Ministry of Tertiary Education, Science and Research

PROCEEDINGS OF THE NATIONAL RESEARCH WEEK 2025

National Research Week 2025

Uniting Research, Industry and Innovation

14-18 APRIL 2025

Ministry of Tertiary Education, Science and Research

Proceedings
The National Research Week 2025 was organised from Monday, 14th to Friday, 18th April 2025 under the purview of the Ministry of Tertiary Education, Science and Research. Its Proceedings is available for download from the Mauritius Research and Innovation Council (MRIC) website at: https://www.mric.mu/publications

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Foreword

Dr The Hon Kaviraj Sharma Sukon, PFHEA
Minister of Tertiary Education, Science and Research

Together, we are stronger.
Together, we can do more.

For the first time in our nation's history, all public universities in Mauritius have come together to showcase their research projects and publications under one unified platform. This milestone is more than an event—it is a bold declaration that research will be a central pillar of our national development and a driver of our future economy.

For too long, research in our higher education institutions evolved in isolation—each institution pursuing its own agenda, hosting its own Research Week, and engaging primarily within its own academic circle. While these initiatives contributed to the advancement of knowledge, they often lacked the collaborative force needed to create transformative, large-scale impact.

The year 2025 marks a turning point in our research ecosystem. This National Research Week, guided by a common calendar, a shared vision, and an unwavering commitment to cooperation, has demonstrated the extraordinary potential that emerges when minds, disciplines, and institutions unite with purpose.

Throughout the week, our universities opened their doors to one another, breaking down institutional barriers and fostering intellectual cross-pollination. Researchers, scholars, and students engaged across boundaries—sharing insights, challenging established thinking, and forging partnerships that promise lasting impact.

The work presented addressed some of the most urgent and complex challenges of our time: climate resilience and the energy transition; inclusive and sustainable healthcare systems; the advancement of smart agriculture; the transformative potential of artificial intelligence and digitalisation; and the sustainable development of our Blue and Green Economies. These are not merely academic topics—they are the very foundation of our prosperity, resilience, and competitiveness.

As Albert Einstein once remarked, *"Research is what I'm doing when I don't know what I'm doing."* This week has shown that the courage to explore the unknown, when channelled through collaboration, can illuminate the path to solutions that transform lives and shape futures.

Moreover, as John Dewey wisely observed, *"The value of knowledge lies in its use."* Our researchers are not just generating knowledge—they are applying it to inform policy, inspire innovation, and deliver tangible benefits for the people of Mauritius.

The Government remains resolute in its commitment to building a vibrant, coordinated research and innovation ecosystem. This National Research Week must be remembered not only as a celebration of achievement but as the beginning of a new chapter—one where research is recognised as a strategic asset and a cornerstone of economic growth.

Let us move forward with the conviction that in research, as in nation-building, **together we are stronger, and together, we can achieve more.**

National Research Week 2025

The National Research Week 2025 was organised from Monday, 14th to Friday, 18th April 2025 under the purview of the Ministry of Tertiary Education, Science and Research. The overall theme of the National Research Week was *"Uniting Research, Industry, and Innovation."* The organisation of this event was coordinated by the Mauritius Research and Innovation Council (MRIC), as the apex body responsible for promoting and coordinating the Government's investment in research and innovation.

The National Research Week aimed at fostering a dynamic platform for collaboration and knowledge-sharing between higher education institutions, research institutions, policy makers, industry leaders and relevant stakeholders from civil society. This would provide a common ground for Academia, Industry and the Civil Society to work in synergy to bring transformative solutions for a better, sustainable future.

The objectives of the National Research Week were to:
- Promote interdisciplinary collaboration by fostering partnerships among academic institutions, research institutions and industry.
- Showcase cutting-edge research and innovations by providing a platform for researchers and innovators to present their work to a broader audience.
- Drive economic growth and sustainability by linking research outcomes with industry needs to develop new products, services, and technologies.
- Inform policy development and integration by using insights gained during the week to bridge the gap between research and industry.

The Opening Ceremony was held at Octave Wiehe Auditorium, University of Mauritius on Monday 14th April 2025, followed by half-day/full day sessions at different institutions dedicated to specific themes for days 1 to 4 as follows:

- Day 1 (afternoon) - Innovating Sustainability: Synergies for a Resilient Future (Organised by University of Mauritius)
- Day 2 - Global Economic Interactions and Health Innovations (Organised by University of Technology, Mauritius)
- Day 3 (morning) - Cultural and Ethical Foundations for a Sustainable Society (Organised by Mahatma Gandhi Institute)
- Day 3 (afternoon) - EduTech Evolution: Shaping Education with Technology (Organised by Mauritius Institute of Education, Open University of Mauritius and Polytechnics Mauritius Ltd)
- Day 4 - Tech Horizons: Pioneering Future Technologies (Organised by Université des Mascareignes and Polytechnics Mauritius Ltd)

Day 5 of the National Research Week was dedicated to *"Research and Innovation in Action: Bridging Academia and Industry"*, whereby industry-based research, entrepreneurship ecosystem/incubators/incubatees, grants beneficiaries were showcased and steps that need to be taken to bridge the gap between academic research and industry needs were discussed. Day 5 was organised by the Mauritius Research and Innovation Council, Mauritius Institute of Biotechnology Ltd, Higher Education Commission, Polytechnics Mauritius Ltd, Centre for Biomedical and Biomaterials Research and Business Mauritius.

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DAY 1
Monday 14 April 2025
University of Mauritius

THEME
Innovating Sustainability - Synergies for a Resilient Future

VENUE
Paul Octave Wiehe Auditorium

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Introduction

The University of Mauritius (UoM) hosted the Opening Ceremony of the **National Research Week 2025 on Monday 14 April 2025,** under the umbrella theme *"Uniting Research, Industry, and Innovation",* with Day 1 focused on *"Innovating Sustainability: Synergies for a Resilient Future".* **This national event,** organised under the aegis of the **Ministry of Tertiary Education, Science and Research** and coordinated by the **Mauritius Research and Innovation Council (MRIC),** provided a dynamic platform for UoM to showcase key research and innovation initiatives.

The Opening Ceremony was graced by **Dr.** the **Honourable Kaviraj Sharma Sukon, Minister of Tertiary Education, Science and Research** as **Guest of Honour.** In his address, the Honourable Minister underlined the importance of aligning research with national development priorities and the need to enhance synergies among key stakeholders. He reaffirmed his Ministry's support for initiatives that promote innovation-driven growth and knowledge-based development.

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The keynote address was delivered by **Dr. Surya Raghu, Visiting Professor at Wits University and President of Advanced Fluidics (USA).** His presentation, titled *"Innovation and Sustainability Education: Activity-Resource Mapping"* offered insightful frameworks for embedding sustainability thinking into the heart of academic research and educational ecosystems. Dr. Raghu encouraged institutions to foster creative problem-solving through interdisciplinary learning and community-linked research.

The Ceremony brought together key stakeholders from academia, government, private sector, and civil society, marking a strong commitment to bridging research, education, and societal impact.

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Following the Opening Ceremony, the Mauritius Broadcasting Corporation (MBC), as official media partner, hosted two live radio discussions at the Paul Octave Wiehe Auditorium, highlighting the role of research in national development. The first session *"Shaping the Future: Research-Driven Transitions in Green, Blue, Circular and Silver Economies"* explored how research supports sustainable and inclusive economic transitions, featuring experts from the Faculties of Science, Agriculture, Law & Management, and Engineering. The second session *"From Knowledge to Impact: Transforming Research into Value-Driven Innovation"* focused on academia-industry collaboration to drive impactful innovation. Interviewees included representatives from the International Centre for Sustainable Tourism and Hospitality, the Faculties of Medicine & Health Sciences, Information, Communication & Digital Technologies and the Doctoral School.

The Day 1 programme, partly sponsored by Dayforce Mauritius, Huawei Technologies Mauritius, SICOM Group and SBM Bank (Mauritius) Ltd featured thematic sessions on the **Blue Economy, Green Economy, Circular Economy, Silver Economy,** and **Cultural Industry/Economy,** highlighting multidisciplinary approaches to sustainability challenges and inclusive development.

Poster sessions and research exhibits were held in the Paul Octave Wiehe Auditorium, where students, faculty and researchers presented ongoing projects and research findings. This visual showcase attracted wide interest from attendees and created opportunities for peer exchange and networking. Presenters received constructive feedback, enriching the dialogue around research impact and collaboration. Further details are available on the event's website: https://sites.uom.ac.mu/researchweek

Day 1 of National Research Week 2025 successfully highlighted the central role of the University of Mauritius in driving sustainable development through research excellence and stakeholder collaboration. The Opening Ceremony, media engagement, and thematic sessions together fostered a vibrant space for knowledge exchange and highlighted the importance of aligning academic research with both national priorities and global sustainability objectives.

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Keynote Session

Dr Surya Raghu,
Visiting Professor, Wits University (South Africa)
and President, Advanced Fluidics (USA)

Dr. Surya Raghu is a leading expert in entrepreneurship, technology transfer, and research commercialisation, with extensive experience in policy development and impact measurement. He has led workshops in over 30 developing countries and collaborates with organisations like UNESCO, USPTO, and WIPO to shape global innovation policies.

As an inventor with 20+ inventions and 15 patents, Dr. Raghu has commercialised four products and authored 65+ publications in fluid mechanics. He is the President of Advanced Fluidics LLC, leading R&D projects funded by NASA, Boeing, and the U.S. Air Force, focusing on fluid dynamics and aerospace technologies.

Dr. Raghu is a Visiting Professor at Wits University (South Africa) and Kyunshu Institute of Techniology, Japan where he mentors students and builds academic partnerships. He also serves on the Board of Vaughn College and is the Founding Partner of ETCube International, helping startups in emerging markets.

Passionate about mentoring entrepreneurs, particularly in developing countries, Dr. Raghu supports innovators with resources and networks to drive economic growth. He empowers local entrepreneurs to address societal challenges through technology.

A strong advocate for diversity in innovation, Dr. Raghu promotes policies that ensure equitable access to opportunities. His work has a lasting global impact, combining technical expertise with a commitment to sustainable development.

National Research Week 2025

Uniting Research, Industry and Innovation

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PRESENTATIONS
(Parallel Session 1 – Blue Economy)

VENUE
Lecture Theatre 1, New Academic Complex,
University of Mauritius

Ministry of Tertiary Education, Science and Research

Investigation of mangrove-associated halophilic bacteria with antibacterial and antibiofilm activities

Presenter: Mr. Sundev Parboteeah

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Abstract:

Antibiotic resistance is a critical global health challenge that can be addressed through the discovery of new antimicrobial agents to kill or inhibit drug-resistant pathogens. Marine ecosystems, particularly mangrove habitats, are known to host diverse halophilic microorganisms with specialised adaptations that enable production of bioactive secondary metabolites that represent a valuable yet untapped reservoir for novel antibacterial compounds. The aim of this study was to investigate mangrove soil as a source of halophilic microorganisms exhibiting antibacterial and antibiofilm properties against clinically important pathogens. The specific objectives were to isolate halophilic microorganisms from highly saline mangrove soils, evaluate antibacterial and antibiofilm activities of microbial extracts against pathogenic bacteria, identify the active isolates, correlate predicted antibiotic biosynthetic pathways from genomic analyses with chemical profile data; and perform metagenomic analyses of the mangrove soils. Samples were collected from a *R. mucronata* forest in Mauritius where salinity levels are elevated. Culture-dependent techniques were deployed to isolate microorganisms, and extracts from eight isolates were tested against six pathogens: *E. coli, P. aeruginosa, B. cereus, S. aureus, S. epidermidis*, and *K. pneumoniae*. Antibiofilm activity against *E. coli* and *P. aeruginosa* was determined. Chemical characterisation of extracts was performed using liquid chromatography-mass spectrometry (LC-MS/MS), and genomic/metagenomic sequences were generated through next-generation sequencing platforms. Eighty-eight strains were isolated from the mangrove sediment. Of these, eight strains were selected for evaluation of their antibacterial and antibiofilm potential, and all exhibited significant efficacy. Sequence analyses indicated similarities with *Globicatella sanguinis* (Z3RZ3), *Shewanella chilikensis* (Z3PZ1), *Shewanella algae* (Z5PZ2), *Micrococcus luteus* (Z3RZ1), *Pontibacillus* sp. (Z2PM2), *Pontibacillus chungwhensis* (Z5RM1), *Pontibacillus* sp. (Z5RM4) and *Halobacillus trueperi* (Z2PM3). Extracts from isolates Z3RZ3 and Z2PM3 exhibited the highest antibacterial activity with minimum inhibitory concentrations ranging from 3.91×10^2 to 6.25×10^3 µg/ml. All extracts showed robust antibiofilm activity, achieving over 75% inhibition against E. coli and more than 95% against P. aeruginosa. Extracts Z3RZ3 and Z2PM3 demonstrated complete disruption of established P. aeruginosa biofilms within a 2-hour exposure period, whereas a panel of 28 commercial antimicrobial agents exhibited no discernible inhibitory effect against this pathogen. LC-MS/MS analyses of the extract Z3RZ3 displayed peaks indicating lactones, diketopiperazines, cyclopentenones, terpenes, anthraquinones, and macrolides as key bioactive compounds. This study confirms that mangroves are rich sources of microorganisms capable of producing novel bioactive compounds with antibacterial and antibiofilm activities. Such compounds offer strong potential for the development of new therapeutic agents to combat resistant pathogens.

Keywords: Mangrove, Halophilic bacteria, Antibacterial, Antibiofilm, Chemical profiling

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A study on the morphological characteristics and antimicrobial properties of nudibranch in selected areas of Mauritius

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Abstract:

Sea slugs are marine invertebrates that belong to the class of Gastropoda. Nudibranchs are well-known for their vivid colors and ecological functions in marine environments. They have evolved several interesting defensive mechanisms, such as their secretion of chemical toxins, camouflage, and stinging cells. In the past, sea slugs have been widely used for their medicinal purposes in the Far East; they are considered to have promising prospects in the field of medicine In Mauritius, the chemical ecology of nudibranchs remains largely unexplored, particularly their potential for novel antimicrobial compounds amid rising antibiotic resistance. Exploring species from regions like Pointe aux Feuilles, which are close to aquaculture operations, may highlight unique adaptations and bioactive profiles relevant to local and global health issues. The aim of this study is to assess the morphological characteristics and antimicrobial properties of the sea slugs found near the fish farm at Pointe aux Feuilles, Mahebourg. A total of 12 specimens were collected and analyzed based on their shape, colour, size, and other features. Morphological data analysis was conducted using SPSS software to generate a proximity matrix and dendrogram. The molecular characterization involved DNA extraction using the DNAzol reagent kit, and the purity of the DNA was determined using the spectrophotometry technique. While spectrophotometric analysis showed good DNA purity and concentration, electrophoresis showed faint bands indicating partial degradation, preventing successful PCR amplification and subsequent species-level identification. Extracts from *Roboastra luteolineata* were processed using the organic solvent extraction technique (dichloromethane:methanol 1:1) for the chemical and antimicrobial assay. The crude extract (CE) was then fractionated into the hexane fraction (HF), ethyl acetate fraction (EAF), and aqueous fraction (AF). According to the results, only 8 out of the 12 species were successfully identified morphologically. Chemical profiling indicates the presence of alkaloids in CE, EAF and AF, while terpenes/steroids were observed only in CE and HF. Antimicrobial assay was evaluated against four bacterial strains: *Escherichia coli*, *Staphylococcus aureus*, *Bacillus cereus*, and *Pseudomonas aeruginosa*. The crude extract was found to be most effective against the four bacterial strains, with the highest zone of inhibition (14.60 mm) against *Escherichia coli,* while the lowest activity was observed in the ethyl acetate fraction against *Pseudomonas aeruginosa*. This study demonstrates that nudibranchs collected from Pointe aux Feuilles have promising antibacterial properties, especially in crude extracts. The presence of alkaloids and terpenes strengthens their potential as sources of new bioactive chemicals. These results illustrate the unexplored medicinal potential of marine invertebrates from Mauritius and emphasize the importance of using advanced molecular methods in future studies to complement morphological classification.

Keywords: Nudibranch, Molecular characterization, Antimicrobial assay, Bioactive compounds

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Diversity of cigua-toxic related dinoflagellates in Mauritius: Integrating morpho-taxonomy and molecular characterization

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Abstract:

Microalgae are a highly diverse group of unicellular organisms, ubiquitous in the euphotic zone of marine ecosystems, and form the basis of the marine food chain. Benthic dinoflagellates thrive in shallow waters and have been observed as epiphytic, epibenthic and tychoplanktonic forms. Some species of benthic dinoflagellates are known to produce different toxins owing to illnesses such as ciguatera poisoning, paralytic shellfish poisoning, and neurotoxic shellfish poisoning thus presenting public health and environmental risks. The marine dinoflagellate genera *Gambierdiscus, Ostreopsis*, *Coolia* and *Prorocentrum* have been reported in the Western Indian Ocean and potentially include harmful species.

Prorocentrum lima from Flic-en-Flac
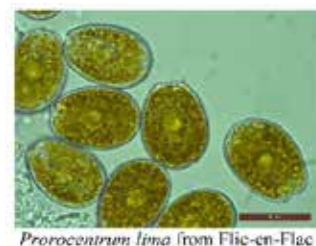
However, no comprehensive taxonomic surveys have been reported in Mauritian waters. The primary aim of this project was to isolate, identify and characterize potentially toxic epiphytic *Gambierdiscus, Ostreopsis, Coolia* and *Prorocentrum* species from the coastal waters of Mauritius. Morphological characteristics were examined using light/fluorescence microscopy and scanning electron microscopy. DNA sequences from the partial large subunit (LSU D1-D2 region) and ITS (ITS1-5.8S-ITS2) regions were analysed to depict their phylogenetic relationships, using Bayesian Inference (BI) and maximum likelihood (ML) methods.

Our findings broaden the current body of knowledge and revealed *Gambierdiscus caribaeus, Ostreopsis ovata*, *Coolia canariensis*, *Prorocentrum fukuyoi*, *P. rhathymum*, and *P. lima*. *Gambierdiscus caribaeus* represented a first report from Mauritius Island and the Mascarene region. *Ostreopsis ovata* clustered within the clades of this species complex and supported the presence of an Indo-Pacific lineage. Similarly, *Coolia canariensis* clustered within the clades of this species complex and represented the first record of *Coolia canariensis* in Mauritius, ascribed to *C. canariensis* phylogroups I and V (new lineage). Likewise, three *Prorocentrum* species including the *P. rhathymum,* and *P. fukuyoi* and *P. lima* species complexes were identified. The antimicrobial activities of *Prorocentrum fukuyoi* complex, *P. rhathymum*, and *P. lima* complex were assayed against potential human pathogenic bacterial strains. The highest zone of inhibition was recorded for intracellular and extracellular protein extracts of *Prorocentrum rhathymum* against *Vibrio parahaemolyticus*. The polysaccharide extracts of the *Prorocentrum fukuyoi* complex had a higher zone of inhibition (24 ± 0.4 mm) against MRSA at a minimum concentration of 0.625 μg/mL.

