

SDG HIGHLIGHT REPORT





TABLE OF CONTENTS



Introduction	— — — — — — — — — —	1
---------------------	---------------------	----------



SDG-3: Good Health and Well-Being	— — — — — — — — — —	2
--	---------------------	----------

RESEARCH & EDUCATION



SDG-4: Quality Education	— — — — — — — — — —	3
---------------------------------	---------------------	----------

RESEARCH & EDUCATION

ENGAGEMENT & OUTREACH



SDG-5: Gender Equality	— — — — — — — — — —	5
-------------------------------	---------------------	----------

RESEARCH & EDUCATION



SDG-6: Clean Water and Sanitation	— — — — — — — — — —	6
--	---------------------	----------

RESEARCH & EDUCATION



SDG-7: Affordable and Clean Energy	— — — — — — — — — —	7
---	---------------------	----------

RESEARCH & EDUCATION



SDG-8: Decent Work and Economic Growth	— — — — — — — — — —	9
---	---------------------	----------

RESEARCH & EDUCATION



SDG-9: Industry, Innovation and Infrastructure	— — — — — — — — — —	10
---	---------------------	-----------

RESEARCH & EDUCATION



SDG-10: Reduced Inequalities	— — — — — — — — — —	11
-------------------------------------	---------------------	-----------

RESEARCH & EDUCATION



SDG-11: Sustainable Cities and Communities	— — — — — — — — — —	12
---	---------------------	-----------

RESEARCH & EDUCATION



SDG-12: Responsible Consumption and Production	— — — — — — — — — —	13
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RESEARCH & EDUCATION

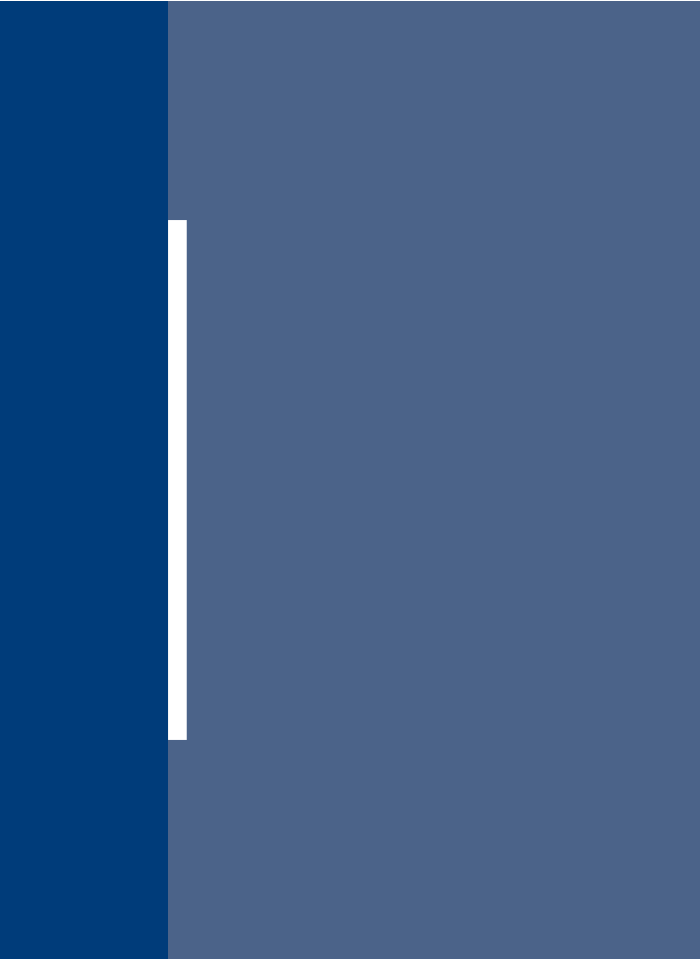


SDG-13: Climate Action	— — — — — — — — — —	12
-------------------------------	---------------------	-----------

RESEARCH & EDUCATION

SDG-16: Peace, Justice and Strong Institutions	— — — — — — — — — —	15
---	---------------------	-----------

RESEARCH & EDUCATION



INTRODUCTION

The Australian University (AU) places sustainability at the core of its mission, advancing education, research, and innovation to address critical challenges facing Kuwait, the region, and the wider world. Our alignment with the United Nations 2030 Agenda for Sustainable Development and Kuwait Vision 2035 grows stronger each year as we embed sustainable development into every aspect of the University—from pioneering research and forward-looking teaching, to impactful community engagement.

Our commitment is both local and global, as we foster collaborations with leading universities, research centers, and industry partners, and contribute to shaping Kuwait's sustainable future. Through applied research projects supported by the Kuwait Foundation for the Advancement of Sciences (KFAS) AU is actively working towards practical solutions for sustainable growth. In parallel, our faculty, staff, and students participate in international scientific forums and conferences, positioning AU as an emerging voice in the global sustainability dialogue.

As this report captures just a snapshot of AU's efforts and collective impact, we invite readers to reflect on the shared mission of safeguarding our planet and society. Through innovation, collaboration, and education, AU reaffirms its commitment to building a more sustainable future, for Kuwait, the region, and the world.



