişantaşı University
mithatzeki.dincer@nisantasi.edu.tr
ORCID: 0000-0002-4928-8303

Prof. Fatma Füsun İSTANBULLU DİNÇER
İstanbul University
istanbul@istanbul.edu.tr
ORCID: 0000-0003-2338-2462

Asst. Prof. Dilbar GULUYEVA
Department of Tourism Management
İstanbul Nişantaşı University
dilbar.guliyeva@nisantasi.edu.tr
ORCID: 0000-0001-9528-8446

ABSTRACT

The Trans-Anatolian Natural Gas Pipeline (TANAP) is not only an energy corridor but also a modern Silk Road that integrates Anatolia's archaeological and ecological heritage. However, the fact that a large part of this pipeline's physical structure is underground limits the tourist experience. The main objective of this study is to model how the TANAP route can be transformed into a sustainable and interactive "Smart Tourism Route" through the integration of Smart Tourism Technologies (Augmented Reality (AR), Internet of Things (IoT), Big Data, and Gamification).

The study was designed as an exploratory case study, one of the qualitative research methods. The data set was created from a document pool exceeding 2,500 pages, including TANAP's Sustainability Reports for 2022-2024, Social and Environmental Investment Programme (SEIP) results, archaeological rescue excavation catalogues, and technical maps. The data was analysed using the "three-stage coding" (open, axial, selective) technique with MAXQDA 2024 Analytics Pro software.

The analysis identified three main themes and seven subcategories: (1) Digital Restoration of Invisible Heritage, (2) Eco-Technological Corridor, and (3) Data-Driven Destination Management. The findings show that physically inaccessible “embedded” heritage can be rebuilt in a virtual environment using Digital Twin technologies, and that the route can be transformed into a “Digital Experience Area” rather than an “Open-Air Museum”.

The study proves that linear energy infrastructures are not merely engineering structures; they can be transformed into a hybrid (phygital) tourism product through technology-supported storytelling and gamification dynamics. In this context, the “Digi-TANAP: Integrated Smart Route Model” is proposed as an original contribution to the literature.

Keywords: *Smart Tourism Ecosystem, TANAP, Energy Tourism, Digital Twin, Gamification, Industrial Heritage.*

INSTITUTIONAL QUALITY, GOVERNANCE AND ENERGY TRANSITION IN EMERGING ECONOMIES

Saheed Akande SHITTU
Department of Financial Governance
University of South Africa, South Africa
shittusa1212@gmail.com
ORCID: 0000-0003-3382-5917

Lourens J. ERASMUS
Department of Financial Governance
University of South Africa, South Africa
erasmlj1@unisa.ac.za
ORCID: 0000-0003-3692-9586

ABSTRACT

Switching to renewable energy in the developing economies is a pivotal issue that depends not only on the development of technologies but also on the quality of the governance system and the institutions. This paper will discuss how institutional quality can determine the result of energy transition in emerging economies and how the governance structure can either support or impede the development. Institutional quality can be defined as the efficiency of legal, regulatory and administrative frameworks that are underpinning energy policies and initiatives. Good institutions are more likely to enhance transparency, accountability, and stability, which are essential in attracting investments, encouraging innovation, and enforcing the energy transition policy. In contrast, weak institutions tend to cause inefficiencies, corruption, and inconsistency in policies, which derail the process of a low-carbon economy. In this paper, a comparative approach has been used by comparing emerging economies that have different levels of institutional quality and governance in order to evaluate their energy transition strategies and performance. The study demonstrates a major contribution of governance systems, such as political stability, regulatory systems, and the capacity of the state, to the success or failure of energy transition initiatives. At the end of the paper, policy recommendations are given to prevent ineffective and inclusive energy transition by enhancing institutional frameworks and better governance. The findings show that while technology solutions are necessary, the success of sustainable energy transitions in developing economies

depends critically on strong institutional quality and governance. This abstract provides clues on the interaction of governance and energy policy, and the implication of the same to policy makers and scholars in the pursuit of sustainable growth in up-and-coming economies.

Keywords: *Institutional Quality, Energy Transition, Renewable Energy, Governance, Developing Economies, Sustainable Development*

TEACHING RENEWABLE ENERGY SOURCES IN SCIENCE EDUCATION THROUGH A DESIGN THINKING APPROACH: AN APPLIED ACTIVITY PROPOSAL FOR MIDDLE SCHOOL STUDENTS

Asst. Prof. Seda USTA GEZER
Hasan Ali Yücel Faculty of Education
İstanbul University-Cerrahpaşa
ORCID: 0000-0002-7505-0024
sedausta@iuc.edu.tr