Though most of the studies have been devoted to elucidating dinoflagellate toxins owing to illnesses, they also possess unique bio-toxins and biologically active substances. Hence, dinoflagellates are likely candidates in the development of new efficient antimicrobial drugs, especially given the emergence of multi-drug-resistant bacteria.

Keywords: Dinoflagellates, Cigua-toxic

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Spatial and seasonal variation of meso-and micro-plastics observed in Mascarene islands

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Abstract:

Plastics pollution is impacting the coastal and marine environment, particularly in vulnerable island states where natural resilience is often limited. The Western Indian Ocean region is under-documented, and comparisons between islands is highly needed for adequate plastic reduction, reuse and recycling strategies. This study investigated the spatial and seasonal variation of meso- (size 25-5 mm) and micro-plastics (size < 5mm) in beach sediments around Mauritius Island (11 sites) and Rodrigues Island (7 sites). The protocol for fieldwork was adapted from WIOMSA (2020) and Löder *et al*. (2018). Belt transects (50 cm wide) were placed across the sandy beach from berm/vegetation line to the HWM, in triplicates, at 100m intervals. Quadrats (50cm x 50cm) were placed in each belt transect at three zones: vegetation line (VL), beach slope (BS) and strandline (SL). Surface sediment (5 cm depth) was sampled from each quadrat for further analysis. Laboratory extraction of plastics was done by mechanical sieving using sieve sizes (from 25 mm to 500µm*)* while small MPs were extracted by digestion using hydrogen peroxide solution, followed by density separation using sodium chloride solution. Plastics were counted, weighed (in grams) and further classified by size, shape, colour, and polymer types. Microplastic (MPs) was further classified into large MPs (4mm ≤x> 1.4 mm) and small MPs (1.4mm ≤x> 1.6µm). Windward (exposed) sites exhibited higher plastics densities than leeward (protected) sites. A distinct spatial disparity was observed between the two islands with Rodrigues having highest meso- (244 particles/m^2 in summer; 127 particles/m^2 in winter) and micro-plastics densities (36.64±29.66 particles/L in summer; 30.56±61.92 particles/L in winter) than Mauritius across both seasons. The predominant colours varied by size class with meso-plastics comprising mainly white (51%) and blue (21%), large MPs consisting mainly of white (57%) and blue (27%), and small MPs dominated by blue (63%) and black (17.4%). Fragments (64%) and fibers (40%) were the most prevalent morphological types for both meso- and micro-plastics. Fourier-transform infrared spectroscopy (FTIR) data indicated polyethylene (PE) as the most prevalent polymer followed by polypropylene (PP). There is an absence of PU and PLA polymers. Despite variations in densities, both islands exhibit a homogenous meso- and micro-plastic composition with similarities in shape, colour and polymer type. Plastic pollution decreases the aesthetic value of beaches, impacting tourism and the local economy. By comparing plastics densities along with their morphological characteristics across the two islands having differing coastal exposure and population size, this study provides insight into regional plastics pollution dynamics. It consolidates baseline data to support strategies and action plans for the abatement of plastic pollution.

Keywords: Mauritius, Plastics, Pollution, Polymers, Rodrigues

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Carbon sequestration potential of *Rhizophora mucronata* mangroves in Mauritius: Integrating remote sensing, biomass and photosynthetic performance

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Abstract:

Global warming, driven largely by atmospheric CO_2, is severely affecting our climate and contributing to drastic changes in weather patterns and the intensification of many types of natural disasters (Filonchyk *et al.,* 2024) such as more intense and frequent storms and cyclones, heatwaves, heavy precipitations, and severe droughts. Mangrove forests, recognised as key 'blue carbon' sinks, offer a natural climate mitigation solution by sequestering substantial carbon in biomass and sediments. Over the last few decades, Mauritius has been experiencing a wide range of changes in its coastal zone whereby activities such as deforestation, for the sake of coastal development, have contributed to the decline of the mangrove population and reduced coastal protection. The main objective of our study is to combine various assessment methods namely remote sensing, biomass measurements, soil analysis, and photosynthetic apparatus performance, to obtain a comprehensive outlook of the health and carbon sequestration potential of *Rhizophora mucronata* mangrove forests in Mauritius. Historical Landsat 7/8 imageries obtained from Google Earth Pro were analysed using ImageJ software to monitor the rate of canopy growth. Field measurements employed 25m×25m quadrats with simple random sampling to record plant height and diameter at breast height. *Rhizophora* allometric equations were applied to calculate above-ground biomass (AGB) and below-ground biomass, while standard methods assessed the physicochemical parameters, total organic carbon (TOC), sediment carbon storage and essential minerals. Photosynthetic analyses, including chlorophyll fluorescence, electron transport rate, and net CO_2 exchange, will further provide insights into carbon assimilation efficiency. Data were collected from five mangrove forests including two planted forests, Le Morne (LM) and Grande Rivière Noire (GRN), and three natural forests Ferney (FN), Residence la Chaux (RLC) and Roches Noires (RN). Study sites were classified into four zones based on tidal variations. Our main findings (Doodee *et al.,* 2023; Doodee *et al.,* 2025) revealed significant variations in mangrove growth and carbon sequestration across study sites. Image processing showed faster canopy development at Le Morne (LM), achieving >95% cover in ~6.4 years due to higher planting density, while Grande Rivière Noire (GRN) required ~15.4 years under similar conditions. Statistical analysis of both canopy growth rates and biomass revealed that inundated zones were first established in both natural and planted forests. AGB ranged from 26.5 to 347.6t/ha, following the order FN > RN > GRN> RLC > LM. Notably, FN, characterised by lower salinity (5-15 ppt) and steady-state canopy cover since 2010, exhibited exceptionally high AGB (326.2 ± 26.3 t/ha) and TOC (47.34%), surpassing global averages for *R. mucronata* (94.8 t/ha) and *Rhizophora spp.* (281 t/ha, TOC: 2.00-40.00%). Salinity emerged as a critical factor influencing mangrove growth and carbon sequestration potential. Our study highlights the potential use of remote sensing techniques along with image processing for mapping and monitoring mangrove forests. Furthermore, the combination of photosynthetic measurements, with conventional biomass and TOC measurements will provide a more comprehensive insight into the carbon sequestration potential of our mangrove forests which are crucial for developing targeted management and restoration strategies in these vital coastal ecosystems.

Keywords: Carbon sequestration, blue carbon, biomass, remote sensing, mangroves, *Rhizophora mucronata*

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National Research Week 2025
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Ministry of Tertiary Education, Science and Research

Low-cost, portable sensing system for microplastic detection and classification

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Abstract:

Millions of tons of plastics are dumped into the ocean each year and are subsequently broken down into small fragments due to environmental forces. Fragments smaller than 5 mm are referred to as microplastics (MPs). Microplastics have become rapidly pervasive in terrestrial and marine ecosystems but MP detection is challenging due to the variation of shapes, densities, physical degradation, additives, and chemical compositions of plastics found in the natural environments. Given the absence of a universal detection and analysis method, multiple instruments are often required for plastic identification. Common detection methods include visual inspection, fluorescence microscopy, and Fourier Transform Infrared Spectroscopy (FT-IR) [1,2]. Moreover, the high cost of laboratory equipment for these spectroscopy and spectrometry methods can be a barrier for research groups with limited funding [3]. These methods can also be time-consuming [2,3,4]. Therefore, there is a need for rapid, portable, low-cost detection systems to assess health and environmental risks in a timely manner. Fluorescent tagging with Nile Red (NR), a fluorescent, solvatochromic dye, has emerged as a popular MP detection method due to its accessibility and low cost [5,6,7,8,9]. However, variations in fluorescent emissions based on plastic polymer complicate standardization [2,10,11,12,13,14]. My MIT MS research characterized the fluorescent nature of plastic samples stained with Nile Red, and resulted in a preliminary polymer identification scheme based on the data [15]. The next step in this research is to build a field-deployable, low-cost system that can rapidly (a) Image a fragment of unknown origin and composition, (b) Identify if the fragment is of plastic origin and (c) Identify the polymer makeup of the fragment if it is plastic.

To accomplish these goals, a dataset of images containing field-weathered plastics and other non-plastic materials found in the marine environment will first be created. To account for the variation, the plastic samples in the dataset will contain a variety of polymer types, form factors, density, colour, and state of weathering. For this purpose, a previously collected dataset of micro- and meso- plastics and other marine litter items found within 9 sites on Rodrigues Island will be used for imaging. The material composition for each plastic sample will be verified using Fourier Transform Infrared Spectroscopy (FTIR). The samples will then be stained with the fluorescent dye Nile Red and imaged using a low-cost, high-resolution camera, such as the Arducam Hawkeye 64MP. This $60 camera is capable of autofocus and can be operated using a Raspberry Pi. My prior research used this camera to image Nile Red-stained plastics as part of a proof-of-concept low-cost imaging system. When employing multiple excitation wavelengths and optical filters, different polymers appear visually distinguishable from each other. Once the image dataset is constructed, Red Green Blue (RGB) data will be extracted from the images and used to train, validate, and test two supervised machine learning models: one that can identify if the subject matter is plastic/non-plastic and one that can identify the polymer composition if the subject is classified as plastic. RGB characteristics can automatically be extracted from images using existing automated image processing software such as ImageJ. My MS research characterized fluorescent colour characteristics of Nile Red-stained plastics; the data from my MS and other literature can be used to choose the decision rules for the classification models [15,16,17]. Other studies have successfully applied this approach to classify images of Nile Red-stained plastics taken with a fluorescent microscope [18,19]. While their studies used costly instrumentation to obtain the images and RGB data, my proposed study will use data from images taken with low-cost, portable equipment (such as a Raspberry Pi). This will be conducive to ensuring the model can be run on a low-cost, field-deployable system.

Keywords: Mesoplastics, Microplastics, Low-cost, Ocean monitoring, Sensors

Ministry of Tertiary Education, Science and Research

Low-cost, portable sensing system for microplastic detection and classification

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Ministry of Tertiary Education, Science and Research

Smart societies, safe waters: Advancing water security and equity through society 5.0 and the Blue Economy

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Abstract:

Water is an essential facet for human survival for yet for billions, clean and safe water remains a distant promise. In the face of climate change, incessant flooding, population growth, and growing inequalities, ensuring universal water access, many societies are marginalized and become climate refugees. Thus, resolving the unequitable water crisis is not just a developmental priority but a moral imperative for human survival globally. This paper explores how Society 5.0, a visionary model of a super-smart, human-centered society, can revolutionize water security and equity within the framework of the Blue Economy. Society 5.0 goes beyond digitization and automation; it redefines progress by merging advanced technologies - such as AI, IoT, remote sensing, and big data - with inclusive governance to solve pressing societal challenges. In the water sector, these tools can optimize distribution, detect contamination in real-time, predict scarcity patterns, and support participatory water management and drive data driven solution especially in underserved communities. This study critically examines the intersection of Society 5.0 and SDG 6 (Clean Water and Sanitation), analyzing how smart solutions can bridge disparities in water access across rural, urban, and marginalized regions. Case studies from Asia, Sub-Saharan Africa, and island nations illustrate innovative deployments of digital water infrastructure, smart monitoring, and AI-powered policymaking to improve equity and resilience. However, the paper also highlights risks - such as technological exclusion and data governance challenges - arguing for a human-rights-based and context-sensitive approach to digital water solutions. By aligning Society 5.0 principles with Blue Economy goals, this paper presents a roadmap for transforming water insecurity into water resilience. The vision is clear: a future where clean water is not a privilege, but a guaranteed right - empowered by technology, sustained by ecosystems, and driven by equity.

Keywords: Society 5.0, Water Security, SDG 6, Blue Economy, Technological Equity, Smart Water Management, Inclusive Innovation

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Ministry of Tertiary Education, Science and Research

Potential use of geophysical techniques in identifying preferential pathways for groundwater flow in a fractured subsurface

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Abstract:
Groundwater is a valuable water resources for several reasons. It is relatively much cheaper to exploit as compared to surface water. It does not require dense water distribution network. It has a strong buffering capacity during long dry periods, and it is often of good quality. Groundwater can be affected by land use activities and development of groundwater requires a thorough understanding of the movement of groundwater within the whole groundwater catchment. In small islands, the need to better understand groundwater resource is even more important, especially if the groundwater body is in directly hydraulic contact with the sea. This causes groundwater to emerge in the lagoon or the ocean, hence the groundwater resource is lost to the sea. Along the coastal zones, groundwater is also highly prone to seawater intrusion, a process which affects the quality of the groundwater. The need to understand the dynamic movement of groundwater for a small island is highly being felt.

Based on existing storage facilities, the hydrography network, the potential of existing aquifers, and the growing demands for water, the island has already been categorised as water stressed. Water stress is a condition whereby the water demand is greater than the amount of water available due to a decrease in the quantity and quality of freshwater resources (EEA, 1999). In line with the Un-Water policy, availability of harnessed water per person per day is less than 1700 m^3 of water yearly (UN-Water, 2021). Groundwater resource is currently contributing around 60% total potable water demands for the island of Mauritius. Unplanned development in groundwater resource development can have significant impacts, such as increasing seawater intrusion inland or the drying of a borehole.

In this study, the aims were to use a one-dimensional geophysical equipment to firstly investigate seawater intrusion along a coastal site and secondly to validate the presence of preferential pathways along which groundwater flows with the northern aquifer. Three methods were used for the data collection and analysis; the Wenner array for data collection, the inverse slope method for true resistivity and the IPI2WIN, were used to map the seawater intrusion situation along the coastal site located in the northwest of the island.

The results confirm that the zones saturated with groundwater exhibit resistivity values ranging from 30 to 300 Ωm, range of values similar to that reported by past studies (Sentenac, 1963 & Hunt, 2005). The geophysical survey provided further insight on the number of layers making up the aquifer. The results obtained at the four sites, indicated the presence of a strong hydraulic gradient at one particular site, Pointe Aux Piments. This particular observation confirmed the presence of a major preferential flow path where groundwater exploitation is recommended.

Keywords: Groundwater, One Dimensional Geophysics, Wenner Array, Preferential pathways, Small islands

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Ministry of Tertiary Education, Science and Research

Lunar influence on luciferase activity in bioluminescent dinoflagellates and spatiotemporal variability of nocturnal micro phytoplankton in Mauritius' coastal waters in the wake of climate change

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Abstract:

Mauritius, a tropical island in the western Indian Ocean, boasts rich marine biodiversity, where dinoflagellates play a crucial role in biotic-abiotic interactions. Historically, the region experienced high phytoplankton productivity, accompanied by frequent bioluminescent phenomena. However, long-term observations have revealed a significant decline in these events, attributed to anthropogenic disturbances and climate-induced oceanographic changes. Despite their ecological relevance, the diel variability, enzymatic kinetics, and environmental regulation of bioluminescent dinoflagellates in the region remain poorly understood. This study presents a novel nocturnal assessment of micro-phytoplankton communities and luciferase (*luc*) enzymatic activity across 17 coastal locations, examining the influence of abiotic factors on bioluminescence dynamics. Bioluminescent intensity was inversely correlated with lunar luminosity, with peak emissions observed at Mont Choisy during the new moon phase. Three bioluminescent species - *Pyrocystis fusiformis*, *Ostreopsis* spp., and *Prorocentrum* spp.- were successfully isolated and cultured under a 14h:10h light/dark cycle. Luciferase assays demonstrated a 20-fold increase in absorbance at 554 nm, with *Ostreopsis* spp. exhibiting the highest catalytic efficiency (0.475 ± 0.002 AU). Nocturnal micro-phytoplankton assemblages exhibited significant diel and seasonal shifts, with dinoflagellates (54%) prevailing during summer, while diatoms (16%) and cyanobacteria (30%) dominated during winter, as shown in figure 1 below. Nutrient concentrations (nitrate, phosphate, ammonia) significantly influenced community structure ($p < 0.05$), with elevated nitrate levels and water temperature negatively correlating with dinoflagellate abundance, indicating physiological stress in oligotrophic conditions. The observed suppression of bioluminescence under high lunar illumination supports the hypothesis of a photo-inhibitory regulatory mechanism, potentially modulated by diel vertical migration and circadian oscillations of luciferase expression. Consequently, these findings show the environmental modulation of bioluminescence and phytoplankton structure, driven by lunar cycles, nutrient availability, and seasonal stratification, therefore reinforcing the need for sustained monitoring to evaluate its climate-induced shifts and their implications for marine trophodynamics in the Western Indian Ocean.

Keywords: Bioluminescence; Dinoflagellates; Luciferase activity; Environmental modulation; Phytoplankton dynamics
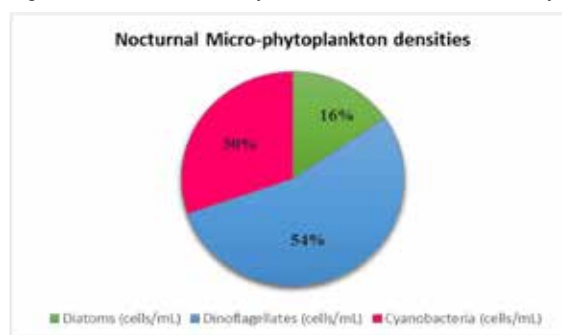
Figure 1: Density of micro-phytoplankton groups during nocturnal sampling.