SDG-3: GOOD HEALTH AND WELL-BEING



RESEARCH & EDUCATION

Connecting Nutrition and Sleep: Pathways to Better Health

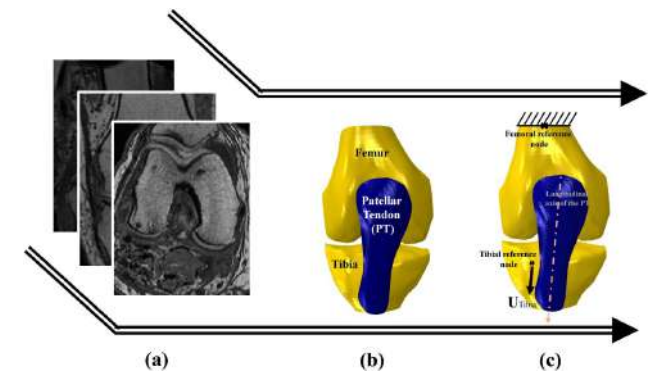
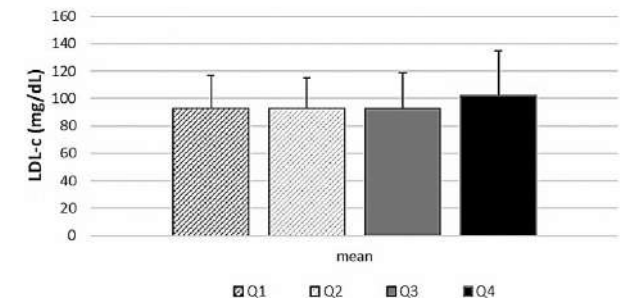
Faculty researchers at the Australian University investigated the relationship between dietary inflammation and sleep quality among overweight and obese women. Using a 147-item food frequency questionnaire, the study derived a Dietary Inflammatory Index (DII) and compared it with sleep outcomes measured by the Pittsburgh Sleep Quality Index. Results showed that participants with higher DII scores, reflecting greater consumption of pro-inflammatory foods, had significantly poorer sleep quality, with ~58% reporting disturbances. In contrast, women with lower DII scores, indicating healthier dietary patterns, experienced better sleep outcomes. By linking dietary choices to sleep health, this research provides evidence for nutrition-based interventions that may reduce risks of chronic disease and psychological impairment. The findings contribute to SDG 3 (Good Health and Well-Being) by highlighting the importance of diet quality in promoting healthier lifestyles and improving overall well-being.



Understanding How Aging and Diabetes Affect Tendon Health

Faculty researchers at the Australian University explored the impact of advanced glycation end-products (AGEs)—proteins that accumulate with aging, diabetes, and related diseases—on tendon mechanics. Tendon injuries are common in these conditions, with AGEs suspected of reducing tissue resilience and healing capacity. Using a multiscale fibril-reinforced hyper-elastoplastic model, the study simulated how varying AGEs density affects tendon behavior. Results revealed that higher AGEs levels decreased tendon stiffness in the pre-yield stage, creating localized stress concentrations, while the post-yield stage showed abnormally high stiffness and a more abrupt mechanical response. These findings highlight how AGE-related collagen alterations contribute to tissue damage and impaired healing, offering insights into the mechanisms underlying musculoskeletal complications in metabolic and age-related disorders. The research contributes to SDG 3 (Good Health and Well-Being) by deepening understanding of chronic disease impacts on tissue function and guiding future prevention and treatment strategies.

Quartiles of DII





SDG-4: QUALITY EDUCATION

RESEARCH & EDUCATION

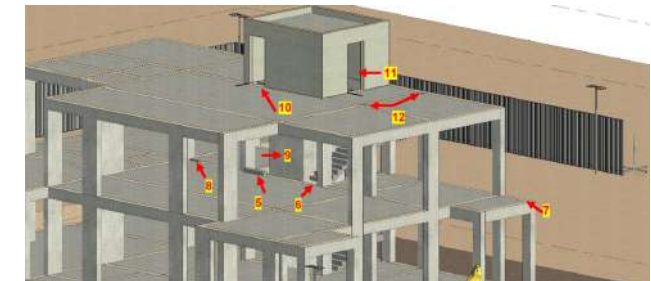
Digital Entrepreneurial Competences for Quality Education

Researchers from the Australian University, in collaboration with a Kuwait Foundation for the Advancement of Sciences (KFAS)-funded project with the Institute of Economic Sciences (Serbia), examined university students' digital entrepreneurial competences (DEC) and identify which factors most influence them. Focusing on the EmDigital framework's first area—Identification of opportunities (search and analysis, creativity and innovation, prospecting)—the study found overall low DEC levels, with location, field of study, level of study, and employment status as significant predictors, while age and gender matter less. These insights inform curriculum design and targeted skills development, and they underpin the creation of an online DEC assessment tool (modeled on the Digital Competence Wheel) that universities can use to track learning outcomes—directly advancing SDG 4 (Quality Education) by improving how higher education teaches and measures entrepreneurial digital skills.