ABSTRACT

This study proposes an innovative instructional activity designed through a design thinking approach for teaching renewable energy sources. The proposed activity aims to enhance middle school students' design thinking skills and strengthen their capacity to generate sustainable solutions. Given the increasing energy consumption, the deepening of environmental problems, and the growing need for sustainable lifestyles, it is essential to teach energy-related topics at the middle school level through pedagogically enriched approaches. The design thinking approach offers a learning process that enables students to empathize with real-life problems, define the problem accurately, generate solution ideas, develop prototypes, and test their models. In this respect, the design thinking approach supports not only conceptual learning but also the development of core 21st-century skills such as problem-solving, creativity, critical thinking, and collaboration. The proposed activity aims to guide middle school students in exploring renewable energy sources by linking them with engineering skills. The activity consists of the stages of empathizing, defining the problem, ideating, prototyping, and testing—each structured in alignment with the constructivist nature of science education. Teacher observation forms and student self- and peer-assessment form samples will also be developed and presented to support the learning process with multidimensional assessment tools. The activity is designed in a holistic structure aligned with the 2024 Türkiye Century Education Model integrating technology and targeting skill acquisition. With these characteristics, the proposed activity provides an engineering experience that contributes to raising a qualified future workforce in the energy field. The design-oriented approach suggested in

this study offers an application-based framework that fosters innovation awareness in the energy domain while supporting students' creative problem-solving skills.

Keywords: *Science Education, Design Thinking, Middle School Students, Renewable Energy.*

THE IMPACT OF GAFAM ON BIO-RESOURCES: AN EMERGING PARADIGM IN SUSTAINABLE ENERGY AND RESOURCE MANAGEMENT

Bolanle Waliu SHIYANBADE
Department of Public Administration
Obafemi Awolowo University, Nigeria
ORCID ID: 0000-0002-4770-5484
bwshiyanbade@oauife.edu.ng

Mary Olajumoke TAIWO
Department of Public Administration
Obafemi Awolowo University, Nigeria

ABSTRACT

Big Tech corporations like Google, Amazon, Facebook (Meta), Apple and Microsoft (commonly referred to as GAFAM) have grown exponentially and has completely changed the consumption styles and resource use paradigms of the world. Although much focus has been thrown towards their direct energy needs via data centers and digital infrastructures, there is a knowledge gap that is crucial since there is a lot of understanding about their radical influence on bio-resources and biological systems that form the foundation of sustainable energy changes. The study explores the multidimensional impact of GAFAM companies on bio-resource management, usage and conservation in the context of global energy changes. This paper integrates both quantitative analysis of the supply chain bio-resource footprints of GAFAM and qualitative analysis of their investments in agricultural technologies, their biotechnology projects and their use of the circular economy strategies. There are several areas of interest such as how the artificial intelligence and machine learning platforms of GAFAM can be used to streamline biomass production and bio-energy conversion processes; how they are investing in synthetic biology and bioengineering projects that have the potential to transform the development of renewable energy feedstock; and the impact their huge land holdings on data centers have on the sustainability of bio-resource accessibility and ecosystem services. The innovations of GAFAM can increase the efficiency of bio-resources by 23-35% in pilot farmer agricultural projects, increase the transparency existing in the renewable biomass supply chain, and increase the democratic access of smallholder

farmers to precision agricultural tools. This study contribute to the growing discussion on the intersection between digital platform capitalism and the governance of biological resources.

Keywords: *GAFAM, Bio-Resources, Sustainable Energy, Digital Agriculture, Resource Governance*

STATIONARITY ANALYSIS OF CO2 EMISSIONS IN G7 COUNTRIES: A COMPARATIVE EXAMINATION USING PANEL UNIT ROOT TESTS

Research Assistant Şevket PAZARCI
Faculty of Economics, Administrative and Social Sciences
İstanbul Nişantaşı University
ORCID: 0000-0002-3675-909X
sevket.pazarci@nisantasi.edu.tr

ABSTRACT

This study examines the stationarity properties of CO2 emission series for G7 countries (USA, Germany, United Kingdom, France, Italy, Japan, and Canada) over the period 1965-2024 using panel unit root tests. Understanding the stochastic properties of emission series is critically important for evaluating the effectiveness of global climate change policies. Three different generations of panel unit root tests have been applied to test the stationarity structure of emission series. In the methodological framework, the PANIC test developed by Bai and Ng (2004) was first applied, yielding stationarity findings at the panel level. Subsequently, the analysis was deepened with the Bai and Carrion-i-Silvestre (2009) PANIC test, which accounts for structural breaks, and the presence of a unit root process was detected in this test. Finally, the Nazlioglu et al. (2023) panel unit root test, which incorporates both Fourier functions and factor structure, was applied, also yielding unit root findings. The empirical findings reveal that different econometric specifications can produce different results regarding the stationarity properties of CO2 emission series. The unit root findings from tests that account for structural breaks and smooth transitions indicate that CO2 emissions in G7 countries are subject to permanent shocks, emphasizing the importance of long-term effects of emission reduction policies. These findings suggest that the stochastic properties of the series should be considered in the design of climate policies.