Ministry of Tertiary Education, Science and Research

Mauritius in the wake of oil spills with advancements in enzymatic bioremediation

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Abstract:

Mauritius, an island nation with diverse coastal ecosystems, faces mounting threats from oil spills, exacerbating the vulnerability of its marine environment. In response, the study explores the potential of enzymatic bioremediation, specifically leveraging *Pseudoalteromonas* species, to mitigate the environmental impact of petroleum hydrocarbons. With oil spills posing severe ecological risks to biodiversity and coastal livelihoods, innovative bioremediation strategies are urgently needed to combat such threats and restore affected ecosystems (United Nations Office for the Coordination of Humanitarian Affairs, 2020). Our research involved isolating and characterizing *Pseudoalteromonas* strains from various coastal sites in Mauritius, focusing on their enzymatic activities, including proteases, amylases, and their capacity for hydrocarbon degradation. Notably, *Pseudoalteromonas* isolates from Cap Malheureux exhibited the highest protease activity (7.7 mm), and amylase activity peaked at Grand Baie (3.5 mm) (Figure 1). Furthermore, oil degradation potential was evidenced by fluorescence under UV light, suggesting the strains' capability to produce biosurfactants essential for hydrocarbon emulsification and degradation (Varjani, 2017). Salinity and dissolved oxygen concentrations (mean 35.1‰ ± 0.865 and 6.11 mg/L ± 0.229, respectively) were found to be significant influencers of microbial activity, supporting the need for site-specific bioremediation strategies. Genetic analysis, including 16S rRNA sequencing, revealed close homology with *Pseudoalteromonas gelatinilytica* (92% identity), though lower query coverage indicates potential novel strains within the genus. Our findings underscore the potential of *Pseudoalteromonas* in bioremediation applications, not only for oil spill cleanup but also as a critical tool for marine conservation in Mauritius. Given the rising urgency of anthropogenic pollution and its irreversible effects on marine ecosystems, integrating microbial biotechnology into conservation strategies is no longer an option— it is crucial. This study paves the way for future bioremediation applications that could significantly enhance oil spill mitigation efforts in Mauritius, offering a sustainable, cost-effective approach to preserving the island's invaluable coastal resources.
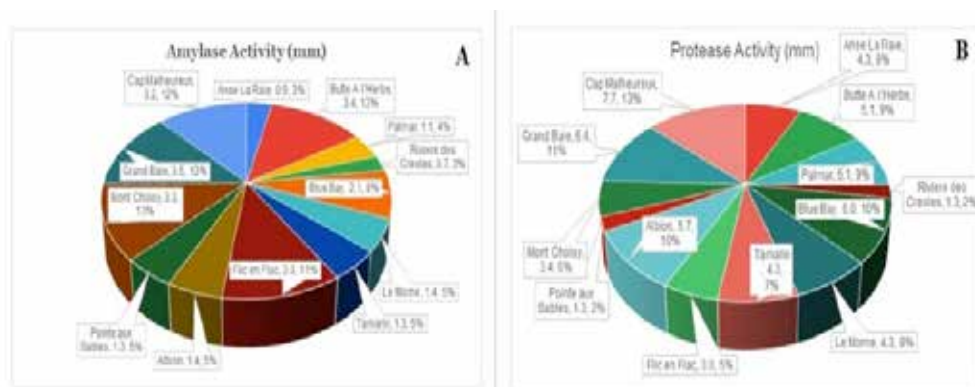
Figure 1. Comparative Enzyme Activity of Bacterial Isolates

(A) Amylase activity across sampling sites, with Grand Baie exhibiting the highest enzymatic activity. (B) Protease activity across sampling sites, showing Cap Malheureux with the highest activity, indicating significant proteolytic potential.

Keywords: Oil spills, Coastal ecosystems, Hydrocarbon degradation, Microbial enzyme activity

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Ministry of Tertiary Education, Science and Research

Empowering business innovation: Consumer insights into mobile payment adoption in Mauritius

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Abstract:

This study examines the adoption of Mobile Payment Services among consumers in Mauritius, a small island developing state transitioning towards a cashless economy. By integrating the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT), the study develops a comprehensive framework incorporating Attitude as a mediating variable. A sample of 249 respondents was analysed to investigate key adoption factors, including Subjective Norms, Compatibility, Perceived Risks, Perceived Trust, and Intention to Use. Findings reveal that Subjective Norms do not significantly influence mobile payment adoption in Mauritius. However, Compatibility, Trust, and Intention to Use positively impact both adoption and attitude towards mobile payments. Conversely, Perceived Risk negatively affects adoption. Attitude was found to mediate the relationship between key factors and adoption, reinforcing the importance of consumer confidence in mobile payment services. The study suggests that financial institutions should invest in awareness campaigns and educational initiatives to highlight the benefits of mobile payments over traditional methods. Strengthening security measures and building consumer trust is crucial to enhancing adoption rates. From a theoretical perspective, this research contributes by extending traditional technology acceptance models with the inclusion of Attitude as a mediator, offering insights into consumer adoption behaviours in a post-pandemic digital landscape. However, limitations include a sample skewed towards younger, tech-savvy individuals, potentially limiting generalizability. Additionally, findings may not directly apply to countries with different economic and regulatory environments. Overall, the study provides practical and theoretical contributions to the growing discourse on digital payment systems, offering valuable recommendations for financial institutions, policymakers, and mobile payment service providers aiming to improve acceptance in emerging economies like Mauritius.

Keywords: Mobile Payment Adoption, Mauritius

Ministry of Tertiary Education, Science and Research

PRESENTATIONS
(Parallel Session 1 – Circular Economy)

VENUE
Lecture Theatre 1, New Academic Complex,
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Ministry of Tertiary Education, Science and Research

Innovation from the business perspective: A systematic review

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Abstract:

Purpose: The purpose of this paper is to conduct a research synthesis of the studies that have analysed the main drivers of innovation on business performance and growth.

Design/methodology/approach: A systematic literature review of good rating articles in the last five years (2015-2025). The PRISMA 2020 model is used to select the most relevant articles based on specific criteria. From the Scopus platform, a total of 598 studies are identified out of which 137 are considered as most appropriate to serve the purpose of this study.

Findings: The findings of the review have shed light not only on the complex nature of innovation in the business but more importantly the distinctive relationship between innovation and business. Although technology is seen to be the primary engine of innovation in business, a number of other drivers have also been highlighted which are classified as organisational, economic, social and environmental.

Research limitations: The authors adopt a systematic literature review method to probe into existing literature, inevitably missing some empirical studies. Future research may be to review articles for a period of more than ten years for better clarity in the evolution of innovation in business.

Practical implications: The paper offers interesting implications for businesses and academia. For business practitioners, this study can provide a useful reference regarding the role of innovation in business performance and growth. For scholars, the study can provide a current research landscape and development process in this field.

Originality/value: The findings are derived from a systematic literature review that has studied the influence of innovation in business. The study provides the opportunity to look at the literature of the area studied from a broad perspective. In addition, it provides useful insights as to where future research might be usefully inquired to bridge the gap in his field.

Keywords: Business innovation, Innovation drivers

Ministry of Tertiary Education, Science and Research

An educational dual-axis solar tracker for varying PV module sizes and varying solar tracking and MPPT algorithms

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Abstract:
Solar PV technologies have a relatively low energy conversion efficiency as compared to other renewable energy technologies. Hence, getting the most out of a PV module is crucial. Most installed PV systems have a fixed azimuth and inclination angle, which are optimally determined for a given location on Earth. However, such systems fail to respond to changes in the ambient conditions such as passing clouds, shading objects and low solar elevation angles occurring in the early morning or late afternoon. Solar tracking has the capability to rotate a module so as to make it produce more power. Solar trackers may be broadly classified as active and passive, the former ones requiring motors and sensors to track the Sun continuously. Trackers may also be categorized into single-axis and dual-axis. Single-axis solar trackers may be more reliable due to less moving parts, and may consume less energy, but limit the full motion of the solar modules, thereby preventing the modules from facing the sun directly. Very little information is available on the energy performance of a solar tracker in a tropical weather such as that prevailing in Mauritius. It should be noted that studies carried out elsewhere may not necessarily be generalized, and local experiments are more reliable. Moreover, very little to no information is available on the concept of having two linear actuators performing dual-axis solar tracking. Furthermore, most other works have employed LDRs as means to track the sun, while there are numerous other algorithms which may be used. Most importantly, many studies have used only the PV module current, or the power obtained as the product of module current and voltage. However, it is crucial to know if the gain in MPP of the module is worthwhile. Modern battery chargers and inverters always try get the MPP of a given PV module or system. In this work, a dual-axis solar tracker employing two linear actuators was designed and implemented. Its performance was assessed using a monocrystalline PV module, whose output energy was compared to that of a static PV module under cloudy and sunny conditions. Moreover, for the prevailing tropical weather of Mauritius, a water-cooling system was also incorporated, in order to maintain a low module temperature during extreme temperatures. Perturb and observe solar tracking alongside the maximum power point tracking algorithm resulted in 26.6 %, 54.4 %, and 44.1 % energy gain for cloudy, sunny and sunny alongside water cooling scenarios respectively.

Keywords: Dual-axis solar tracker, mono-crystalline, water cooling, Perturb & Observe, MPPT

Ministry of Tertiary Education, Science and Research

Investigating three dual-axis solar tracking Algorithms with CdTe, CIS and Mono-Si PV modules in a tropical climate

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Abstract:
Photovoltaic (PV) modules are mostly installed at fixed inclination and azimuth angles based on their location on Earth. However, these static modules do not produce maximum possible power consistently, especially at different times of the day, and in the presence of shadings and passing clouds. Solar trackers enable PV modules to change their inclination and azimuth angles in order to increase the power generation. Hence, depending on the prevailing outdoor conditions, much more useful energy may be generated by employing solar tracking. In this work, the output power of a PV module on a dual-axis solar tracker (DAST) was compared to that from a static module. Studies on the behaviour of different PV technologies when tested on a given solar tracker are rare. Moreover, no study has been found on the application of different solar tracking algorithms to the same dual-axis solar tracker. Hence, in this research, three commercially available and widely used PV technologies were investigated: Cadmium Telluride (CdTe), Cadmium Indium Selenide (CIS) and mono-crystalline silicon (mono-Si). Moreover, three solar tracking algorithms were exploited: Perturb and observe (P&O), mathematical modelling with P&O, and the four LDR method. The excess energy gains excluding the DAST energy consumption was quantified. Particularly, up to 46.6%, 93.2%, and 62.5% energy gains were achieved for the CdTe, CIS and mono-Si technologies under the different tracking conditions in winter period, and the DAST was found to consume only up to 9.3% of the generated energy. Such significant energy gains demand for further investigation of solar tracking in a tropical climate particularly over the duration of a whole year.

Keywords: Dual-axis solar tracker, Mono-crystalline, CdTe, CIS, Perturb & Observe, MPPT

Ministry of Tertiary Education, Science and Research

PRESENTATIONS
(Parallel Session 1 – Zoom Sessions)

SUB-THEME
Circular Economy/Green Economy/Blue
Economy/Cultural Industry/Economy

VENUE
Lecture Theatre 1, New Academic Complex,
University of Mauritius

Ministry of Tertiary Education, Science and Research

The determinants of sustainable urban planning in developing countries: Tanzania context

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Abstract:
Currently, the existing body of literature posits that, sustainable urban planning in developing countries is impacted by a complex interaction of a number of different factors. On the other hand, there is a debate in emerging nations over which factors impact sustainable urban planning. A number of further studies demonstrate that political instability and frequent leadership changes are detrimental to the continuity of long-term planning. In a similar vein, unstable governance is usually a contributing factor in the failure of plan execution. Numerous African cities often depend on out-dated planning concepts that date back to the colonial period, which do not correspond to the requirements of the current needs. This study was carried out in response to the debate that has been taking place in the existing body of literature in order to reveal the factors that determine sustainable urban planning in Tanzanian cities. The study used systems theory since it emphasizes on flexibility, continuous monitoring, and the integration of social, economic, and ecological aspects in planning decisions. The positivist paradigm, an explanatory design, and a random sampling approach were used in the study in order to acquire a sample of four hundred thirty-five respondents. For the purpose of data collection, a questionnaire and a document analysis were used. On the other hand, descriptive statistical methods were employed to analyze the quantitative data collected on the respondents' profiles using IBM SPSS Statistics software version 26, while the Partial Least Squares Structural Equation Modeling (PLS-SEM) technique was utilized for inferential analysis with SmartPLS software version 4. The findings reveal that, the most important factors that determine urban planning in Tanzanian cities are governance, planning decisions performance, implementation capacity, and the socio-economic dynamics of the region. In order to achieve sustainable urban planning in Tanzanian cities, it is recommended that local governance be strengthened, municipalities should be empowered with enforcement tools, participatory planning should be empowered, sustainability integration should be adopted, and strategic densification should be prioritized.

Keywords: Determinants, Governance, Implementation capacity, Planning decisions Performance socio-economic dynamics and sustainable urban planning

Ministry of Tertiary Education, Science and Research

Assessing the commercial feasibility of a citrus pectin coating enriched with bioactive compounds extracted from the Rodrigues lime to extend the shelf life of minimally processed fruits and vegetables in Mauritius

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Abstract:

Post-harvest losses (PHL) in Sub-Saharan Africa (SSA) amount to approximately $4 billion annually, resulting in significant wastage of natural and human resources. This food loss consumes about one-quarter of all agricultural water usage and contributes to approximately 8% of global greenhouse gas emissions each year. According to the FAO, on-farm losses of fresh fruits and vegetables (FFV) in SSA can reach up to 50%, the highest in the world, largely due to inadequate storage, transport infrastructure, and fragmented supply chains in tropical climates. In Mauritius, the situation is similar, with an average of just 132.5g of fruit and 323.7g of vegetables available per person per day as of 2020, while 2% of fruits and 4% of vegetables are lost along the supply chain from post-harvest to retail. These losses significantly impact food availability and hinder the achievement of Sustainable Development Goal 2 (Zero Hunger). To tackle this issue, an edible coating called EcoPEC® was developed, consisting of pectin extracted from the peels of Mauritius pamplemousses and enriched with phytochemicals from Rodriguan lime peels. By utilizing waste citrus peels, this solution not only reduces food waste but also adds value to by-products from the juicing industry, contributing to sustainable food systems. Market research, including a focus group with Mauritian stakeholders such as local growers, the Ministry of Agro Industry, and agricultural agencies, showed that 72.8% of participants experienced monthly losses of 15-30% of their produce. The majority (88.9%) supported the integration of EcoPEC® into existing supply chains to reduce food wastage. A Business Model Canvas (BMC) was created to assess EcoPEC®'s commercial feasibility. The BMC highlights key partners, activities, and resources needed for production and distribution, including collaboration with agro-processors, hotels, and input suppliers, as well as R&D support from FAREI. EcoPEC®'s value proposition includes extending the shelf life of fruits such as pineapple (80%) and pumpkin (67%) using natural, cost-effective ingredients like citrus pectin and bioactive compounds. Cost analysis revealed a production cost of MUR 829.27 per kg of EcoPEC® powder, with an initial investment of MUR 872,634. The selling price to agricultural input suppliers is MUR 914/kg, while the retail price is MUR 1006/kg. One kilogram of EcoPEC® powder can produce 33 liters of coating solution, enough to coat approximately 165 kg of FFV, providing a return on investment of 57%, demonstrating its financial viability for large-scale production.

Sensory evaluation with 50 consumers showed a strong preference for coated produce over uncoated controls, particularly after an eight-day storage period, confirming the potential of EcoPEC® to extend freshness and reduce waste. In conclusion, the EcoPEC® coating provides a promising, sustainable solution to reduce PHL and food wastage in Mauritius, with potential for broader application in Sub-Saharan Africa. The product's commercial feasibility, cost efficiency, and positive consumer feedback demonstrate its potential to significantly contribute to food security and the achievement of SDG 2 (Zero Hunger).

Keywords: Consumer feasibility, circular economy, sustainability, post-harvest losses

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Ministry of Tertiary Education, Science and Research

AI and drone technologies for coastal monitoring

Presenter: Ms. Azina Nazurally
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Abstract:

The coastal landscapes of Mauritius face increasing challenges from environmental changes, necessitating advanced monitoring techniques. Current methods in Mauritius, primarily based on satellite imagery and GIS technologies or traditional bathymetric data, lack the frequency and resolution necessary for effective and timely erosion monitoring. This research addresses a critical gap in coastal management by exploring the potential of Unmanned Aerial Vehicles (UAVs) and Artificial Intelligence (AI) for precise beach erosion monitoring. Through a comprehensive investigation, we developed and tested a novel methodology for automated coastal change detection tailored specifically to the unique environmental characteristics of Mauritian beaches. This study aligns with Mauritius' commitment to the United Nations Sustainable Development Goals (SDGs 13, 14, and 15) by employing drone and AI technologies to enhance the protection and restoration of terrestrial ecosystems and prevent biodiversity loss. Unlike the typical global studies that use coarser shoreline demarcation due to turbid waters, our research faces unique challenges due to the exceptionally clear waters around Mauritius, which necessitates fine-tuning existing methodologies or developing novel approaches for effective monitoring. While previous studies by (Aspragkathos et al., 2022) and (Zhong and El-Diraby, 2022) have applied similar UAV-AI technologies in coastal regions, these approaches typically focus on visibly turbid water boundaries rather than the transparent water-sand interfaces characteristic of Mauritius's pristine beaches.

Our research methodology employs a rigorous and systematic approach, starting with a comprehensive literature review using the PRISMA framework and extending to monthly UAV data collection, data annotation, cleaning, preprocessing, shoreline extraction, and change management. By creating and using a novel dataset of high-resolution UAV imagery specifically for Mauritian beaches and applying advanced computer vision and neural network techniques, we have demonstrated the potential of AI-driven coastal monitoring. This approach has not only highlighted the unique challenges presented by Mauritius' exceptionally clear coastal waters but also shown significant improvements in monitoring accuracy tailored to these specific conditions. Key findings underscore the complexities involved in automated beach erosion monitoring. Our developed Convolutional Neural Network (CNN) approach achieved an initial accuracy of 70% in correctly classifying and detecting shoreline boundaries, which presents a promising foundation for automated monitoring in Mauritius' uniquely challenging coastal environments with exceptionally clear waters. However, further refinements are necessary to adeptly manage the unique coastal dynamics of Mauritius. This research not only demonstrates the feasibility but also the effectiveness of using AI and drones for such applications, establishing a robust foundation for future technological advancements in environmental monitoring. The study crucially identifies a substantial gap in the literature concerning the quantification of coastal changes and underscores the necessity for location-specific, tailored monitoring strategies. This research represents a significant advancement in our understanding and capabilities in this critical area, providing valuable insights and methodologies for further development.