Innovating Teaching with Immersive Technologies

Researchers from the Australian University explored how immersive technologies and gamification strategies can transform engineering education. Civil engineering students were tasked with identifying structural errors in a building using three approaches: traditional 2D plans, a gamified 3D model, and an immersive Virtual Reality (VR) environment. Results showed that students using VR performed 35% better than 2D and 4% better than 3D, highlighting VR's potential to significantly enhance learning outcomes. Importantly, the study found no correlation between gamified methods and simulation sickness, addressing a key concern in immersive education. This research was presented at the 14th IEEE Global Engineering Education Conference (EDUCON), underscoring its contribution to global dialogue on innovative teaching strategies. By advancing effective, technology-driven learning environments, the study directly supports SDG 4 (Quality Education).





SDG-4: QUALITY EDUCATION

ENGAGEMENT & OUTREACH

Hands-On Digital Marketing Education

The Australian University hosted a workshop showcasing Simbound, a digital marketing game simulation, led by its CEO, Mr. Louis Havriliuc. Scientific evidence demonstrates that game-based learning increases student motivation and achievement, and Simbound exemplifies this approach by allowing students to design and manage digital marketing campaigns with virtual budgets in a simulated real-world environment. By engaging with consumer behavior scenarios and applying corrective actions, students learn digital marketing fundamentals through a practical, hands-on, and engaging method. The platform also equips instructors with tools to monitor and evaluate performance, ensuring structured learning outcomes. This workshop reflects AU's commitment to innovative educational practices and its active role in engaging students with cutting-edge technologies that make learning both effective and enjoyable.



Bridging the Gap in Higher Education Quality

The Australian University, through its Teaching and Learning Center and in partnership with the Kuwait Foundation for the Advancement of Sciences (KFAS), organized the annual forum "Bridging the Gap – Quality of Education and Higher Education" on May 31, 2023. The event brought together experts, educators, and stakeholders to address the pressing challenges facing Kuwait's education system and to explore solutions that align higher education with the needs of a dynamic labor market. Featuring keynote speeches, a high-level panel discussion, and interactive workshops on augmented learning, teacher bias, and the role of psychology in education, the forum created a platform for dialogue on reforming education for a sustainable future. By promoting innovation in teaching and inclusive educational practices, this initiative directly advances SDG 4 (Quality Education), fostering pathways for both individual growth and societal well-being.





SDG-5: GENDER EQUALITY

RESEARCH & EDUCATION

Gender Equality in the Digital Labour Market: Competence Gaps among persons with disabilities

Faculty collaborators examined the role of digital labour platforms in fostering inclusive employment opportunities for persons with disabilities (PwD). Recognizing that these platforms can reduce barriers to workforce entry, the study assessed the digital competences of PwD and investigated potential gender-related differences. Findings highlighted both existing skills and notable gaps that may hinder PwD from successfully engaging in freelance or entrepreneurial ventures. By identifying discrepancies between current and required competences, the research provides evidence-based insights to support targeted training and empowerment programs. This work contributes to SDG 5 (Gender Equality) by highlighting gender disparities in digital readiness while also reinforcing the broader agenda of equitable access to employment opportunities for marginalized groups.

Socio-Demographic Drivers of Women's Financial Inclusion in the Western Balkans

Researchers examined the financial inclusion of women in the Western Balkans as a critical driver of women's entrepreneurship and empowerment. Using data from the Global Findex Database 2021, the study analyzed responses from 2,683 women across Albania, Bosnia and Herzegovina, Croatia, North Macedonia, and Serbia. Financial inclusion was measured through a modified index incorporating digital payment variables, reflecting modern financial practices. Results revealed that higher education levels, employment status, and income positively influence women's financial inclusion, while an inverted U-shaped relationship with age was observed— participation rises to a point before declining. By highlighting key socio-demographic factors shaping women's access to financial resources, this research contributes to SDG 5 (Gender Equality) by offering insights to policymakers on strengthening women's financial empowerment and entrepreneurial potential in the region.





SDG-6: CLEAN WATER AND SANITATION

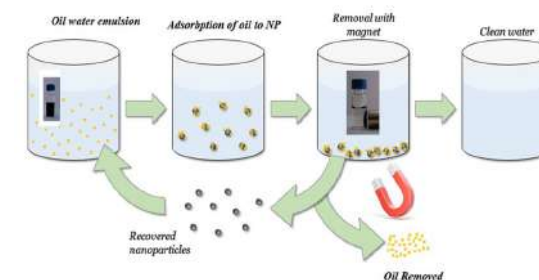
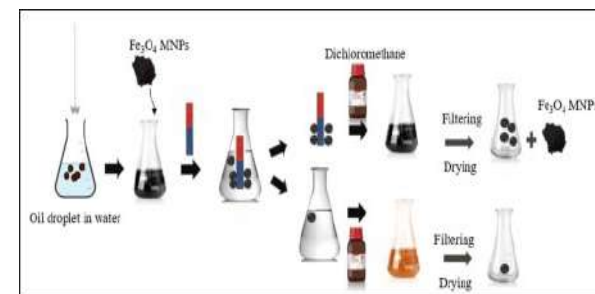
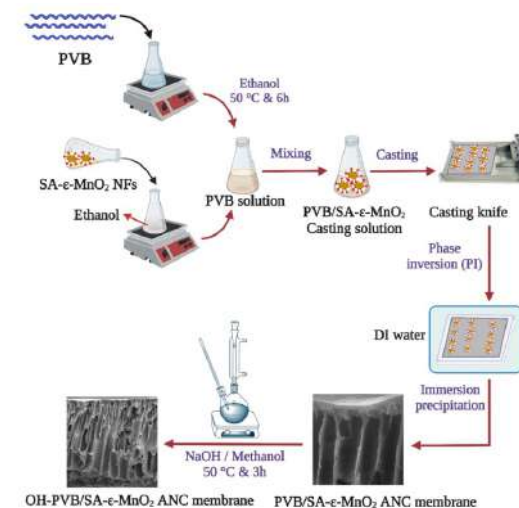
RESEARCH & EDUCATION