Keywords: *CO2 Emissions, Panel Unit Root Tests, Structural Breaks, Fourier Function, G7 Countries, Climate Policies.*

BRIDGING THE HUMAN DIMENSION: THE ROLE OF SOCIAL SCIENCES IN ADVANCING SUSTAINABLE ENERGY TRANSITIONS

Yinusa Olumuyiwa GANIYU
Department of Banking and Finance
Olabisi Onabanjo University, Nigeria
yinusa.ganiyu@oouagoiwoye.edu.ng
ORCID: 0000-0001-6030-6018

Arowona Kamildeen TUNDE
arowonakamildeen@yahoo.com

Kazeem Seun BELAU
belau.kazeem@oouagoiwoye.edu.ng

ABSTRACT

The global shift toward sustainable energy is often framed as a technological and environmental challenge, yet its success ultimately depends on social dynamics, governance structures, and cultural acceptance. This paper explores the critical role of social sciences in facilitating equitable and effective energy transitions. Drawing on interdisciplinary perspectives from sociology, political science, economics, and anthropology, the study examines how social behavior, policy frameworks, and power relations influence the adoption and implementation of renewable energy systems. It highlights the importance of energy justice, community participation, and socio-economic inclusivity in shaping sustainable energy outcomes. Through case studies of diverse national contexts, the paper demonstrates that technological innovation must be complemented by social innovation to ensure long-term sustainability. Ultimately, it argues that integrating social science insights into energy policy and planning is essential for achieving not only decarbonization goals but also broader societal resilience and equity.

Keywords: *Sustainable Energy, Social Sciences, Energy Transition, Energy Justice, Social Innovation, Governance Policy, Cultural Acceptance, Equity, Renewable Energy, Sustainability.*

GREEN DIGITAL FINANCE AND THE ENERGY TRANSITION IN EMERGING ECONOMIES

Yinusa Olumuyiwa GANIYU
Department of Banking and Finance
Olabisi Onabanjo University, Nigeria
yinusa.ganiyu@oouagoiwoye.edu.ng
ORCID: 0000-0001-6030-6018

Arowona Kamildeen TUNDE
arowonakamildeen@yahoo.com

Kazeem Seun BELAU
belau.kazeem@oouagoiwoye.edu.ng

ABSTRACT

Emerging economies are experiencing a rapid convergence of green digital finance, accelerating digitalisation, and expanding renewable energy systems, yet the integrated implications of these trends for energy transition remain insufficiently theorized. Existing studies have examined digital finance or renewable energy in isolation, but fewer have provided a unified conceptual analysis of how digital financial innovations collectively shape low-carbon transformation. This study addressed this gap by synthesising contemporary literature to evaluate how blockchain-enabled green bonds, AI-driven ESG analytics, mobile-based green lending, and renewable-powered digital infrastructure influence clean energy deployment and energy transition outcomes in emerging economies.

The review proposed that digitalisation affects energy transition through direct pathways including enhanced transparency, reduced information asymmetry, and improved financial and energy-system efficiency and indirect pathways, such as increased digital-driven energy demand and the ability of green digital finance to mobilise capital for low-carbon technologies. The synthesis reveals that while digitalisation enhances funding transparency and mitigates financing frictions, its transformative potential depends heavily on governance quality, institutional capacity, and coherent regulatory frameworks.

The study contributed a novel integrative framework that explains how green digital finance functions as a catalyst for inclusive and resilient low-carbon development when aligned with smart energy systems and supportive policy reforms. Policy implications emphasise the need for harmonised green-digital financial strategies, improved regulatory clarity, expansion of renewable-powered digital infrastructure, and stronger institutional mechanisms to address greenwashing. Public-Private Partnerships (PPPs) and Development Finance Institutions (DFIs) are highlighted as critical vehicles for mobilising sustainable capital and reducing risk in clean-energy investments.

Keywords: *Green Digital Finance, Digitalisation, Renewable Energy Transition, Blockchain-Enabled Green Bonds, AI-Driven ESG Analytics, Sustainable Development.*

BRIDGING SUSTAINABILITY AND ECONOMIC PROGRESS THROUGH GREEN GROWTH

Prof. Saloni GUPTA
Bharati College, University of Delhi

Ms. Jyoti GUPTA
Department of African Studies, University of Delhi

ABSTRACT

This research paper presents an in-depth exploration of the concept of "Green Economy" by giving insights on various Sustainable Development Goals (SDGs) related to it, namely, SDG 3 ("Good Health and Well-being"), SDG 12 ("Responsible Consumption and Production"), SDG 13 ("Climate Action"), and SDG 16 ("Peace, Justice, and Strong Institutions"). The study conducts a comprehensive Bibliometric Analysis of the trends and patterns of scholarly landscape on the green economy and SDGs with 885 documents from Scopus spanning over a time span of 32 years (1992-October, 2024) published in 369 journals, having 2269 authors with an international collaboration of 31.42%. The paper also identifies the thematic evolution, trend topics, most frequent keywords, impactful papers, and journals in the field of SDGs & Green Economy. The paper also assesses the progress of various SDGs and the programs supporting green economy initiatives by analyzing data retrieved from the United Nations Sustainable Development Group. The findings provide valuable insights into the evolution of scholarly discourse and policy implications related to the role of SDGs in advancing progress towards the Green Economy.

Keywords: *Green Economy, Sustainability, Green Investing, Green Issues, Inclusive Development, Green Jobs, Sustainable Development Goals (SDGs).*