Keywords: Unmanned aerial vehicles, Computer vision, Beach erosion, Remote sensing, Environmental monitoring

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Ministry of Tertiary Education, Science and Research

PRESENTATIONS
(Parallel Session 2 – Green Economy)

VENUE
Lecture Theatre 2, New Academic Complex,
University of Mauritius

Ministry of Tertiary Education, Science and Research

Assessment of ocean acidification in selected coastal lagoons in Mauritius

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Abstract:

As a Small-Island Developing State (SIDS), Mauritius is among the nation's most vulnerable to the impacts of climate change. The rising concentration of carbon dioxide (CO_2) in the global atmosphere is causing increasing dissolution of CO_2 in the alkaline oceans and coastal seawater. While the global mean pH of seawater was around 8.2 before the Industrial Revolution, it has since declined to around 8.0, with some regions in Mauritius registering pH values as low as 7.86 (Boodhoo *et al.*, 2022). Since pH is measured on a logarithmic scale, even a pH decrease of 0.1, which might initially seem minor, amounts to around a 30% increase in the concentration of hydrogen ions ($[H^+]$). This increase in $[H^+]$ lowers the pH of seawater towards greater acidity—a process commonly referred to as ocean acidification (OA). This research aims to elucidate the carbonate chemistry of the coastal lagoons of Mauritius to develop an understanding of the natural variability of OA-related physico-chemical parameters, oxygen content and possible chemical impacts of OA (Imrit *et al.*, 2023). A dataset including pH, sea surface temperature (SST), dissolved oxygen content, total alkalinity (A_T) and the seawater buffer capacity, was built from July 2021 to December 2024, using measurements across five sites: Flic-en-Flac, Albion, Mont-Choisy, Trou d'Eau Douce, and La Cambuse. Statistical analyses assessed possible parameter relationships and spatio-temporal variations. The study recorded significant differences in key marine parameters, with pH levels ranging from 8.33 at Trou-d'Eau-Douce to 7.86 at Mont-Choisy, indicating possible acidification effects. A_T varied widely on the west coast, from 2040.70 µmolkg^{-1} at Flic-en-Flac to 2627.96 µmolkg^{-1} at Albion, highlighting regional disparities (ANOVA, *p* < 0.05). Sea surface temperature extremes, from 22.6°C at Mont-Choisy to 33.9°C at Trou d'Eau Douce, suggest differing thermal stress patterns. Dissolved oxygen levels were lowest at Albion (3.38 mg^{-1}), placing the site on the brink of hypoxia (< 3.00 mgL^{-1}). The buffer capacity exhibited significant site-dependent variations, with Mont-Choisy and Albion showing notable differences in carbon cycling. These fluctuations, particularly on the west coast of Mauritius, underline the importance of localised environmental monitoring to understand marine ecosystem responses to climate and anthropogenic pressures.

Keywords: Ocean acidification, Mauritius

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Ministry of Tertiary Education, Science and Research

Weathering the storm: How climate change is shaping the subsistence of female farmers in Mauritius

Presenters: Ms. Divya Ramphul[1] and T. Makoondlall-Chadee[2]
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Abstract:

Climate change is a global issue with far-reaching impacts on agriculture, threatening the livelihoods and wellbeing of millions of people worldwide (George et al., 2022). Climate change is not just an environmental issue – it is also a human issue which impacts profoundly and personally the livelihood of female farmers in Mauritius (Antriyandarti et al., 2024). Small Island Developing States like Mauritius particularly vulnerable to climate change, with its fragile ecosystems and limited resources, depend on various economic sectors and the agricultural sector is one of the main pillars for the economy of Mauritius but is heavily threatened by the vagaries of the climate (Bryan et al., 2024).

Small-scale farmers play a significant role in shaping a green economy and food production and employment arising from this sector cannot be overlooked but rather needs to be carefully understood, planned and enhanced (Matthew et al., 2012; Mishra et al., 2022; Chandio et al., 2023). In this work and through the talk, the researchers stress on how climate-related impacts found to be heavy rainfall, floods, cyclones and high temperatures led to crop failures and reduced yields. From diminished yields to increasing financial and physical burdens, this work study employed a qualitative data collection and analysis method. Open-ended questions were conducted with 30 female farmers from different districts in Mauritius to gather information on their views, experiences and coping mechanisms. Yet these female farmers are not just victims of these climate challenges – they are powerful agents for adaptation and the study revealed a lack of awareness among female farmers about climate change causes and technologies available for sustainable agricultural practices. By identifying innovative strategies, we showcase following our findings such as varied adaptation strategies employed by female farmers identified, namely crop switching, crop diversification, changing planting dates and using traditional agricultural practices for water and pest management, how these women are rising to meet the climate related challenges. Join us for an immersion that intersects climate change, gender and agriculture and learn how opportunities, challenges and adaptation strategies enhance female farmers contributions in the agricultural sector. Empowering the female farmers is a bug move towards a more sustainable and climate-resilient sector through adoption of climate-smart agricultural practices and building a resilient future for Mauritius.

Keywords: Women in agriculture, Green economy, Climate and agricultural resilience, Climate change and action

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Ministry of Tertiary Education, Science and Research

Climate Smart Agriculture as an agritourism asset in the hotel industry in Mauritius

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Abstract:

Mauritius, as a Small Island Developing State (SIDS), is increasingly vulnerable to food insecurity and environmental shocks, among them climate change. With 77% of its food imported and the tourism sector contributing significantly to GDP, there is growing urgency to adopt integrated and resilient strategies (Statistics Mauritius, 2021; UNEP, 2020). Climate-Smart Agriculture (CSA), defined as an approach that sustainably increases productivity, builds resilience, and reduces greenhouse gas emissions (FAO, 2014), offers a viable pathway for transforming agriculture into a strategic asset for the tourism industry.

This study explores CSA's potential as an agritourism asset in Mauritius by assessing how CSA practices can be embedded in hotel supply chains and tourist experiences. Using a mixed-methods approach, 300 smallholder farmers were targeted for surveys in Belle Mare and Palmar, with 100 surveys completed to date. Findings indicate that 68% of respondents are aware of CSA, but only 37% apply techniques such as mulching, drip irrigation, and crop rotation. Key barriers include lack of training, financial limitations, and absence of consistent market access (Hardowar et al., 2015). Notably, 74% of farmers are interested in CSA training, and 61% are open to hotel partnerships. Meanwhile, 81% of hotel respondents expressed readiness to source CSA produce, conditional on reliable supply and digital coordination.

A CSA–Tourism Integration Framework is proposed, including carbon footprint tracking, digital farm-hotel platforms, and agri-experience offerings. This aligns with global sustainability trends (WTTC, 2021; Lipper et al., 2014) and supports Mauritius' transition toward a resilient, inclusive, and eco-authentic tourism model (Scheyvens & Momsen, 2008).

Keywords: Climate-Smart Agriculture, Agritourism, Sustainable tourism, Small Island Developing States, Local Food Systems, CSA Integration

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Ministry of Tertiary Education, Science and Research

Copper-Based nanostimulants: Eco-friendly alternatives to pesticides for disease-prone plants

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Abstract:

There is a global imperative to create sustainable solutions for enhancing food security and combating plant diseases in agriculture. Traditional methods often rely on excessive pesticide application, which suffers from inefficient delivery systems. Emerging approaches utilizing nanomaterials for disease management as well as enhance growth present a promising alternative, offering precision and increased efficacy. As an essential micronutrient for plant growth, copper also helps with defence against pathogens like ergot and bacterial wilt. Advances in nanotechnology—such as nanoscale carriers or nano-formulated copper particles—could optimize agricultural outcomes by improving nutrient delivery, curbing disease transmission, and minimizing ecological and public health risks associated with conventional pesticide overuse. Water dispersible copper-based nanoparticles were synthesized through co-precipitation approach, employing different ligands to functionalize and maintain the stability of the nanomaterials. The synthesized particles were analyzed using standard characterization methods, including scanning/transmission electron microscopy (SEM/TEM), dynamic light scattering (DLS), Fourier-transform infrared spectroscopy (FTIR) and energy dispersive x-ray spectroscopy. In vitro studies on a variety of cell lines were also performed to establish nanoparticle toxicity. Preliminary greenhouse studies have been conducted on tomato and potato plants, with half exposed to *Ralstonia solanacearum* inoculation and the remaining half serving as an untreated control group. Nanoparticles were applied through both foliar spraying (1 mg per plant) and soil incorporation (200 mg nanoparticles per kg of soil) and several growth metrics (e.g., plant height, signs of wilting, root/shoot biomass, number of fruits) collected over a few weeks. The nanoparticle sizes ranged from 40-500 nm and shapes ranged from spherical to cubic, depending on reaction conditions and stabilizing ligand. The copper content varied between 20-60%. During greenhouse trials, it was observed that smaller nanoparticles led to higher resistance to bacterial wilt. Overall, our data indicated that copper-based nanoparticles could be useful in providing resistance to bacterial wilt in tomato plants. Further testing is under way to determine the mechanism of action of these nanostimulants.

Keywords: Sustainable agriculture, Nanotechnology, Copper, Bacterial wilt

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Ministry of Tertiary Education, Science and Research

Evaluating agricultural practices in Mauritius: Local sustainability challenges and global implications for ecosystem and human health

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Abstract:

Agricultural boom in Mauritius, together with limited integration of pest management strategies, has triggered overuse of agrochemicals. However, following the COVID-19 and the Ukraine-Russia conflict in 2022, the Mauritian government has refocused on self-reliance, food security, and sustainable agriculture. Hence, in response, this study evaluated the ecosystem quality and human health impacts associated with three farming systems from a lifecycle perspective, namely: partial organic farming with limited amount of chemical fertilisers but high amount of organic fertilisers (poultry manure and compost applications) and no pesticides (scenario 1); conventional moderate farming employing moderate amount of chemical fertilisers (scenario 2), and conventional intensive farming, which uses chemical fertilisers, organic fertilisers, and pesticides applications (scenario 3). The functional unit was the production of 1 kg of vegetables. The inventory data was processed with SimaPro 9.5.0.1 using the IMPACT World+ v1.00 method. The results indicate that scenario 3, particularly the crop cultivation and harvest stage, caused significant ecosystem and health impacts due to the heavy use of mancozeb fungicides, land preparation in scenario 2 impacted highly due to chemical fertilisers. Conversely, scenario 1 emerged as the least harmful practice. A sensitivity analysis explored sustainable solutions, such as replacing poultry manure with cow manure in scenario 1, reducing chemical fertilisers by 50% in scenario 2, and eliminating pesticides in scenario 3. The improved scenario 3 (zero-pesticide farming) and scenario 1 (cow manure substitution) demonstrated the most significant reductions in ecosystem quality and health impacts (up to 99%). These findings align with global sustainability efforts, such as the EU Green Deal's Farm-to-Fork strategy and India's Zero Budget Natural Farming (ZBNF). The study provides scalable solutions for smallholder farmers and island nations like the Maldives and the Caribbean, supporting SDG 2 (Zero Hunger), SDG 12 (Responsible Consumption and Production), and SDG 15 (Life on Land).

Keywords: Sustainable agriculture, Life cycle assessment, Ecosystem quality, Human health, Food security

Ministry of Tertiary Education, Science and Research

Effects of invasive alien plants on avian frugivory in the best-preserved wet forests of an oceanic island

Presenter: Ms. Ghanishta Seeburrun
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Abstract:

Frugivorous birds play an essential role in ecosystem functioning in tropical forests by dispersing seeds, which is vital for forest maintenance and regeneration[1]. Their effectiveness as seed dispersers depends on their fruit removal rates. However, invasive alien plants (IAP) can disrupt this function by altering mutualistic plant-animal interactions and changing forest structure, which affects native understorey species and the distribution and behaviour of fruit-feeding animals[2]. Few studies have addressed how IAP influences the avian frugivore-frugivory relationship. This study aims to assess how IAP influences birds' consumption of understorey fruits, highlighting the ecological implications of invasive species on avian seed dispersers. The study was conducted at two sites, each comprising a Conservation Management Area (CMA) where IAP had been removed, alongside adjacent areas still invaded by IAP. To assess the impact of habitat restoration on frugivory, we compared frugivory rates between two habitat types within each site: one plot in a restored area (IAP removed) and another in an unrestored area (IAP present). We established two 50 × 40 meter grids at each site, with one grid placed in the restored area and the other in the unrestored area. Twelve understorey trees were selected per grid and 15 red plasticine fruits were attached to branches and left for 72 hours. Acoustic recorders were deployed at each grid centre to assess avian abundance and species richness, while percentage canopy cover was measured to evaluate its influence on avian foraging behaviour. Frugivory rates were significantly higher in restored compared to invaded habitats at both sites. In Brise Fer, fruit removal was 5.7 times greater in restored plots (17.6%) than in invaded ones (3.1%) (Fisher's exact test, $p < 0.01$). At Mare Longue, frugivory was 1.75 times higher in restored plots (7.8%) than in invaded plots (4.5%) (Fisher's exact test, $p < 0.01$), indicating consistent positive effects of habitat restoration on frugivore activity. IAP indirectly impact avian frugivory rate. The decline in plant-frugivore interactions due to the presence of IAP could negatively affect essential processes like seed dispersal, further impacting forest plant communities.

Keywords: Forest restoration, Plant-animal interaction

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Ministry of Tertiary Education, Science and Research

Effect of seaweed compost on growth and yield of food crops

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Abstract:

Synthetic fertilizers are widely used to boost crop yields, but they raise concerns about environmental impact, soil degradation, and health risks. The usage of natural 'Seaweed Compost' whether used alone or with chemical fertilizers, offers a more sustainable and eco-friendly alternative. The aim of this research was to establish whether the application of seaweed compost affected the development and production of Brassica Rapa chinensis (Bok Choy) and Tourbillon RZ (Batavia lettuce) in a manner that was significantly different from that of traditional fertilisers. The principle objectives of this study were to improve the growth of bok choy and lettuce and compare the effectiveness of seaweed compost with other fertilizers and a control. A field experiment was conducted at the UOM AgriTECH Park, situated in Reduit at latitude 20°23'56"S and longitude 57°49'07"E, using a randomized block design (RBD) with four treatments: seaweed compost alone, seaweed + organic fertilizer, seaweed + chemical fertilizer, and a control. The parameters assessed were number of leaves, shoot height, leaf length, leaf width were recorded at various stages of crop growth. Results showed that chemical fertilizer significantly enhanced bok choy growth ($p<0.05$) across all measured parameters. Seaweed compost also improved plant growth compared to the control, though its effects were less pronounced. No significant differences were observed between treatments for lettuce. Nitrogen levels in bok choy increased midway through growth and declined at harvest, with the highest final concentration in the seaweed + chemical fertilizer treatment (4.75%), followed by seaweed compost alone (4.25%), seaweed + organic fertilizer (4.17%), and the control. Yield analysis indicated that seaweed compost alone produced a higher yield than seaweed + chemical fertilizer, with a mean difference of -18.83 g/m. These findings suggest that seaweed compost is a viable organic amendment for plant growth and nutrient accumulation particularly when combined with fertilizers. In this trial, bok choy and lettuce, which have short life cycles, were used. Longer-cycle crops like maize or strawberries may provide further insights.

Keywords: Seaweed compost, Chemical fertiliser, Organic fertiliser, Brassica Rapa chinensis (Bok Choy), Tourbillon RZ (Batavia lettuce), Yield

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Ministry of Tertiary Education, Science and Research

Conservation of epiphytes and lianas: pioneer trees serve as important hosts in Mauritius, a small oceanic island

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Abstract:

Globally, biodiversity is decreasing rapidly driven by a variety of human activities and impacts. Such biodiversity crisis is leading to the destruction of a wide range of ecosystems worldwide, among which tropical forests and oceanic islands are particularly affected. Within tropical forests, epiphytes and lianas constitute a significant proportion of plant diversity but also some of the most threatened floristic components. Yet, they have often been understudied and neglected within restoration projects in favour of tree plantations. To assess the importance of pioneer trees and tree dynamic in shaping vascular epiphyte and liana communities within ecological restoration projects, we compared epiphytes and lianas growing on a fast-growing pioneer tree species from tropical Africa (*Harungana madagascariensis* - Hypericaceae) with those growing on other native species of 1) similar trunk diameter and 2) similar age, in two areas undergoing ecological restoration for biodiversity conservation on the oceanic island of Mauritius, where the tree species is commonly cut by conservation managers to rapidly maximise tree diversity. In addition, we investigated whether tree trait attributes influenced epiphyte and liana abundance. No significant difference in epiphyte and liana' species richness and abundance existed between *H. madagascariensis* and other native trees of similar diameter, but when trees of similar age are considered, *H. madagascariensis* hosted significantly more diverse epiphyte and liana communities. Furthermore, six species were closely associated with *H. madagascariensis*, compared to three with other trees of similar diameter and none with other trees of similar age. Among all tree traits recorded, host DBH, and the presence of a smooth bark were identified as key traits influencing epiphyte and liana abundance but only DBH had a significant impact. Short-lived pioneer trees therefore constitute an important host for communities of native epiphytes and lianas, which can be as diverse and abundant within about three decades as on other native trees, which are often multi-centennial. We show that in their pursuit to focus ecological restoration primarily on woody plants, conservation managers in Mauritius perpetuate a blind spot-on important constituents of tropical forest diversity like epiphytes, which are consequently paradoxically further threatened by conservation managers.

Keywords: Epiphyte, Pioneer species

Ministry of Tertiary Education, Science and Research

Assessing food waste dynamics: A comparative study of supermarkets, market vendors, and growers in Mauritius

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Abstract:

This research explores the intricate dynamics of food loss and waste within the vegetable supply chain, focusing on the roles of vegetable growers, market vendors, and supermarkets. The study employed a field-based approach to assess vegetable waste along the supply chain in Mauritius. A total of 24 vegetable growers from different regions were interviewed on-site, allowing direct observation of farm-level waste. Additionally, data collection extended to market vendors through visits to seven wet markets across urban and rural areas, where 41 market vendors participated in face-to-face interviews. Furthermore, insights from supermarkets were gathered through interviews with six managers overseeing fresh fruit and vegetable sections. Drawing from recent academic research and data collected through interviews and surveys, the challenges faced by vegetable growers, such as environmental factors and labour shortages, underscore the need for a comprehensive understanding of waste patterns. Most growers sorted and graded their produce (90%), with grading criteria influenced by market demand, weather conditions, and labour availability. Excess or rejected vegetables were either abandoned in fields, repurposed as compost or animal feed, or, in cases of pest or disease outbreaks, incinerated. Key causes of food loss included environmental factors, pests and diseases, market fluctuations, labour shortages, and inadequate storage facilities. While 50% of growers adopted strategies to minimize waste—such as crop diversification, improved pest control, and greenhouse management—additional measures were suggested, including a Market Information System, better synchronization of imports and local production, enhanced irrigation, and government subsidies for agrochemicals. The study highlights the critical role of market vendors in the vegetable supply chain, with 75% engaged in full-time trade. Vendors primarily source vegetables from planters (56.1%) and auctioneers (51.2%), with 40% also cultivating their own produce. Physical appearance is a key factor in vegetable sales, with 78% of vendors and 92% of customers valuing aesthetics when purchasing. Market vendors, serving as crucial intermediaries, navigate consumer preferences, rejection criteria, and storage limitations, contributing significantly to waste reduction strategies. Supermarkets, as major stakeholders, prioritize product quality through stringent acceptance criteria and employ various measures to manage unsold produce. The proposed strategies to mitigate food waste encompass the entire supply chain, emphasizing improved stock management, minimal processing, and the need for cold storage facilities. These recommendations align with the broader goals of sustainability and resilience within the food system. The interconnectedness of these strategies across different stages highlights the necessity for collaborative efforts among stakeholders to address food loss comprehensively. In conclusion, this study advocates for a collective commitment to sustainable practices, leveraging insights from research findings to inform actionable solutions. Integrating these recommendations into the daily operations of growers, market vendors, and supermarkets holds the potential to transform the vegetable supply chain into a more efficient, responsible, and resilient system, contributing significantly to the global effort to reduce food waste and build a sustainable future.