High-Performance Alkali-Treated Nanocomposite Membrane for Sustainable Water Purification

Researchers developed a novel alkali-treated nanocomposite membrane to tackle one of the pressing challenges in water treatment—simultaneous removal of heavy metals and pharmaceutical pollutants from contaminated water. Using a facile phase inversion method, the team fabricated an alkali-treated PVB/SA-grafted ϵ -MnO₂ adsorptive nanocomposite (ANC) membrane that combines adsorption and filtration capabilities. Characterization using FTIR, XPS, FE-SEM, water contact angle, and AFM confirmed improved structural and surface properties, with alkaline treatment significantly increasing pure water flux from 311.54 to 394.62 L/m²·h·bar. The membrane achieved high rejection rates of Cd(II) (98.55%) and tetracycline (98.73%) at pH 6, while maintaining excellent antifouling performance, with flux recovery ratios above 97% after multiple cycles. By addressing both pollutant removal efficiency and long-term membrane stability, this research contributes to SDG 6 (Clean Water and Sanitation) by advancing sustainable technologies for safe, reliable, and high-quality water purification.

Functionalized Magnetic Nanoparticles for Efficient and Reusable Oily Wastewater Treatment

This study addresses the pressing challenge of treating oily wastewater, a major environmental concern due to strict effluent quality standards and increasing demand for water reuse. Researchers investigated the use of Fe₃O₄ magnetic nanoparticles (MNPs) as highly effective adsorbents for oil-water separation. Six nanoparticle types were tested, including uncoated (A–C) and functionalized (NH₂/–COOH; A1–C1) MNPs with varying particle sizes. The results showed that functionalized nanoparticles significantly enhanced oil removal efficiency, achieving up to 94% removal under optimized conditions (20 minutes, 150 mg/L oil concentration, 100 mg adsorbent dose, 28 API, pH 4, room temperature). Moreover, functionalized MNPs exhibited superior reusability compared to uncoated variants, making them a more sustainable solution. The adsorption process followed pseudo-second-order kinetics and aligned with the Freundlich model, validating the mechanism of interaction. By advancing efficient and reusable nanomaterials for oily wastewater treatment, this research contributes directly to SDG 6 (Clean Water and Sanitation) by promoting technologies that enable water reuse, reduce pollution, and support sustainable water management.





SDG-7: AFFORDABLE AND CLEAN ENERGY

RESEARCH & EDUCATION

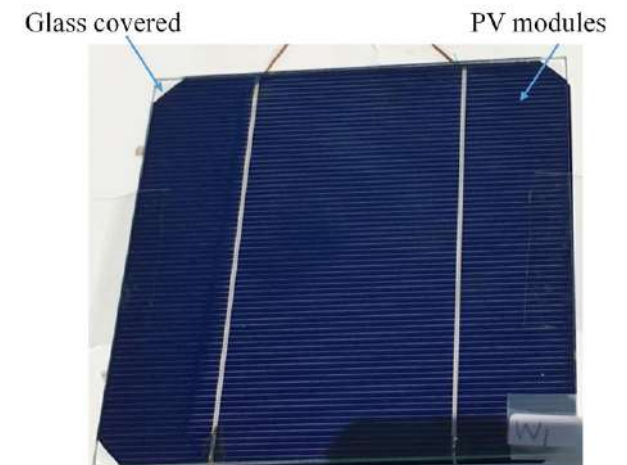
Transforming Waste into Clean Energy

Faculty at the Australian University received approval for a KFAS-funded research project titled “Assessment of Exhaust Emissions, Engine Performance and Comparative Toxicology of Waste (Biomass) Derived Fuels.” The study investigates how waste materials, including waste tires and biomass, can be converted into cleaner biofuels through the pyrolysis process. Using advanced diesel engine testing and exhaust gas measurement, the research assesses environmental benefits—such as reduced waste disposal and lower CO₂ and GHG emissions—alongside potential human health risks. By advancing knowledge on sustainable energy production and safer biofuel applications, this project supports the transition toward renewable alternatives while ensuring environmental gains do not compromise wellbeing. The initiative directly contributes to SDG 7 (Affordable and Clean Energy) by exploring innovative waste-to-energy solutions for a cleaner future.