Keywords: Food loss and waste, Vegetable supply chain

Ministry of Tertiary Education, Science and Research

Diel and seasonal patterns of loss of commercial lychee fruits to vertebrate frugivores in Mauritius: Implications for mitigating a human-wildlife conflict

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Abstract:
Human-wildlife conflicts pose a growing threat to biodiversity, particularly when the targeted species plays an ecological keystone role. Mauritius has repeatedly mass-culled an endemic and threatened flying fox species (the Mauritian flying fox; *Pteropus niger*) failing the intended objectives of crop protection and elevating the species' extinction risks. In this context, the ecology of this species should be better understood to develop non-lethal management strategies. Here we investigated foraging patterns of vertebrate frugivores over 24-hour cycles in lychee orchards and backyard gardens. We assessed all agents of damage (mainly flying fox, alien bird, alien mammal) to fruits sampled in 2022, and the temporal variation of flying fox and bird foraging (take and amount eaten relative to fruit ripeness) on lychee trees at six-hourly intervals. We sampled two orchards (Calebasses and Beaux Songes) and three backyard gardens (north and central upland region) using 120 permanent fruit traps. The most important frugivores foraging on lychees were flying foxes (78.3%) and birds (16.1%), namely ring-necked parakeets (*Alexandrinus krameri*), red-whiskered bulbuls (*Pycnonotus jocosus*), village weavers (*Ploceus cucullatus*) and common mynas (*Acridotheres tristis*) while damage by alien mammals was negligible (<1%). Flying foxes consumed more fruits in the early night (59%) compared to the late night and this was statistically significant in one orchard and backyards. However, the difference in damage was on average one to three fruits per tree per night. Bird damage at both orchards was highest during the first half of the day (64%). Flying foxes ate fewer fruits towards the end of the fruiting season while birds followed the opposite trend. As fruit ripeness increased from unripe to fully ripe, flying foxes ate 39-42% more lychee pulp per fruit at the two orchards. Parakeets ate 7% more fruit pulp with increasing ripeness at one orchard only. Deliberate disturbances involving smoke, noise or light to deter flying foxes were common in orchards. The weak difference in the extent of flying fox damage to fruits between early and late night suggested at best minor advantages of concentrating deliberate disturbances in early night, and that netting would be a better strategy as it would also protect against diurnal frugivores. Additionally, trees should be protected from the sixth week after fruit set as most damage occurred when fruits were unripe. Such an improved timing of crop protection should play an important role in reducing fruit losses and thereby alleviate the human-wildlife conflict around the flying fox's diet.

Keywords: Flying fox, foraging pattern, fruit protection, *Litchi chinensis*, Mauritius, *Pteropus niger*

Ministry of Tertiary Education, Science and Research

Green innovation in wound care: Valorization of agricultural waste for cutaneous leishmaniasis treatment

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Abstract:

Biopolymers derived from plant biomass offer significant advantages, including biocompatibility, biodegradability, and cost-effectiveness, making them promising candidates for biomedical applications [1]. Among them, cellulose and lignin, the most abundant biopolymers in nature, were selected from sugarcane bagasse (SCB) for developing bioactive wound dressings targeting cutaneous leishmaniasis (CL). CL is a neglected tropical disease (NTD) prevalent on five out of seven continents, causing ulcerative wounds that lead to social stigma, immunosuppression, and mental health issues. Current treatments focus on parasite eradication but fail to address wound healing and secondary bacterial infections, a key challenge identified in the World Health Organisation NTDs Roadmap 2030. This study aligns with UN Sustainable Development Goals 3 (Good Health and Well-being) and 13 (Climate action) by repurposing agricultural waste into value-added healthcare products. SCB cellulose and lignin were co-extracted using a single-step method to enhance cost-effectiveness and minimize waste. SCB lignin demonstrated antibacterial activity against common wound pathogens. The extracted biopolymers were crosslinked into soft hydrogels (Cel-lig) in various ratios, with Cel-lig 70:30 displaying optimal physicochemical and biological properties, supporting L929 cell proliferation while maintaining antimicrobial activity [2]. Further incorporation of bioactive compounds into Cel-lig 70:30 enhanced its antibacterial properties without altering its structural integrity or inducing excessive tumour necrosis factor alpha (TNF-α) expression in mouse macrophages. The loaded hydrogels exhibited a 61–79% bacterial growth reduction after 24 hours, with Cel-lig 70:30 + molecule BER emerging as the most promising formulation for CL wound management. A wound patch prototype was subsequently developed by adhering Cel-lig 70:30 + molecule BER onto a textile support. The final patch exhibited multiple therapeutic benefits, including supporting human fibroblasts and endothelial cell growth, antibacterial activity against multi-drug-resistant hospital isolates, eradicating established biofilms, absorbing wound exudates via swelling mechanisms, and reducing inflammation, especially interleukin-6 and TNF-α, to promote wound healing. These findings demonstrate the potential of SCB-derived biopolymers for advanced wound care applications, particularly in resource-limited settings affected by CL.

Keywords: Biopolymers, Lignin, Tissue engineering, Sugarcane Bagasse, Wound Care

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Ministry of Tertiary Education, Science and Research

Study of the coagulating capacity of different parts of Calotropis gigantea in the manufacture of paneer cheese

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Abstract:

The study investigated the optimal coagulation conditions for the production of paneer cheese using fresh aerial organs of *Calotropis gigantea* as a natural coagulant. The coagulation time and cheese yield were evaluated based on varying doses of coagulant prepared from leaves, stems, and their combination. Results showed that the coagulation time decreased significantly with increasing doses of coagulant, reaching as low as 2 minutes at doses of 35–40 g/L, with the combination of leaves and stems being the most effective. Cheese yield analysis revealed that the combined use of leaves and stems yielded up to 18.12%, surpassing yields from stems (17.67%) or leaves (17.23%) alone. Optimization of the leaves-to-stems ratio highlighted that a mixture with 90% stems and 10% leaves achieved the highest yield of 19.15%, demonstrating the superior coagulating activity of stems. Physicochemical characterization of milk, cheese, and whey revealed slight pH increases in cheese (6.97–7.04) and acidity increases in whey (19–20 °D) after coagulation. These results confirm the effectiveness of *C. gigantea* as a natural coagulant, supporting its use as a sustainable and efficient alternative to industrial coagulants in traditional cheese-making processes.

Keywords: *Calotropis gigantea*, Natural coagulant, Paneer cheese.

Ministry of Tertiary Education, Science and Research

How cafeteria manage food waste? Case study in a local University setting

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Abstract:

The food service sector contributes significantly to food waste. This study attempts to determine the amount, types and causes of food waste in a university cafeteria. It also explores tertiary students' knowledge, attitude and practices regarding food waste. The amount of waste generated both in the kitchen and in the service area by students were collected and weighed on 10 different days. A face-to- face questionnaire was administered to 150 students to explore their knowledge, attitude and practices on food waste. The data collected was analyzed by Statistical Package for Social Sciences version 26.0. The average amount of food waste generated in the cafeteria kitchen was 14.06 kg (SD ± 2.82) per day. Main types of food waste in the kitchen were potato peels followed by cabbage leaves, carrot peels, fish skin and cucumber peels. The amount of food waste generated by the students using the cafeteria was 16.2 kg (SD ± 3.61) per day. The main foods discarded by students were rice followed by noodles, bread, soya beans and eggs. About 73% of the students were quite/very concerned about food loss and food waste. 61% of the respondents were knowledgeable that SDG 12 addressed sustainable consumption and production. According to the students, the top three main causes of food waste were: expiry date (71.3%), loss of freshness and visual appearance (68%) and improper storage (56.7%). The main drivers of food waste reported by the tertiary students were lack of awareness about food waste (88%) and taste of food (51%). Overall, the students had a positive attitude towards FLW (mean score of 4.14 out of 5 and SD ± 0.687). The mean score for correct practices of students towards FLW was 58%. 84% of the participants checked the date marking before purchasing foods while 75% of the students did not purchase more food than they can finish. Less than 50% used leftovers meals, practiced composting or brought excess food home. There was a significant positive correlation between the mean score of attitude and practices of the students on food loss and waste (spearman's rho value= 0.494, p value= 0.000). Cost of foods and environment implications of food waste motivated students to reduce food waste. 83% of the students stated that everyone had responsibility to address food waste while only 5% mentioned that students had a role in it. The measures proposed by the students to reduce food waste in the cafeteria were awareness campaigns on food waste and control of portion size of foods served. In order to handle food waste effectively, there is a need of an ongoing improvement of knowledge and awareness related to waste management in a sustainable way, thus leading individuals to turn their attitude into positive action. The cafeteria should also review portion sizes and adopt segregation of food waste for composting.

Keywords: Food waste, University cafeteria

Ministry of Tertiary Education, Science and Research

Development and characterization of advanced and sustainable composite discs reinforced with coconut fibres for enhanced abrasive resistance in surface polishing application

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Abstract:

Polishing is one of the most important steps manufacturing since all products need to be aesthically acceptable. The existing polishing tools on the market are predominantly made from conventional materials such as metals and plastics which normally possess a higher carbon footprint given the energy-intensive processes required in the raw material extraction, production and disposal stages. Moreover, the current polishing discs on the market, are single-use products and their poor disposability poses a major waste disposal issue and, consequently, a threat to the environment [1]. The use and disposal of these polishing discs are not regulated or controlled and much information on their utilization is not available through their disposal is thoroughly detrimental to the environment and clearly not sustainable. Moreover, they are not produced locally but rather imported from abroad. With the growing issue of poor waste management, the need for alternative, greener and recyclable products like the eco-friendly polishing disc is key to alleviate the environmental impact caused by our modern society. This study is focused on the development of advanced and sustainable composite discs reinforced with coconut fibres for enhanced abrasive resistance and optimal surface polishing which can be used for all polishing processes in the manufacturing industry. Both the durability and performance of the developed disc and its polishing ability were thoroughly evaluated by considering the GelSight and the Taylor Hobson Surtronic 3+ devices respectively. From test results, the 5% NaOH-treated fibres were found to exhibit the highest tensile strength of 39.63 MPa. The corresponding DIC analysis, which revealed a maximum strain of 75.51, demonstrated an effective fibre-matrix adhesion. The composite disks, particularly those treated with 5% NaOH and 15% fibre content, achieved a low surface roughness (R_a value of 0.39 μm), outperforming conventional sandpaper across various grades. The DSC analysis indicated a glass transition temperature (T_g) of 85.1°C, suggesting robust thermal stability suitable for polishing applications. The findings of this study clearly demonstrate the potential of utilizing coconut fibre-reinforced composites as an alternative reinforcement component in advanced composite material owing to their notable physical and mechanical characteristics. Furthermore, being a renewable and biodegradable material, the environmental benefits of using coconut fibres underscore the high significance and potential of this study to promote sustainable practices in industrial polishing applications.

Keywords: Coconut fibres, Abrasion resistant, Polishing discs, Renewable, Recyclable, Sustainable

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National Research Week 2025

Uniting Research, Industry and Innovation

Ministry of Tertiary Education, Science and Research

PRESENTATIONS
(Parallel Session 2 – Silver Economy)

VENUE
Lecture Theatre 2, New Academic Complex,
University of Mauritius

Ministry of Tertiary Education, Science and Research

Assessing the impact of an ageing population on economic growth – The case of Mauritius

Presenter: Ms. Kilvanee Mootooperian
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Abstract:

Demographic changes have been a major concern for many countries. Marked by a low fertility rate and increased life expectancy, various economies are witnessing an ageing population. This transition brings both opportunities and challenges. On one hand, it implies advancements in healthcare and living standards. However, it also presents social and economic problems, including a rise in the need for long-term care systems, pensions, and healthcare services. The current work attempts to assess the impact of ageing population on economic growth in the Mauritian context. The paper implements a vector error correction model (VECM) to test the linkage where the findings confirm the negative and significant impact of ageing population on the Mauritian economic growth. The results from the VECM further conclude the positive significance of trade, gross enrolment and government expenditure towards the country's GDP. The observation from the impulse response function of economic growth to the impact of the ageing population shows a rise in the initial stages followed by a sharp decline, until it finally stabilises. Lastly, the diagnostic test validates the use of the model in the ageing population-economic growth nexus for the Mauritian economy.

Ministry of Tertiary Education, Science and Research

Transdisciplinary research approaches for economic growth and resilient future through strategic health tax planning

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Abstract:

Mauritius as a developing country has a rather high prevalence of Non-Communicable Diseases such as Diabetes, Hypertension, Obesity leading to complications such as Myocardial infarction and Cerebro-vascular accidents. The government has implemented taxes on tobacco and alcohol. More recently, since 2018, an excise tax on the sugar content of sugar sweetened products was introduced. There is a scarcity of research undertaken in Mauritius to guide and/or to evaluate tax policy implementation. The authors aim to foster transdisciplinary research approaches for the implementation of evidence-based health taxation policies in Mauritius. The presentation bears the following objectives: (1) To shed light on the current taxation of harmful and unhealthy products in Mauritius, (2) To showcase country successes in the implementation of strong health tax policies, and (3) To discuss the need for capacity-building for transdisciplinary research to guide health tax policy development in Mauritius. This presentation is based on desk research as the method of gathering information and insights. Information collected include current taxation policies on alcohol, tobacco and sugar sweetened products in Mauritius and other specific countries. Qualitative data analysis was performed and synthesized for presentation with scientific evidence being put forward. The presentation will address the health tax policies in Mauritius and the health taxation programmes implemented in countries leading in the field of health taxation. Assessment of needs for capacity-building for research about health economics and health taxation will be discussed. To conclude, the authors highlight the need to sensitize academia and other stakeholders on the need for transdisciplinary research to guide health tax policy development in Mauritius.

Keywords: Transdisciplinary research, Health taxes, Public health, Revenue generation

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Ministry of Tertiary Education, Science and Research

Identification of marine diatoms in the photic zone of Bel Ombre lagoon, Mauritius for forensic use

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Abstract:

Diatoms are referred to as the cardinal key in water-related deaths and are reliable forensic indicators in providing evidence to drowning cases and water-related crimes in several countries (Jakhar et al., 2015: Vinayak, 2010; Pal et al., 2017, Scott et al., 2017, Zhou et al., 2020). The species richness and diversity characteristic of diatoms when coupled with the resilient nature of their siliceous cell wall, the frustule, renders diatoms ideal for forensic application. The diatom test for diagnosis of drowning assumes that if valid cardiorespiratory activity occurs, diatoms reach the lungs through liquid inhalation and disseminate via the bloodstream into organs and tissues (Pollanen, 1998). Thus, detecting diatoms in organs and tissues may help in distinguishing genuine drowning cases from postmortem submersion. Additionally, taxonomic comparison of diatoms in the putative drowning medium and the victim's organs can assist in determination of the drowning site because diatom diversity changes spatio-temporally. Currently, the diagnosis of drowning cases in Mauritius is restricted to traditional autopsy findings of cadavers, on the basis of confessions, witness reports and/or circumstantial evidence and without the ability to distinguish between immersion or submersion. To shift from traditional autopsy finding to scientific/evidence-based findings for the diagnosis of drowning cases and analysis of aquatic crime scenes in Mauritius, there is a need to generate baseline forensic diatomological data. However, the existing studies carried out on diatoms in Mauritius have been limited to very few regions of the island only and mostly associated to density and diversity of microplanktons including diatoms. Conducting a comprehensive diatomological mapping of Mauritian waters is the first step to address the existing limitations in the forensic use of diatoms as bio-indicators in drowning cases in Mauritius. The general objectives of our study are to: analyse the trend of drowning cases reported since 2013 in view of identifying potential drowning hotspots in Mauritius, gather baseline data regarding abundance and diversity of diatoms for diatomological mapping of Mauritian coastal waters to develop standard operating procedures for diatom recovery in questioned cases. The abundance, distribution, and spatio-temporal variations of diatom species are monitored. Here, we present comprehensive data on marine diatoms of Bel Ombre, a touristic destination found in the South-East region of the island that has registered eleven drowning cases from 2013 to 2023. Samples have been collected from Bel Ombre lagoon using plankton nets and processed using standard protocols and identified using microscopy through morphological and texture descriptors, with appropriate keys and through accessing curated databases. A total of 33 different species belonging to 14 families were identified at Bel Ombre, with pennate diatoms being more diverse and abundant than centric diatoms. Navicula sp, Amphora sp and Cocconeis scutellum are the species of high abundance at Bel Ombre. Our findings will contribute towards building a reference dataset when assessing diatoms recovered forensically from body tissues of corpses through the implementation of the diatom test.

Keywords: Drowning, Forensic diatomology, Diatomological mapping, Diatom diversity, Mauritius

Ministry of Tertiary Education, Science and Research

Universal coverage, user's fee and health outcomes in Nigeria: Case study of HIV/AIDS

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Abstract:

There is no doubt that the pattern of health care financing mechanism impacts on household welfare and national health outcomes. In climes with poor social health insurance mechanism, the individuals will be forced to pay for their health services through out of pocket. Out of pocket health expenditure does not guarantee financial risk protection and could push many into poverty. In this study, the impact of out-of- pocket expenditure on Nigerian health outcomes was examined using annual time series data covering the period (1995-2019). The data was obtained from various sources prominent among which is the central Bank of Nigeria statistical bulletin and World Bank development indicators. The study utilized various techniques in order to obtain robust outcome. The augmented Dickey Fuller test shows that the variables have mean reversion. Health outcome was proxy with HIV prevalence. The pair wise Granger causality could not trace any causality from any of the regressors to HIV prevalence. The long- run co-integrating equation shows that out of pocket as a proportion of total private health expenditure and total health expenditure did not significantly drive HIV prevalent rate. The short-run parsimonious ECM evidence the same finding. The study recommends that there is need to broaden our study of HIV in order to be able to proffer recommendations that will redress the menace.