Boosting Solar Power with Self-Cleaning Nanocoatings

Faculty researchers at the Australian University investigated innovative anti-soiling nanocoatings to enhance the performance of solar cells in arid regions where dust accumulation is a major challenge. With Kuwait experiencing airborne dust nearly 70% of the year, the study tested SiO₂, ZnO/SiO₂, and TiO₂/SiO₂ films for self-cleaning applications under natural summer conditions of high dust and temperature. Results revealed that TiO₂/SiO₂ coatings provided the most durable protection, maintaining stable power output (~0.2 W) and minimizing efficiency losses with a low soiling ratio deviation (~5%). In contrast, ZnO/SiO₂ initially improved performance but showed faster deterioration, while SiO₂ alone proved less effective. By linking coating properties such as surface morphology, transparency, and hydrophilicity to solar cell efficiency, this study provides a pathway for designing nanocoatings tailored for dusty environments. The findings contribute to SDG 7 (Affordable and Clean Energy) by improving solar energy reliability and extending the service life of photovoltaic systems in harsh climates.





SDG-7: AFFORDABLE AND CLEAN ENERGY

ENGAGEMENT & OUTREACH

Hybrid Renewable Energy Systems for Kuwait's Future

The Australian University organized a research seminar for faculty members and external participants to explore innovative solutions for Kuwait's growing energy demands. With peak electricity consumption rising sharply during the summer months, the seminar highlighted the potential of renewable energy given Kuwait's abundant sunshine and wind resources. In his presentation, Dr. Michel Nahas proposed an off-grid hybrid power system combining solar panels, wind turbines, battery storage, and fuel cells to supply a typical Kuwaiti household. Using meteorological data and residential load demand, the system was modeled to deliver dynamic, year-round performance tailored to local conditions. This initiative advances SDG 7 (Affordable and Clean Energy) by promoting renewable, efficient, and sustainable energy solutions for Kuwait's future.



The Future of Sustainable Transport

The Australian University organized the International Scientific Conference on the Future of Sustainable Transport, bringing together academics, policymakers, and industry leaders to explore pathways toward cleaner and more efficient mobility systems.

Central to the discussions were the adoption of electric vehicles (EVs), the development of EV charging infrastructure, and the broader economic and environmental impacts of sustainable transport. The conference also served as a dissemination platform for a KFAS-funded project entitled "Breaking the Internal Combustion Engine Reign: A Mixed-Methods Study of Attitudes Towards Using and Purchasing Electric Vehicles in Kuwait." By fostering dialogue and knowledge exchange on renewable energy integration in transport, the event directly advances SDG 7 (Affordable and Clean Energy), supporting Kuwait's transition to sustainable energy solutions and low-carbon mobility.





SDG-8: DECENT WORK AND ECONOMIC GROWTH

RESEARCH & EDUCATION

Information and Communication Overload Impact on Knowledge Workers in the Digital Transformation Age

Digital transformation has fundamentally reshaped the way knowledge workers operate, often leading to excessive information and communication demands. This project investigates how such overload affects creativity, productivity, and wellbeing, with a specific focus on the roles of creative self-efficacy, autonomy, and workplace civility. By extending the Job Demands-Resources (JD-R) model to include these factors, the research, funded by KFAS, provides new theoretical insights into how job demands and resources interact in the digital workplace. Findings aim to guide organizations in designing healthier, more supportive work environments that reduce digital strain while fostering innovation and sustainable performance. In doing so, the project aligns closely with SDG 8 by promoting safe, resilient, and productive employment practices in the knowledge economy.

Empowering Persons with Disabilities for the Digital Workforce: Competencies for Remote Work and Digital Entrepreneurship

Researchers examined the digital entrepreneurial competencies (DEC) and remote work skills of persons with disabilities (PWD) to better understand how inclusive employment opportunities can be supported in the digital economy. Using self-assessment methods with a sample of 125 PWD in Serbia, the study explored the relationship between competency levels and socio-demographic as well as contextual factors. Statistical analyses, including exploratory factor analysis, reliability analysis, and non-parametric tests, revealed both the need for capacity building in remote work and the influence of individual background factors on perceived competencies. By highlighting gaps in digital and remote work readiness, this research provides actionable insights for designing targeted training and support initiatives that promote the labor market inclusion of PWD. In doing so, it advances SDG 8 (Decent Work and Economic Growth) by fostering equitable access to employment, enhancing workforce diversity, and contributing to sustainable economic participation.



مؤسسة الكويت للتقدم العلمي
Kuwait Foundation for the Advancement of Sciences





SDG-9: INDUSTRY, INNOVATION AND INFRASTRUCTURE

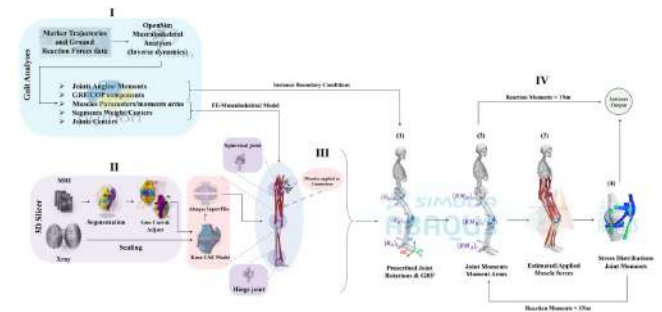
RESEARCH & EDUCATION

Multiscale Computational Modeling of Chondrocyte Mechanics in Articular Cartilage

Under this project, funded by KFAS researchers are developing a novel multiscale and multistructure computational model of articular cartilage to better understand how cellular distributions and their microenvironment shape tissue-level mechanical responses. By explicitly linking chondrocyte behavior with cartilage structure, the model investigates how intermediate pathogenetic alterations, particularly systematic factors, influence the mechanical environment of cells and the aggregate functionality of cartilage. This innovative computational framework provides new insights into functional cartilage alteration and opens pathways for identifying therapeutic targets in degenerative joint diseases. By advancing biomedical modeling methods that integrate cellular and tissue-level mechanics, this project contributes to SDG 9 (Industry, Innovation, and Infrastructure) by fostering scientific innovation, strengthening research infrastructure in computational biomechanics, and supporting the development of advanced healthcare technologies.

Artificial Intelligence and Intuitionistic Fuzzy Subring Methods for Industry 4.0 Automotive Manufacturing

The integration of Artificial Intelligence (AI) with robotic engineering is transforming industrial sectors as they move toward Industry 4.0. This project introduces a novel mathematical framework—intuitionistic fuzzy subring (IFR) methods—to address the uncertainty inherent in massive industrial datasets. By leveraging generalized intuitionistic fuzzy set (IFS) theory, the study establishes a flexible and efficient AI platform for robotic automotive manufacturing systems. Key properties of IFR, such as the stability of overlapping elements, surjective homomorphism effects, and upper-lower bound level cuts, are mathematically validated and applied to automotive AI systems (AAIS). Using real datasets from industrial robots in supply chains, the model demonstrates its capacity to improve factory effectiveness by simplifying the identification of effective and compatible robotic components. By bridging advanced algebraic methods with practical AI applications in automotive manufacturing, this research enhances industrial innovation and resilience. In doing so, it aligns with SDG 9 (Industry, Innovation, and Infrastructure).





SDG-10: REDUCED INEQUALITIES

RESEARCH & EDUCATION

Reducing Inequalities in Education: Learning Support for Students with Disabilities in Kuwait

This study examines the current landscape of learning support services available to university and college students with disabilities in Kuwait. Through extensive data collection—including surveys, policy reviews, and institutional interviews—it identifies the types of support provisions in place, their accessibility, and how effectively they meet the needs of post-secondary students with disabilities. The findings reveal the strengths and gaps in institutional accommodations and highlight the need for inclusive frameworks and tailored support systems. By mapping the existing support infrastructure and pinpointing areas for improvement, this research offers practical guidance for higher-education institutions and policymakers striving to create equitable learning environments. In doing so, the study aligns closely with SDG 10 (Reduced Inequalities) by advocating for inclusive educational provision and equal access for students with disabilities within Kuwait's post-secondary system.

Digital Skills and Inequalities: Evidence from Persons with Disabilities in Serbia

This study investigates the perceived level of digital competences among persons with disabilities (PWDs) in Serbia, drawing on survey data from 250 participants using an internationally comparable methodology. Employing a quantitative research design, the analysis combined descriptive and inferential statistics, including the Mann-Whitney U test, Kruskal-Wallis test, Spearman's correlation, and binary logistic regression. The findings reveal that while many PWDs perceive themselves as sufficiently skilled to complete digital tasks, disparities remain—particularly in accessing essential information and e-services. Socio-demographic factors such as gender, age, education, employment status, income stability, and health condition were identified as significant determinants of perceived digital competence. Notably, younger men with walking impairments reported higher levels of confidence in performing tasks independently compared to other PWD groups. By highlighting structural inequalities and the need for tailored interventions, the study underscores the importance of targeted digital training programs and inclusive policies. This research aligns with SDG 10 by addressing digital inclusion challenges and supporting equitable access to the opportunities of the digital society.



SDG-11: SUSTAINABLE CITIES AND COMMUNITIES

RESEARCH & EDUCATION

A Digital Twin Framework for Flood-Resilient and Sustainable Cities

Under this research project funded by KFAS, researchers are developing the Kuwait Resilient Digital Twins System (KReDiTS-1) to address the growing threat of urban flash floods in the context of climate change. The project leverages digital twin (DT) technology to simulate multiple climate scenarios, identify flood-prone areas with high-risk populations, and evaluate nature-based solutions alongside sustainable urban management strategies. By integrating advanced modeling with real-world data, the system provides a powerful tool for policymakers and urban planners to design and implement flood-resilient infrastructure. Beyond risk assessment, KReDiTS-1 establishes a foundation for long-term resilience by enabling proactive planning, community protection, and adaptive strategies tailored to Kuwait's unique environmental and urban context. This research aligns closely with SDG 11 (Sustainable Cities and Communities) by advancing innovation in disaster risk reduction and supporting the creation of safe, inclusive, and climate-resilient urban environments.