Keywords: Out of pocket, Health outcomes, HIV, Co-integration and ECM

National Research Week 2025

Uniting Research, Industry and Innovation

Ministry of Tertiary Education, Science and Research

PRESENTATIONS
(Parallel Session 3 – Circular Economy)

VENUE
Paul Octave Wiehe Auditorium

Ministry of Tertiary Education, Science and Research

Sensitivity analysis of different data sizes for the most accurate forecast of solar power in Mauritius using a deep learning LSTM technique

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Abstract:

Mauritius has tremendous potential to harness solar energy, and the country is witnessing a rapid increase in the installed capacity of photovoltaic (PV) energy systems. Accurate future forecasts of solar power are urgently required for efficient resource allocation, reliable and stable power supply, better planning and distribution of electrical power, reducing substantial economic losses and mitigating climate change and global warming. Therefore, this study contributes to the achievement of SDGs 7 and 13. There is an urgent need to prioritise future forecasting instead of testing set predictions, due to its real-life implications for society. Future forecasting is significantly different and comparatively more challenging than testing set predictions. Studies related to future forecasting are severely lacking in the field of solar energy. Hence, this work seeks to contribute to the scarcity of research in identifying the optimum data size by employing a deep learning Long-Short Term Memory (LSTM) technique with different data lengths for one-week ahead forecasting. High-quality ground-based measurement Global Horizontal Irradiance (GHI) data is gathered every hour for the period 01 January 2023 to 31 December 2023 from a PV station located in Albion, Mauritius. Stationary and normalised data are used to enhance the accuracy of forecasts. Forecasts are performed for four different data durations of 6 months, 8 months, 10 months and 12 months (1 year). The main objective of this study is to therefore examine the sole effect of different data sizes for future GHI forecasts by preserving the same hyperparameters selection and maintaining a fixed forecast horizon of 1 week. This work implements the LSTM technique for hourly GHI forecasting. The LSTM network architecture is comprised of the input layer, LSTM layer, fully connected layer and regression layer. Model training is executed with 250 hidden units, 120 epochs, a learning rate of 0.005 and a gradient threshold of 1. The closed loop forecasting method is used for multi-step ahead GHI forecasting over a forecast horizon of 1 week. This approach uses previous GHI predictions as input. From the results obtained, the general observation is that larger data sizes tend to negatively impact the forecasting accuracy of the LSTM model. The performance evaluation revealed that the most accurate data size for future solar power (GHI) forecasting is for 6 months, resulting in values of 0.96 for correlation coefficient (r), 61.94 W/m^2 for Mean Absolute Error (MAE), 90.06 W/m^2 for Root Mean Square Error (RMSE) and 7.90 % for normalised Root Mean Square Error (nRMSE). This inference is applicable for basically any location in Mauritius. By obtaining forecasts ahead of time (beforehand), grid operators such as Central Electricity Board (CEB) and PV system managers are provided with useful and valuable information, aiding in mitigating or even preventing the existence of emergency situations, like power outage or blackout in the country.

Keywords: Solar power, Future forecasting

Ministry of Tertiary Education, Science and Research

Driving sustainable energy transitions in sub-Saharan Africa: A DOI analysis of Kenya and Mauritius

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Abstract:

Sub-Saharan Africa (SSA) possesses vast renewable energy (RE) potential including solar, wind, hydro, biomass and geothermal; yet many countries remain energy deprived, with over half the population lacking access to affordable and reliable electricity (UN Sustainable Development Group, 2025). Overreliance on fossil fuels, overdependence on biomass for energy and inefficient energy systems hinder economic development, limits industrial growth and worsens environmental degradation. Transitioning to RE is critical to enhance energy security, drive sustainable economic progress, and meeting global climate obligations such as the United Nations Sustainable Development Goals (SDGs) and Agenda 2063 of the African Union (AU). Presently, less than 20% of African countries aim for universal electricity access by 2030, while 45% have less ambitious goals than those outlined in SDG 7 (IEA, 2023). Kenya and Mauritius present successful case studies of how a systematic and well-regulated approach to RE adoption can support sustainable development and provide insights for SSA nations. This study applies Rogers' (1962, 2003) Diffusion of Innovation (DOI) framework through a qualitative analysis of policy documents and case study methodology to examine patterns and drivers of RE uptake. Both countries are identified as innovators, having implemented progressive policies, strong institutional frameworks, and significant RE investment. Their success is attributed to policy consistency, innovative financing, stakeholder engagement, demonstration projects, and local adaptation. However, SSA countries still face barriers such as infrastructure limitations, economic constraints, technical capacity gaps, social acceptance issues, and fossil fuel dependencies. To overcome these challenges, nations must adopt balanced policy portfolios, phased implementation strategies, hybrid energy systems, regional cooperation, and adaptative governance frameworks. Kenya and Mauritius demonstrate how integrating circular economy principles (resource efficiency, technological innovation, and decentralised energy solutions) can drive sustainable energy transitions, serving as blueprints for the region. Limitations include data constraints which may affect the depth of analysis and the diverse nature of policies across the region making direct comparisons challenging. Future research should foster data accessibility, assess long term policy impacts and explore emerging technologies such as concentrated solar power plants and green hydrogen to advance RE transitions.

Keywords: Renewable energy, Diffusion of Innovation, Sub-Saharan Africa, Energy transition, Circular economy, Sustainable development

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Ministry of Tertiary Education, Science and Research

Optimising renewable energy integration and grid stability in Southern Africa: A Case for interconnected power pools and circular energy systems

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Abstract:

The energy transition across Africa is gaining momentum, with countries seeking to harness renewable energy sources such as solar, wind and hydro to decarbonise their electricity sectors. This research explores the technical and strategic integration of renewable energy into interconnected power pools, with a focus on the Southern African Power Pool (SAPP). To address the challenge of renewable intermittency and grid reliability, the study develops a model that optimally combines variable generation with energy storage, enhancing system resilience. For Mauritius, which is steadily expanding its clean energy ambitions, insights from the SAPP region offer a valuable lens for adapting large-scale grid strategies to national contexts. The integration of Battery Energy Storage Systems (BESS), grid reinforcement and coordinated operational planning emerges as a powerful combination for managing variability and strengthening stability. The study adopts a mixed-methods approach: simulations to be conducted using DIgSILENT will focus on transient stability indicators; Critical Clearing Time (CCT), Rate of Change of Frequency (RoCoF) and voltage behaviour under high renewable penetration scenarios, while qualitative analysis will explore regulatory frameworks, policy environments and market readiness across the SAPP region. To ensure the relevance and practicality of applying such strategies, the research explores how renewable energy and storage technologies can be adapted, with particular emphasis on the cost of implementation, potential investment needs and long-term benefits. Beyond the technical dimension, the findings are expected to point at the critical role of competitive electricity markets and regional balancing platforms in supporting grid flexibility. Well-designed market structures complement engineering solutions by enabling resource-sharing, efficient dispatch and system-wide coordination across borders. However, the research is limited by data availability across member states and the simplifications inherent in modelling large interconnected systems, which may affect the generalisability of the results. By drawing on experiences from interconnected grids in Southern Africa, the work contributes a scalable framework for renewable energy integration that aligns with circular economy principles. For Small Island Developing States (SIDS) like Mauritius, the outcomes offer practical insights into building power systems that are low-carbon, resilient and capable of supporting sustainable growth.

Keywords: Transient stability, Renewable energy integration, Grid flexibility

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Ministry of Tertiary Education, Science and Research

ECOBrix: Sustainable brick manufacturing using cement, recycled plastic, and glass in Mauritius

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Abstract:

Modern society is highly consumer driven, with daily activities generating significant waste, including plastic and glass materials. In Mauritius, plastic and glass waste management remains a challenge, with a significant portion of these materials entering landfills or the ocean. According to the MCCI report, there are 116,000 tons of plastics thrown away, but only 3,000 tons are recycled, and for glass, there are about 16,000 tons of waste, but only 300 tons are recycled. The decomposition time of white glass exceeds 4,000 years, making it critical to find sustainable recycling alternatives. Discarded glass bottles often cause injury to waste collectors and the general public because of improper disposal. Improper waste disposal contributes to environmental pollution and affects both terrestrial and marine ecosystems. With the increasing focus on sustainable development, recycling initiatives are crucial for mitigating these adverse effects and promoting a circular economy. This study aims to explore the reuse of recycled plastic and glass bottles in the production of small bricks, reducing waste accumulation while contributing to environmentally friendly construction materials. Previous studies have demonstrated the feasibility of incorporating industrial and household waste into construction materials. This study investigates the production of sustainable bricks, ECOBrix, using a combination of cement, crushed recycled plastic, and glass. The primary objective is to determine the optimal material proportions that balance the structural integrity with environmental benefits. Experimental testing was conducted to analyze the physical and mechanical properties of the bricks, including absorption, compression strength, and warpage, to ensure compliance with construction standards. The best-performing mixture ratio was found to be 300g plastic, 400g glass and 600g cement, with ½ volume of water to produce a brick of size 22 × 12 × 6 cm, and costing around Rs16 to produce. Compared to normal bricks, ECOBrix is 30% lighter and supports a load of 754KN which is 8% more than that of normal bricks.

	EcoBrix (cement+ plastic+glass)	Classic (Cement+Maca damRocksand)	Summary
Production cost	Rs 16.00	Rs 10.00	EcoBrix is 60 % more expensive to produce
Density	1800 kg/m^3	2250 kg/m^3	EcoBrix is 30% lighter
Load	754 kN	700kN	EcoBrix can sustain 8% more load
Water absorption	2.8 Kg to 2.815 Kg	4.0 kg to 4.2 kg	EcoBrix absorbs 0.5% water Classic 5%

The adoption of this technology in Mauritius presents an opportunity to raise awareness regarding recycling and the potential for waste transformation. By integrating recycled glass and plastic into construction materials, Mauritius can reduce landfill dependency, lower CO_2 emissions, and contribute to a green future. This initiative aligns with global sustainability efforts and offers practical applications for the efficient management of solid waste.

Ministry of Tertiary Education, Science and Research

From waste to resilience: Developing eco-friendly flood barrier using repurposed tires

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Abstract:

Flash floods triggered by intense rainfall over short periods represent a growing threat to infrastructure, ecosystems, and communities worldwide. These sudden high-energy water surges can overwhelm conventional drainage systems, leading to severe property damage, displacement, and even loss of life. Because climate change increases the frequency and severity of extreme weather events, there is an urgent need for sustainable and cost-effective flood mitigation solutions. An innovative approach involves repurposing discarded tires, which are major environmental pollutants, into modular flood barriers. Used tires pose significant ecological challenges because of their non-biodegradable nature, taking approximately 80-100 years to decompose. Instead of allowing these tires to accumulate in landfills or contribute to pollution, this project transforms them into functional high-performance flood barriers.

The proposed solution plan is to recycle tires into durable rubber sheets with a thickness of 1 mm, which are engineered to provide adjustable flood retention levels ranging from 30 cm to 1 m. These barriers are designed into modular segments ranging from 3m to 9m in length that can be seamlessly connected using reinforced fasteners, allowing for rapid deployment and scalability. An integrated weight ballast system ensures stability and prevents displacement under strong hydrodynamic forces during floods. Research by Prof. Duong at the National University of Singapore (NUS) estimates the production cost to be just $7 per square meter, making it a highly competitive alternative to traditional flood barriers. To show the proof of concept, a prototype was manufactured using PVC, which costs Rs3,000 for 3m. The prototype was tested at Ebène Recreational Park to evaluate the system's real-world performance, including hydraulic resistance and ease of installation. The figure below illustrates the success of this phase, which will pave the way for large-scale manufacturing and deployment in flood-prone regions.

The flood barrier system repurposes recycled tires into durable 1 mm-thick rubber sheets, which are formed into modular panels. These panels can be quickly connected using reinforced fasteners to create a continuous barrier. A built-in ballast system, filled with lead, stabilizes the barrier against strong flood currents. This design enables rapid deployment, effective floodwater retention, and reusability. Beyond flood prevention, this initiative addresses critical waste management challenges by converting an environmental liability into a valuable resource.

Keywords: Flash flood mitigation, Tire recycling, Modular flood barriers

Ministry of Tertiary Education, Science and Research

From leaf to package: Sustainable production of egg cartons using dry leaf fibre-based paper

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Abstract:

The accumulation and improper disposal of dry leaves present pressing environmental challenges, contributing to landfill overflow and methane emissions; greenhouse gases are 25 times more potent than CO^2 and pest proliferation. To address these issues, this project develops a sustainable alternative to conventional paper production by transforming dry leaves into high-quality biodegradable paper specifically designed for egg carton manufacturing. This innovation directly tackles two critical problems: the environmental harm caused by wood pulp-based paper production, which accounts for 14% of global deforestation, and underutilization of agricultural waste.

Building on traditional paper-making techniques, our process involves four key stages: (1) collection and cleaning of dry leaves to remove contaminants, (2) pulping using an energy-efficient mechanical process, (3) sheet formation with natural binders to enhance durability, and (4) drying under controlled conditions. The resulting material met the standards for packaging paper, with a tensile strength suitable for egg carton production. Crucially, this method eliminates the need for chemical bleaching, reducing water pollution by 90% compared with conventional paper mills.
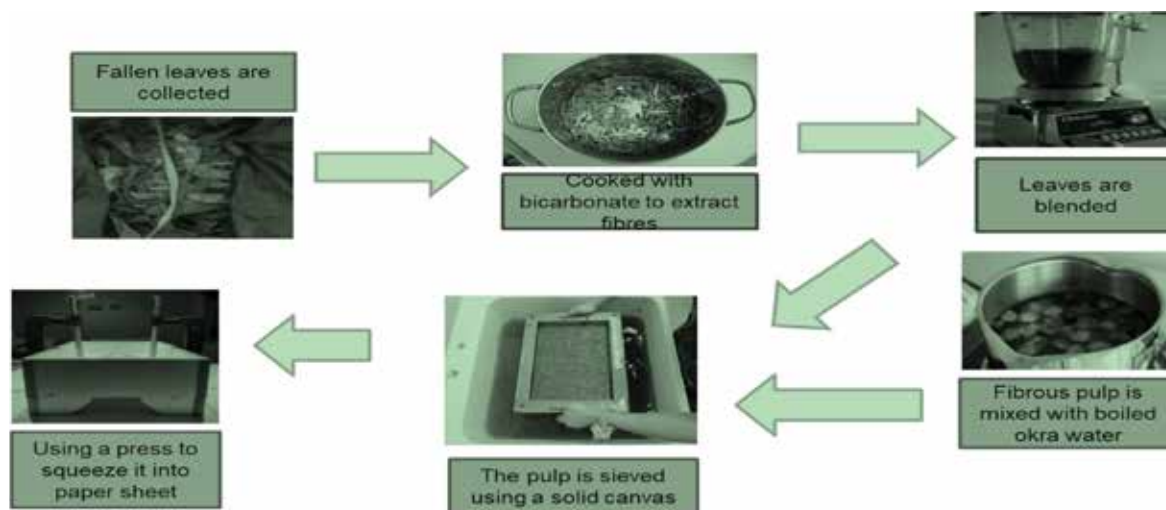
Figure 1: Paper making process from dry leaves

Environmental benefits are substantial, as they divert 30 tons/month of leaves from landfills. It Cuts methane emissions by 0.5 metric tons CO2-equivalent per ton of leaves processed. Economic analysis demonstrated viability, with production costs of Rs2 to Rs4 for one sheet of A4 paper. The process effectively scales from community-level operations to industrial production, creating green jobs in waste collection and processing.

Ministry of Tertiary Education, Science and Research

Development and characterization of a fully biodegradable polylactic acid (PLA) composite reinforced with *Pandanus utilis* fibres

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Abstract:

Advanced composite materials such as carbon fibre reinforced plastics (CFRP) and glass fibre reinforced plastics (GFRP) are being increasingly used in a wide range of engineering applications owing to their enhanced material efficiency in terms of a high strength-to-weight ratio [1,2]. However, one main challenge that still remains presently unsolved by the use of composite materials such as CFRP, GFRP and natural fibre reinforced composites (NFRC), are their reduced recyclability and poor disposability attributes at the end of their service lifetime [3]. This study proposes the development of biodegradable composites derived from natural sources for use as alternative materials in construction in order to address the issue of waste disposal while reducing the carbon footprint. The fully biodegradable natural fibre reinforced composite (NFRC) has been developed by considering fibres from a locally abundant species of Pandanus Utilis and polylactic acid (PLA) polymer will be used as matrix material. In first part of this study, the mechanical characteristics of the biodegradable composites, namely their flexural and tensile strengths were evaluated on the Universal Testing Machine (UTM). In the second part of the study, the fracture patterns in the biodegradable composites were further investigated by considering the Digital Image Correlation (DIC) method. The correlation of the aforementioned evaluation results was conducted to validate the structural performance of the developed composite material in the first place and secondly to shed light into the underlying mechanism leading to fracture in the material. A biodegradability test was conducted via the soil burial test to investigate the degradation of the composite specimens. The composite specimen with fibre length of 4 cm and percentage weight of fibre composition of 10 % displayed greatest flexural strength of around 110 MPa. In terms of tensile strength, the highest performance in the composite specimens was observed at a percentage weight of fibre content of 10 %. Moreover, from the results of soil burial test, the composite specimens with the greatest weight percentage of fibre content of 15 % were found to exhibit greatest mean percentage of mass loss ranging between 1.25 and 1.60 %. This study has shown that biodegradable composites have great potential for replacing synthetic-based composites given their satisfactory mechanical attributes as well as their notable biodegradability traits. The results of this research study will benefit the design of advanced biodegradable composite structures for application involving high strength-to-weight ratio materials while meeting the criteria for sustainable development and end-of-life cycle management.

Keywords: Natural Fibre Composites, *Pandanus Utilis*, Polylactic Acid (PLA), Biodegradable, Digital Image Correlation (DIC)

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Ministry of Tertiary Education, Science and Research

Investigating the mechanical and thermal performance of eco-friendly thermal insulation boards manufactured from *Pandanus utilis* fibres reinforced composites

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Abstract:

The conventional materials used in the construction building industry in tropical countries, namely concrete and corrugated metal roofing sheets, have notable drawbacks of having poor thermal insulation thereby limiting the human comfort inside buildings [1]. Moreover, with rising freight costs, these materials are becoming more costly to procure while also having poor sustainability attributes due to high carbon footprint, poor recyclability and environmental impacts among other factors. This study was therefore conducted to develop an alternative and a more sustainable option for roofing materials for construction building in Small Island Developing States (SIDS) by considering epoxy composites reinforced with *Pandanus Utilis* fibres. *Pandanus Utilis* fibres are an endemic and abundant plant species in the Mascarene islands. However, their use for development of thermal insulation boards has not been well documented in literature and this study was initiated to address this gap.

To achieve the set targets in this study, the natural fibre reinforced composite (NFRCs) specimens were fabricated in accordance with the corresponding ASTM standards for each test specification. Natural fibres, which have been extracted from the leaves of *Pandanus Utilis,* were subjected to an alkaline treatment to enhance their surface adhesion characteristics as well to improve their mechanical properties. Prior to the thermal conductivity test and mechanical characterization tests on the 3-point bending test equipment and in tensile test mode, chemical characterization of the fibres via Fourier Transform Infrared Spectroscopy (FTIR) was conducted. Other physical attributes of the composite specimens were investigated via the water absorption and Differential Scanning Calorimetry (DSC) tests. Additionally, the contactless Digital Image Correlation (DIC) technique was used to determine the strain variation along the length of the composite specimens in tensile test mode.

The thermal conductivity test results showed that insulation performance tend to increase with an increasing weight percentage of fibre content and the best result was obtained in composite specimens having a 15 wt. % of fibre content and a fibre orientation of 45°. Moreover, the greatest percentage of water absorption was observed in specimens having a higher percentage of fibre content as the amount of water intake tends to increase over time through the central hollow section of the fibre structure. In terms of mechanical performance, the tensile test results were found to be largely affected by both the orientation and weight percentage of fibre content within the composite specimen. Optimal performance was observed in test specimens having a fibre orientation of 45° and fibre content ranging between 10 and 15 %. From the DIC test results, defects such as poor interfacial strength, void formation and trapped air bubbles, all linked to the manufacturing process, have been assumed to result in the distinct regions of elevated von Mises strain concentration in the composite specimens.

The promising mechanical and thermal insulation performance observed in this research investigation, have proved that epoxy composites reinforced with *Pandanus Utilis* fibres have great potential for developing advanced & alternative roofing materials with enhanced sustainability attributes.

Keywords: Natural fibre composites, *Pandanus utilis*, Thermal conductivity, Insulation, Digital image correlation

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Insects Biomanufacturing - Black soldier Flies (Hermetia illucens) in the new research-based industry landscape

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Abstract:

This abstract explores the cultivation of black soldier flies, from larvae to pupae, within large-scale industries, emphasizing genetic modifications to ensure their safety for the general population (Remaury, C., et al. (2022); Diener, S., et al. (2011)). These pupae efficiently consume a vast array of human waste products, including rotten food, meat, vegetables, and carrion, thereby contributing to a cleaner environment. They are then harvested in large quantities, dried, and processed into powder. This process effectively reduces human waste and harmful gases like methane, mitigating potential climate disasters. The resulting products are converted through evaporation into inorganic and harmless organic materials suitable for animal feed, fertilizers, and other industrial raw materials (Li, Q., et al. (2020); Yen, A.L. (2005)). The process facilitates the creation of large industries and employment opportunities, aligning with the 17 United Nations Sustainable Development Goals (SDGs), particularly in combating pollution and promoting cleaner air with reduced greenhouse gas emissions. Insect biomanufacturing, particularly with black soldier flies, offers sustainable waste management by converting organic residues into valuable biomass, reducing methane emissions and aligning with circular economy principles. Ongoing research explores genetic modifications to enhance waste degradation and valorization, supporting the development of bio industrial applications (Phelps, D.G. (1997) that contribute to global sustainability goals. Researchers are still gathering data on other benefits of insect biomanufacturing, potentially unlocking additional organic biomolecules, including industrial enzymes, lipids, and fertilizers (van Huis, A. (2013)). This study's implications suggest that integrating biomanufacturing technologies can significantly reduce landfill waste and sequester substantial amounts of CO_2-equivalent through methane reduction. Furthermore, the conversion of waste into biochar and bioenergy supports sustainable development goals by fostering innovation, creating jobs, and providing affordable energy alternatives. This could bridge research, academic endeavors, scientific innovations, mass production, and the business and sales of organic materials, potentially attracting trillions of dollars to the insect biomanufacturing industry and generating jobs in this emerging sector.

Keywords: Insects biomanufacturing, black soldier flies, SDGs

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Ministry of Tertiary Education, Science and Research

Explainable artificial intelligence in 6G networks: A review and future directions

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Abstract:

As cities move towards sustainable urban planning guided by circular economy principles, there is an increasing demand for digital infrastructures which are intelligent, transparent and accountable. 6G is expected to enable this transition by supporting high-speed, low-latency connectivity, massive-scale automation, and real-time data-driven decision-making across urban systems. To achieve this, Artificial Intelligence (AI) will be leveraged to manage complex tasks such as resource optimization, traffic control, and infrastructure monitoring [1]. However, its opaque decision-making raises concerns about trust, reliability, and ethics. Explainable AI (XAI) addresses these issues by making AI outputs transparent and understandable [2]. Recent research on XAI in 6G networks has focussed on various domains, such as network control, resource management, fault detection, and cybersecurity. However, a critical review revealed that many existing approaches are conceptual and there is a lack of rigorous benchmarking against established methods. Additionally, the experiments were conducted in controlled and small-scale environments which do not reflect the conditions and scale of actual network architectures. It is further noted that there is limited discussion on how explainability impacts performance, user trust, or real-time deployment feasibility in 6G contexts. This review identifies these research gaps and outlines emerging directions, including the need for scalable, context-aware XAI models, integration with edge computing, and standardization efforts for explainability metrics. Addressing these challenges is essential for the development of responsible and transparent AI systems in future 6G networks.

Keywords: 6G, Explainable AI (XAI), Artificial Intelligence (AI)

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Ministry of Tertiary Education, Science and Research

Proposing a civil liability framework for climate change wrongs in the Republic of Mauritius

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Abstract:

Shifting climatic conditions present a significant challenge today, and the most evident changes highlight the ongoing struggles to address them. Scientific evidence overwhelmingly confirms that the increase in greenhouse gas (GHG) emissions leads to extreme weather patterns, biodiversity loss, and puts countless people at risk worldwide. For Small Island Developing States (SIDS) like Mauritius, these challenges are even more severe. The nation faces escalating threats such as flash floods, prolonged droughts, and coastal erosion, all of which endanger both the environment and the population. Although Mauritius has made international commitments under the United Nations Framework Convention on Climate Change (UNFCCC), the Paris Agreement, the Climate Change Act 2020, and the Environment Protection Act 2002, implementation remains a major obstacle. Economic development often takes precedence over sustainability, corporate accountability for emissions is lacking, and new climate laws remain largely unmonitored. The aim of this research is to fulfill the gap within Mauritius' legal and policy framework by analysing the role of civil liability in remedying climate change maladaptation. It critically evaluates the country's environmental and climate legislation and attempts to understand the dynamics of global climate litigation, including the feasibility of prosecuting both public and private defendants for climate damage. Using a mixed-methods approach, the study combines an extensive review of literature and policies with qualitative insights gathered from 20 semi-structured interviews with key stakeholders, including government officials, legal experts, civil society representatives, and academics, as well as a targeted survey. Furthermore, a dissemination workshop and a capacity-building session will be conducted for policymakers and affected communities to promote climate justice advocacy and enhance response mechanisms. A crucial part of this project is the attempt to evaluate climate damages in Mauritius, a niche area with lack of scientific information and limited financial resources. This research illustrates how civil lawsuits can fulfill the useful purpose of holding governments and corporations accountable for negligence. These will be used to propose a comprehensive approach to climate law for Mauritius that incorporates civil liability into climate governance so that environmental culprits can participate in both mitigation and reparative efforts. The objective of the research is to, among others, position civil lawsuits as a key tool for achieving climate justice, while strengthening Mauritius' response to climate change and ensuring its accountability in creating a more sustainable and resilient future for the island nation.

Keywords: Climate Change, Litigation, Mauritius

Ministry of Tertiary Education, Science and Research

Redesigning higher education through quality assurance for circular economy and social entrepreneurship

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Abstract:

This paper examines how higher education can be redesigned through quality assurance mechanisms to embed sustainability, circular economy principles, and social entrepreneurship. Anchored in international frameworks such as UNESCO's (2020) *Education for Sustainable Development* roadmap and the ENQA (2015) *Standards and Guidelines for Quality Assurance in the European Higher Education Area*, the study draws on scholarly contributions by Lozano et al. (2017), Mulà and Tilbury (2011), and Kirchherr et al. (2017) to promote transformative learning. It explores how integrating sustainability competencies into curriculum design, pedagogy, and institutional strategy fosters the transition toward circular and socially responsible systems. At the University of Mauritius, this transformation is supported by the institutional Quality Assurance Framework. One of the core methods employed is the Learning and Curriculum Framework (LCF), widely practiced across Faculties. The LCF provides a structured approach to aligning learning outcomes, graduate attributes, curriculum mapping, and assessment strategies. Through this method, transversal skills, digital competencies, and sustainability objectives are embedded into programme design while enabling continuous curriculum review. The LCF, along with review templates and evaluation tools, supports curriculum enhancement. Findings from a three-year programme vetting exercise involving over 300 programmes reveal strong alignment with the United Nations Sustainable Development Goals (SDGs). Approximately 30% of the programmes cover all 17 SDGs. The Faculty of Engineering leads in this regard, with all its programmes fully aligned to the SDGs. The most commonly addressed goals across the university include SDG 4 (Quality Education), SDG 8 (Decent Work and Economic Growth), SDG 9 (Industry, Innovation and Infrastructure), SDG 12 (Responsible Consumption and Production), and SDG 17 (Partnerships). Circular economy and social entrepreneurship principles are integrated across teaching, research, and innovation through interdisciplinary projects, hackathons, living labs, and industry-linked incubators. These initiatives promote solution-oriented thinking, sustainable design, and waste minimisation, while fostering the development of scalable, socially impactful enterprises. In conclusion, the University of Mauritius fosters a future-ready, quality-driven culture that empowers graduates to lead ethically and sustainably in a global context.

Keywords: Sustainability in Higher Education, Circular Economy, Quality Assurance, Learning and Curriculum Framework, Social Entrepreneurship, Transformative Learning, Sustainable Development Goals

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Ministry of Tertiary Education, Science and Research

Novel TVET Approaches for Circular Economy

Presenter: Dr. Premlata Kooshmi Ramtohul
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Abstract:

While topics that relate to circularity are increasingly being integrated in higher education, the role of Technical and Vocational Education and Training (TVET) in advancing circularity remain underexplored. In the era of sustainability-driven transformation, TVET represents a key mechanism for ensuring a skilled workforce for driving the Circular Economy (CE) transition. As industries shift from linear "take-make-dispose" models to regenerative systems that minimise waste and optimise resource use, TVET institutions must evolve to equip learners with occupation-specific skills, green competencies, frugal mindsets, and innovation mindsets in existing and emerging sectors.This paper draws on ongoing industry consultations, literature review, document analysis (including the *Roadmap and Action Plan for a Circular Economy in the Republic of Mauritius*), and continuing research conducted by the Human Resource Development Council (HRDC). The intersection of TVET, business innovation, frugal innovation, and social entrepreneurship offers a unique opportunity to drive sustainable economic growth. By integrating CE principles into competency-based training, TVET can empower individuals to develop business models that prioritise reuse, recycling, remanufacturing, and resource efficiency. TVET has a critical role to play in the evolution of circular approaches as their core strategies of closing material cycles and reducing waste hinge on processes are labour and skills-intensive. These processes include identifying the opportunity of CE, conceptualisation, design, repair, refurbishment, reverse logistics and advanced resource sorting requiring cross-sectoral collaboration between industry, policy, science and education, and civil society. As job roles evolve under circular models, so too must the skills landscape. Upskilling and reskilling through flexible pathways, including micro-credentials, (eco-/high-skills) apprenticeships, and digital training platforms, can ensure rapid responsiveness to industry needs. Innovations such as augmented and virtual reality can further enrich vocational training, offering immersive learning experiences aligned with real-world applications. Ultimately, TVET's ability to foster circular mindsets, technical know-how, and entrepreneurial leadership—grounded in practical exposure and strong industry linkages—positions it as a catalyst for systemic change. By embedding circularity as both a learning outcome and a vocational imperative, TVET can help make sustainability a standard practice across occupations and sectors. Strengthening institutional frameworks and collaboration between the government, the world of work, and training institutions can further enhance TVET's role in preparing learners to drive sustainable business solutions. Additionally, embedding practical exposure to CE principles, ideas and practices within curricula, deliver and practice ensures that learners gain firsthand experience in sustainable value chains and responsible production.

Ministry of Tertiary Education, Science and Research

Assessing the impact of policy frameworks on private investment in renewable energy in resource-abundant and resource-scarce economies in Sub-Saharan Africa: A systematic literature review

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Abstract:

This systematic literature review provides a comparative analysis of economies characterized by abundant natural resources against those with limited resource endowments. The study explores the complex ways in which regulatory frameworks influence private investment in renewable energy across 20 economies in Sub-Saharan Africa over the period 2014-2024. As the region struggles with energy issues, regulatory frameworks, tax incentives, and Feed-In Tariffs (FiTs) have become indispensable tools for encouraging investment in renewable energy. The assessment highlights the unique features of resource-rich economies such as South Africa, Nigeria, and Morocco, where a variety of renewable energy sources, such as wind, solar, and hydropower, are supported by stronger legislative frameworks. Morocco's aggressive solar projects establish it as a regional leader, while South Africa's vast solar potential and wind energy investment show efficient use of its resources. On the other hand, economies with limited resources, like Malawi and Chad, encounter particular challenges. Despite their potential for renewable energy, these countries frequently face challenges with inconsistent policy settings and a lack of financial resources, which deter private investment. Literature has emphasized how effective FiT and tax incentive implementation can pique interest and investment in these settings, frequently necessitating technology transfer and international assistance to get beyond regional obstacles. The analysis also looks at the economy-wide effects of the resource curse in countries with abundant natural resources, where reliance on fossil fuels might impede the switch to renewable energy sources. The review indicates that certain regulatory frameworks, such tax incentives and feed-in tariffs (FiTs), are essential for encouraging investment in renewable energy. FiTs provide investors with financial stability and revenue stream stability by guaranteeing regular payments to renewable energy producers for the electricity they provide. This incentivizes private investment in renewable projects. Through lowering initial capital costs and increasing return on investment, tax incentives such as credits and exemptions also lessen the financial burden on developers and increase the appeal of renewable energy projects to investors. The results indicate that in order to encourage private investment in renewable energy, it is crucial to resolve vested interests and provide favourable regulatory conditions. This systematic review of the literature advances knowledge on how customized policy frameworks might maximize renewable energy investment in Sub-Saharan Africa's various economic contexts. It provides information to stakeholders and policymakers on how to improve approaches that attracts private investment, encourage sustainable growth, and guarantee energy security in the area.

Keywords: Renewable Energy, Sub-Saharan Africa, Private Investment, Wind, Solar, Hydropower, Feed in Tariff (FIT), Technological Cost, Tax Incentive.

National Research Week 2025

Uniting Research, Industry and Innovation

Ministry of Tertiary Education, Science and Research

PRESENTATIONS
(Parallel Session 3 – Cultural Industry / Economy)

VENUE
Paul Octave Wiehe Auditorium

National Research Week 2025

Uniting Research, Industry and Innovation

Proceedings of the National Research Week 2025

Ministry of Tertiary Education, Science and Research

The potential of essential oils as natural antimicrobials to enhance the microbiological safety and quality of Ready-To-Eat chicken ham

Presenter: Mr. Leveen Bookhun
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Abstract:

Listeria monocytogenes is a major foodborne pathogen of public health concern. This pathogen can survive and proliferate in diverse environments due to its psychrotrophic nature, biofilm-forming ability, resistance to high salt concentrations and low pH. Ready-to-eat (RTE) foods are a staple in Mauritian diets and their contamination with L. monocytogenes poses a significant risk, particularly to vulnerable populations, as these products do not require further cooking. In Mauritius, the food regulations (2024) stipulate the absence of L. monocytogenes in 25 g of RTE food products. The food industry thereby relies on chemical preservatives during food processing to mitigate the potential growth of L. monocytogenes. Additionally, the food industry is actively seeking natural alternatives to synthetic preservatives to meet consumer demand for safer and more natural foods. This study investigated the antilisterial and potential listeriostatic activities of Rosemary essential oil (REO) and Spearmint essential oil (SEO) against L. monocytogenes ATCC 7644 spiked in RTE chicken ham stored at 4 ℃. A disc diffusion assay was conducted to assess the antilisterial activity of the essential oils (EOs), followed by broth dilution method to determine the Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC) both of which were established at 0.5% (v/v) for REO and SEO. Chicken ham samples were artificially contaminated with L. monocytogenes (~4 $Log_{10}CFU/g$) and subsequently treated with EOs at their MIC (0.5%). After seven days of refrigerated storage, REO reduced L. monocytogenes counts by 1.96 ± 0.02 $Log_{10}CFU/g$ ($p<0.001$) compared to untreated samples. SEO exhibited a stronger antimicrobial effect with an additional reduction of 1.76 ± 0.02 $Log_{10}CFU/g$ ($p<0.001$), resulting in a total reduction of 3.72 ± 0.02 $Log_{10}CFU/g$ ($p<0.001$). EOs treatment effectively extended the shelf life of chicken ham by approximately four days (2.33-fold) while stabilizing pH, indicating microbial growth suppression. Sensory evaluations revealed no significant differences in texture (6.40 ± 0.60) or colour (6.10 ± 0.64). However, aroma scores were higher for SEO (8.30 ± 0.98) compared to REO (8.00 ± 1.03). Overall, EO-treated samples were deemed organoleptically acceptable by the sensory panellists. The use of REO and SEO as natural alternative antimicrobial agents in chicken ham appears promising as they effectively inhibited L. monocytogenes and extended shelf-life at low concentrations. The findings of this study provide a foundation for further research on EOs applications in other RTE food products.

Keywords: Listeria monocytogenes; Essential Oil; Rosemary Essential Oil; Spearmint Essential Oil; Ready-to-eat; Chicken Ham; Mean Inhibitory Concentration; Mean Bactericidal Concentration; pH; Total Mesophilic Count; Sensory Evaluation

Ministry of Tertiary Education, Science and Research

Creative confidence in the age of AI: Engaging first-year students from web and multimedia development for sustainable innovation

Presenter: Mrs. Sandhya Gunness
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Abstract:

Background/Objective: This study explores the role of creative confidence - referring to one's perceived ability to generate creative ideas and act on them with creative self-efficacy (Beghetto & Karwowski, 2019) - for organising, planning and hosting a Transdisciplinary University-wide workshop on **Unlocking Emotional Intelligence and Future-Proofing** by first-year Web and Multimedia Development students. It examines how AI combined with transdisciplinary skills—such as openness, critical thinking, and collaboration—can empower students to navigate uncertainty, take creative risks, and align their work with Sustainable Development Goals (SDGs).