Sustainable Cooling Strategies: Phase Change Materials for Energy-Efficient Buildings

This research investigates the use of phase change materials (PCMs) in building envelopes to enhance energy efficiency and indoor thermal comfort in hot climate regions. A computational model coupled with design exploration tools and finite element simulations was developed to assess how factors such as PCM thickness, placement, and melting temperature influence thermal performance. Optimization analysis using ANSYS revealed that PCMs can reduce heat entering buildings by up to 80% over a 10-day simulation period, significantly lowering energy consumption. The findings demonstrate the potential of PCMs as a sustainable solution for improving building performance, reducing cooling loads, and fostering climate-resilient construction practices. By advancing innovative materials that support energy efficiency and sustainable design, this research directly contributes to SDG 11 (Sustainable Cities and Communities), promoting resource-efficient buildings and urban resilience in the face of climate change.

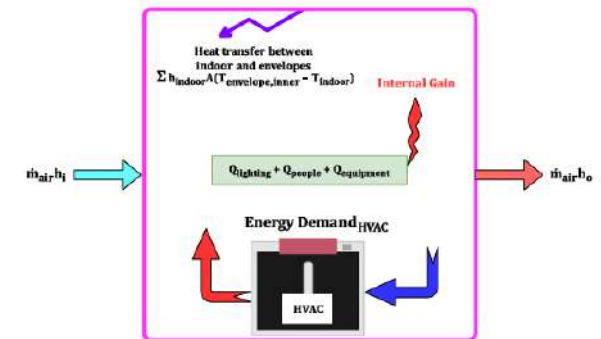
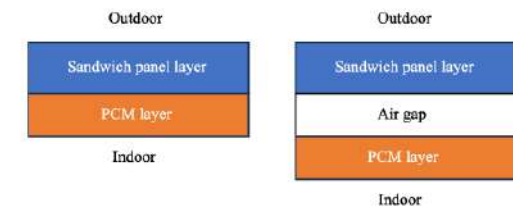


Fig. 5. Energy balance in a building.



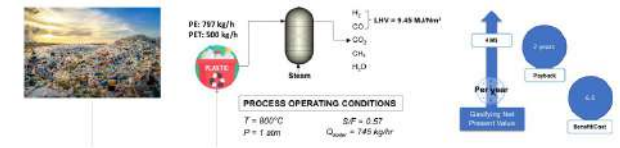


SDG-12: RESPONSIBLE CONSUMPTION AND PRODUCTION

RESEARCH & EDUCATION

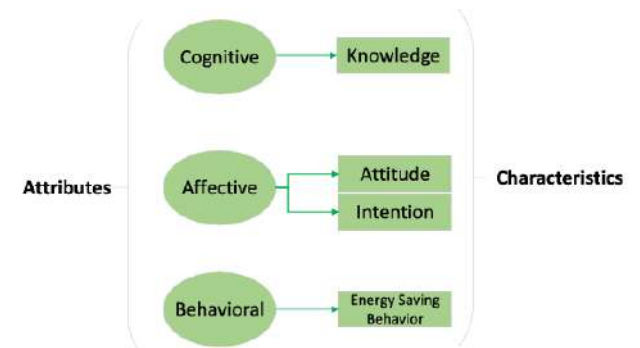
Sustainable Plastic Waste Valorization through Steam Gasification for Resilient Urban Systems

Researchers designed and modeled a polyethylene (PE) steam gasification plant to explore the sustainable valorization of plastic waste while reducing landfill dependency and generating economic benefits. Using Aspen Plus, the team simulated a plant based on Lebanese data, incorporating inputs of 797 kg/hr PE and 500 kg/hr PET to assess syngas production potential. The study found that PET addition did not significantly enhance syngas composition compared to PE-only inputs, but the overall system demonstrated strong economic viability, with a Net Present Value six times greater than the initial investment and a Payback Period of only two years. By combining waste management and energy production in a financially sustainable model, this research highlights a pathway to sustainable waste-to-energy systems that reduce environmental impact and support urban resilience. Contributing to SDG 11 (Sustainable Cities and Communities), this work advances efforts toward resilient infrastructure, reduced landfill dependency, and improved environmental performance of urban systems.



From Intentions to Actions: COVID-19's Influence on Energy Conservation Behavior in Academic Communities

This research investigates the impact of the COVID-19 pandemic on energy literacy and conservation behavior among students, faculty, and staff in academic buildings in Kuwait. Using a mixed-methods approach that combined surveys, focus groups, and interviews, the study examined how attitudes, intentions, and behaviors toward energy conservation shifted during the pandemic. The findings revealed that COVID-19 significantly strengthened the relationship between intentions and conservation behaviors among students, while faculty demonstrated a strong alignment between intention and action. Key factors influencing energy literacy and conservation included education, awareness, motivation, values, religiosity, and culture. The study recommends tailored educational interventions, community engagement, and the integration of cultural and religious perspectives to enhance conservation practices in academic settings. By addressing behavioral and socio-cultural dimensions of energy use, this research directly contributes to SDG 11 (Sustainable Cities and Communities), promoting sustainable energy practices, resource efficiency, and resilient community behavior in the face of global disruptions.



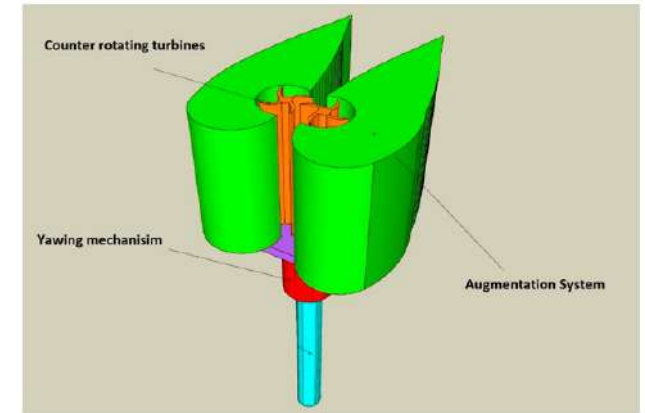


SDG-13: CLIMATE ACTION

RESEARCH & EDUCATION

Augmented Vertical Axis Wind Turbines for Enhanced Renewable Energy and Climate Action

This research investigates the development of an augmentation system to enhance the performance of vertical axis wind turbines (VAWTs) as a renewable energy source. The system employs two identical airfoiled casings designed to increase free stream wind velocity by more than two-fold, thereby boosting turbine power output. Computational Fluid Dynamics (CFD) simulations were conducted to evaluate airflow behavior, focusing on the impact of casing gap and angle of attack on velocity augmentation. The findings revealed that reducing the gap slightly increased velocity, while adjusting the angle of attack had a more significant effect on augmented airspeed. By optimizing turbine design and efficiency, this research demonstrates the potential of innovative augmentation systems to make wind energy more cost-effective and reliable. The study directly contributes to SDG 13 (Climate Action) and SDG 7 (Affordable and Clean Energy) by advancing sustainable energy technologies, reducing reliance on fossil fuels, and supporting global efforts to lower carbon emissions.



Sustainable Alternatives to Peat: PVA Foam Paper for Climate-Resilient Agriculture

This research explores the use of foam-formed paper with polyvinyl-alcohol (PVA) as a sustainable alternative to traditional growth media such as mineral wool and peat, which are environmentally unsustainable and contribute to climate change. A series of experiments were conducted to assess the physical and agricultural performance of PVA foam paper, including measurements of compressive strain, tensile strength, water-holding capacity, and durability, alongside greenhouse trials for Beefsteak tomato growth. Results showed that increasing PVA concentration enhanced material properties, improved water retention, and led to higher seed germination, plant height, and biomass, with 1-1.5% PVA substrates achieving 100% germination. Importantly, PVA foam paper maintained structural durability under regular watering and did not release significant ions into irrigation water. By demonstrating the potential of PVA foam paper as a viable replacement for peat and mineral wool, this research promotes more sustainable agricultural practices, reduces the carbon footprint associated with peat extraction, and supports climate-resilient food production systems. The findings contribute directly to SDG 13 (Climate Action).





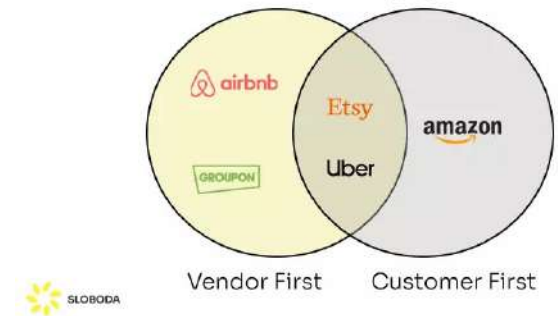
SDG-16: PEACE, JUSTICE AND STRONG INSTITUTIONS

RESEARCH & EDUCATION

Liquidity, CSR, and Accountability: Strengthening Responsible Institutions through Financial and Social Alignment

This research investigates the two-way causality between corporate liquidity and corporate social responsibility (CSR), drawing on financial slack resources theory, stakeholder theory, and signaling theory. Using data from 20,016 firm-year observations across 60 countries (2013–2019), the study employs fixed-effects panel regression to examine how liquidity, measured through the cash conversion cycle (CCC), influences CSR performance and vice versa. The findings reveal that firms with greater liquidity, proxied by shorter CCC, invest more in CSR initiatives, particularly in eco-innovation, resource use, community development, and human rights. Conversely, CSR engagement enhances firm liquidity by fostering customer trust and faster payment behavior. This bidirectional relationship underscores the role of responsible corporate governance in linking financial strength with social and environmental accountability. By showing how liquidity management and CSR reinforce one another to support transparency, human rights, and community well-being, the research contributes to SDG 16 (Peace, Justice and Strong Institutions). It highlights how corporate practices that respect stakeholders and strengthen accountability mechanisms not only improve firm performance but also promote inclusive and responsible institutions at the global level.

Chicken and Egg Problem





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