Methods: Having brainstormed, delegated tasks and responsibilities, and worked out logistics and finances for the workshop with generative AI assisting with ideas and formulation, 45 students participated in a reflective questionnaire and interactive activities (Choi et al, 2025) to assess their creative confidence, risk-taking attitudes, and adaptability in unstructured and rapidly evolving scenarios. Responses were analysed thematically to identify key patterns.

Results: Preliminary findings suggest that while students recognize AI's potential to enhance ideation and problem-solving, some experience self-doubt and over-reliance on AI tools. Those with higher creative confidence demonstrated greater engagement with SDGs, particularly demonstrating greater empathy, collaboration, and resilience.

Conclusion: Integrating creative confidence-building activities into transdisciplinary learning can strengthen students' ability to take creative risks, adapt to technological disruptions, and contribute meaningfully to sustainability efforts

Keywords: Creative Confidence, Inner Development Goals, AI and Creativity, Sustainable Innovation

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Ministry of Tertiary Education, Science and Research

Decoding the Trade-Environment Nexus for Mauritius

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Abstract:

For Small Island Developing States (SIDS), trade openness is not just a catalyst of economic growth but also a cornerstone of their economic resilience. Mauritius offers an illustrative example of a SIDS that has embraced trade openness as a strategy for economic growth. While trade-driven growth is essential to the economy of the country, several concerns have been raised with respect to the fact that trade contributes to climate change by exacerbating emission, particularly in developing countries. This paper examines the environmental impacts associated with trade from two approaches; first, an econometric model was used to find the relationship between trade openness and greenhouse gas emissions, which has been an underexplored area for Mauritius. A Stochastic Impacts by Regression on Population, Affluence and Technology (STIRPAT) model was developed. The ARDL methodology within the STIRPAT framework was employed to analyse the causal relationship between trade-related variables and GHG emissions from 1990 to 2023. The results reveal a significant short-run increase in emissions linked to trade openness, primarily driven by rising energy consumption and industrial expansion. However, long-run impacts appear mitigated by technological advancement, regulatory frameworks, and structural shifts toward service-oriented and low-emission sectors. Secondly, the embodied emissions in imports and exports in Mauritius was assessed. A model for the local scenario was developed based on the methodology proposed by the Organisation for Economic Co-operation and Development (OECD) which evaluates the carbon dioxide emissions embodied in international trade. Available Input-Output Tables (IOT) from the Statistics Mauritius database was used in this case to calculate the embodied emissions in imports and exports. The results reveal that while embodied emissions in trade, in general, increased over the years, Mauritius is a net-importer of embodied emissions since embodied emissions in products and services are higher than those exported. This indicates that Mauritius relies heavily on carbon-intensive imports in various key sectors. By combining the two methodologies, the paper offers a nuanced understanding of how trade policies affect the nation's carbon emissions, providing valuable implications for sustainable trade practices and policy formulation; especially a particular emphasis on import substitution for Mauritius.

Keywords: STIRPAT, Embodied emissions, Greenhouse gas, Trade

Ministry of Tertiary Education, Science and Research

A thematic analysis of micro perspectives of socio-economic drivers of irregular female labour migration from Zimbabwe to South Africa

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Abstract:

The study explores micro perspectives of socio-economic drivers of irregular female labour migration from Zimbabwe to South Africa since the advent of the third phase of migration. A qualitative research design using case study methodology was employed. The data was collected from (n=20) cases selected using snow balling sampling technique from three provinces of Zimbabwe. These are: Masvingo, Manicaland and Matabeleland South Provinces. The cases were made up of deportees and returnees. In order to have an in depth understanding of irregular migration experiences of the respondents, nine themes were constructed using thematic analysis to elicit micro perspectives on the socio-economic drivers. Findings show that despite numerous risks associated with irregular migration, pressing economic conditions increase urgency for irregular migration. On the other hand, presence of smuggling networks helps in facilitating crossing into South Africa thus sustaining irregular migration. Furthermore, dynamics around family dependency burden, household decision making dynamics, integrating back home post deportation or on return play out in explaining the migration typology studied. The findings are important in illuminating specific micro perspectives of socio-economic drivers of irregular migration which have not been given prominence in Zimbabwean migration literature when we employ a gendered lens. These have important policy implications. The study thus guides on significance of scaling up of awareness on risks and dangers of irregular migration, the need for collaboration between neighbouring governments as well as finding a lasting solution to Zimbabwe's long-standing crisis as key policy interventions.

Keywords: Deportees, Labour, Irregular migration, Returnees, South Africa, Zimbabwe

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National Research Week 2025

Uniting Research, Industry and Innovation

Ministry of Tertiary Education, Science and Research

POSTER PRESENTATIONS
(Blue Economy)

VENUE
Paul Octave Wiehe Auditorium

Ministry of Tertiary Education, Science and Research

Analysis of the wave dynamics along a windward coastal site for improved understanding of the process behind coastal erosion

Presenter: Assoc. Prof. Manta Devi Nowbuth
Affiliation of presenter: Department of Civil Engineering, University of Mauritius, Mauritius
Contributor: L. S. Raghoobur
Affiliation of contributor: Department of Civil Engineering, University of Mauritius, Mauritius

Abstract:

The coastal zone, encompassing the transition zone between terrestrial and marine elements on Earth's surface (Crossland, Kremer and Lindeboom, 2006) and the coastline, is the physical boundary between land and water resources. Because the area is subject to erosion, floods, storms, and hurricanes, it is one of the most dynamic locations. By 2020, past studies have reported that roughly three-quarters of the global population will reside within 60 kilometres of the seashore (Prabaharan et al., 2010). Furthermore, through an intricate morphological adaptation and increased exposure to other morpho dynamics causes, relative sea-level rise leads to coastal erosion, particularly in low lying and flat locations.

Mauritius is a volcanic island that spans 1,860 square kilometres. Coral reefs border Mauritius for the most part. The coastline line is around 322 kilometres long, while the coral reef is 150 kilometres long and has an area of 243 square kilometres. In Mauritius, the coastal zone extends from the high-water mark (HWM) to 1km inland and seaward. The setback area is 30 metres inland from the high-water mark (HWM), where building construction is controlled, and there are no constructions. According to research on coastal erosion at fourteen sites (JICA, 2015), roughly 17 % of the beaches are eroding over time, and over 23% are accreting.

The eastern coast of Mauritius is located along the windward site and is often subject to strong waves which are nowadays causing erosion problems. The eastern coast is also home to some of Mauritius's major hotels and is mainly used by the locals and tourists for recreational activities such as swimming and fishing. Therefore, it is imperative to understand how the coast has been changing in that part of Mauritius. In many cases it has been noted that along the same coastline and within a short reach, one zone is stable while another one is prone to severe erosion. So far, very few studies have been carried out to obtain further insight in this situation. This research aimed at comparing and analysing two zones, one stable and one prone to erosion, along the same coastline to understand the driving factors of coastal erosion and what keeps a coastal line stable.

The study was undertaken through a combination of several complementary analyses: Use of historical Google Earth images to study the accretion and erosion process; Beach profiling and field analysis of the longshore drift. The slope of the beach reaches influenced the extent of coastal erosion, with the less stable zone being steeper. The longshore drift highlighted the movement of the waves and confirm the accretion and erosion process, as noted with the satellite images analysis. On the other hand, the longshore drift of the stable zone was found to be greater than the erosion zone, which is quite counterintuitive.

Keywords: Small islands; Coastal Erosion; Longshore drift: Beach Profiling; Morphodynamics

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Ministry of Tertiary Education, Science and Research

POSTER PRESENTATIONS
(Circular Economy)

VENUE
Paul Octave Wiehe Auditorium

Ministry of Tertiary Education, Science and Research

Electrifying the automobile sector in Mauritius: Investigating key factors influencing electric vehicles' purchase intention

Presenter: Mr. Hariram Gungah
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Abstract:

As climate change intensifies, countries globally, and notably Mauritius, are turning their focus toward transformative, sustainable transportation solutions. Mauritius, a minimal contributor to global carbon emissions, is nonetheless critically susceptible to the impacts of climate change. This urgency is intensified by the lack of research tailored to the unique Mauritian landscape, making the generalizability of international findings problematic. This study serves both as an initial exploration and a foundation for future, Mauritius-specific research on electric vehicle (EV) adoption. Methodologically, the research employs a mixed-methods approach, combining Structural Equation Modeling (SEM) with Analysis of Variance (ANOVA), supplemented by qualitative data from expert interviews and social media discourse. For the quantitative segment, a diverse combination of non-probability sampling methods, including purposive, snowball, convenience, and self-selection sampling, was adopted to capture a broad spectrum of perspectives and effectively address the inherent challenges of defining a sample frame within the target population, ensuring a diverse and representative cross-section of respondents. Each method contributes uniquely to the study's validity and reliability. SEM analysis, utilizing the Theory of Consumption Values as the theoretical framework and based on 616 validated responses, identifies Emotional Value as the most potent predictor of EV purchase intent. This is confirmed by a compelling Estimate (.784), Critical Ratio (11.017), and a statistically significant p-value (.000). Complementarily, Functional Values concerning Price and Quality hold significance, although at a diminished scale. In a departure from prevailing notions, Social and Epistemic Values did not reach statistical significance. ANOVA serves to add details to these findings, specifying variances in purchasing intent across multiple demographic categories. For the qualitative aspect, in-depth interviews were planned with 15 experts, selected using judgmental sampling based on their extensive experience and understanding in the automotive sector, particularly in the EV market. This group included sales directors, sales managers, senior sales executives, workshop managers, and risk managers from leading automotive brands. The process of data collection was concluded after the thirteenth expert interview, upon reaching the threshold of data saturation. Social media commentaries, which emerged involuntarily in response to the quantitative questionnaire posted on social media platforms, were deemed significant for offering spontaneous and genuine insights that might not be captured through structured research methods alone. Therefore, they were analyzed thematically, in conjunction with the expert interviews. Primarily through the expert interviews, and supported by the social media commentaries, the study revealed systemic barriers such as inconsistent governmental policies, fragmented stakeholder alignment, upfront costs, and lack of environmental and EV awareness. Interestingly, in the Mauritian context, 'range anxiety' was not deemed substantial, while charging infrastructure emerged more as a psychological impediment rather than a practical necessity. The quantitative and qualitative analyses offer distinct insights; while the former captures the general public's sentiment, the latter provides expert insights. However, they also intersect at various points. For instance, the SEM findings on price resonate with experts' emphasis on upfront costs, and the observed lack of range anxiety aligns with the daily commute distances from descriptive statistics. These methods support and elaborate on one another, resulting in a meaningful interaction of findings and offering a more comprehensive view of the EV market in Mauritius. The study delivers important contributions that are both wide-ranging and tailor-made to suit the multifaceted social, cultural, and infrastructural landscape of Mauritius. The research does more than just probe the effectiveness of current policy measures; it also provides a thorough grasp of both consumer tendencies and market dynamics. The findings thereby provide a solid basis for devising policy strategies in Mauritius. Beyond addressing immediate challenges, these results trigger a wider, evolving discussion, questioning the sustainability of existing market-driven models. Consequently, this research serves as a crucial academic and practical guide for promoting enduring solutions in sustainable transport within the Mauritian setting.

Keywords: Electric Vehicles, Structural Equation Modeling, Analysis of Variance, Consumer Behaviour, Mauritius.

Ministry of Tertiary Education, Science and Research

Analysing the UNSDGs in Mauritius using active and passive satellite data with deep learning

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Contributors: N. Kumar[1], P. Jai Govind[1], T. P. Fowdur[2] and D. Jogee[3]
Affiliations of contributors: [1]Department of Electronics and Communication Engineering, CHRIST University, India, [2]Department of Electrical and Electronic Engineering, University of Mauritius, Mauritius,[3]Department of Civil Engineering, University of Mauritius, Mauritius

Abstract:

Earth observation data including passive and active remote sensing imagery have been an emerging and promising solutions in monitoring and assessment of United Nations Sustainable Development Goals (UNSDGs) in local, national and global levels. The remotely sensed imagery data contain very detailed information of Earth geomorphological features in spatial, spectral and temporal contexts. The primary objective of this research work is to develop a deep learning-based framework for analysing the Earth Observation (EO) data in monitoring the status and progress of some of the UNSDGs including No Poverty, Zero Hunger, Quality Education, Affordable and Clean Energy and with the Climate Action in the Republic of Mauritius. This study investigates the role of EO data and its suitability for the consideration in the key performance indicators for SDGs assessments. These very rich sources of information can be exploited appropriately to identify the type of objects, minerals, vegetation with their unique spectral imprints called as spectral signatures. This proposed research also investigates the application of Deep learning models for image classification, in which high level abstract features will be extracted from the raw images captured by the imaging sensors in order to discriminate the distinct features of landscape of the Mauritian geographical regions with improved performance in relation to traditional image classification schemes. This study analyzes the suitability of distinct spatial, spectral and spectral-spatial information on Deep learning models for classification applications. There is a scope for the development of spectral signature library containing the spectral imprints of natural and manmade substances. Finally, the proposed classification scheme shall be implemented for the diverse applications including change detection on temporal basis, assessment of rural development, urban agglomerations, environmental monitoring and impact assessment.

Keywords: Remote Sensing, Earth Observation, Satellite Imaging, Deep Learning, UNSDGs
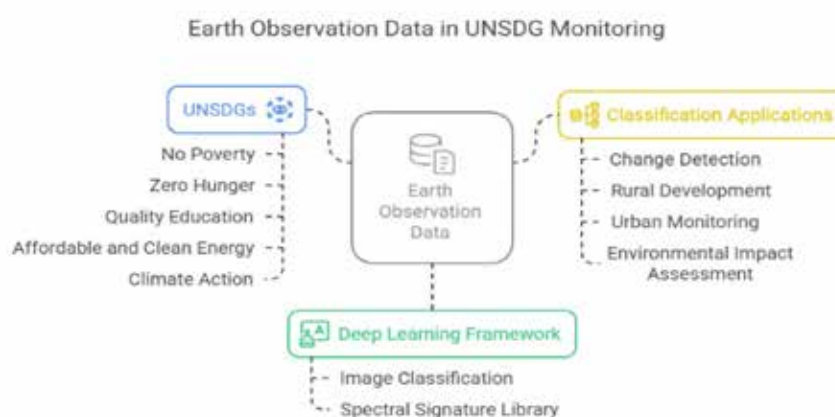
Earth Observation Data in UNSDG Monitoring

Ministry of Technical and Higher Education, Science and Research

National Research Week 2025

Uniting Research, Industry and Innovation

Ministry of Tertiary Education, Science and Research

POSTER PRESENTATIONS
(Green Economy)

VENUE
Paul Octave Wiehe Auditorium

Ministry of Tertiary Education, Science and Research

The Role of Artificial Intelligence in advancing Sustainable Development Goals: Insights from University students in Mauritius

Presenter: Ms. Chitisha Gunnoo
Affiliation of presenter: University of Mauritius, Mauritius
Contributors: R. K. Sungkur[2] and I. Tarling[3]
Affiliations of contributors: [2]Faculty of Information, Communication and Digital Technologies, University of Mauritius, [3]Limina Education Services

Abstract:

The research investigates how technology supports sustainability education through a digital dashboard geared toward enhancing student-instructor engagement in Mauritius higher education institutions. Sustainability requires innovative educational strategies because future leaders need proper knowledge and skills to handle environmental complexities (Hays, & Reinders, 2020). The interactive dashboard provides an online platform used for immediate student-teacher interactions combined with collaborative and feedback functions which enhances learning dynamics. The dashboard displays patterns for student interest and engagement to help instructors modify teaching approaches and classroom materials based on learner requirements. The research method involves using dashboard usage analytics which deliver quantitative results alongside interviews of participants to evaluate technological effects on motivational levels and academic achievements of students, thus encouraging SDG 4 which focuses on Quality Education. This research aims to provide a recommendation as to how technology can reshape sustainability education in Mauritius through the development of efficient digital solutions which connect theoretical knowledge to practical skills for educating students who will participate in sustainable development.

Keywords: Sustainability, Dashboard, Education

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Ministry of Tertiary Education, Science and Research

Smart autonomous irrigation robot powered by renewable energy for sustainable agriculture

Presenter: Dr. Anshu Prakash Murdan
Affiliation of presenter: Department of Electrical and Electronics Engineering, University of Mauritius, Mauritius
Contributor: B. Wong Hon Lang
Affiliations of contributor: Department of Electrical and Electronics Engineering, University of Mauritius, Mauritius

Abstract:
This paper proposes the development and evaluation of an IoT-based autonomous robotic irrigation system aimed at optimizing water management in agriculture. The system uses Internet of Things (IoT) technology to optimize water use in agriculture. Traditional irrigation methods are often inefficient due to manual operations [1]. These inefficiencies result in water waste or inadequate watering, worsened by unpredictable rainfall caused by climate change [2]. To address these challenges, the research integrates IoT technology with renewable energy, creating a smart robotic irrigation solution.

The robotic system features a mobile robot powered by a solar-charged battery. It primarily relies on photovoltaic energy, ensuring sustainability and operational autonomy. Various sensors, including soil moisture, temperature, humidity, rainfall, and obstacle detection, continuously monitor the field. These sensors enable the robot to make informed irrigation decisions, conserving water by irrigating only when necessary. Sensor data is transmitted wirelessly using an Arduino Mega and ESP8266 Wi-Fi module. This data is then visualized on the Cayenne IoT platform, accessible remotely by farmers via computers and mobile devices. The robot navigates autonomously using line-following sensors and wheel encoders. These sensors ensure precise movement along predefined paths. At specific points, the robot deploys soil moisture sensors using a lead screw-driven linear actuator. An onboard water pump, controlled by a microcontroller, activates based on preset moisture thresholds, optimizing irrigation according to crop and soil needs.

Field tests on a prototype showed high sensor accuracy (94.5% ± 2.3%) and reliable navigation and obstacle avoidance (92% success rate). Data transmission to the cloud was consistently dependable (97.3% success rate). The solar energy system provided adequate power but showed efficiency variations under low sunlight. Structural durability tests confirmed the robot's robustness and resistance to environmental stress. However, some difficulties were encountered during field tests. Issues like uneven terrain and extreme weather occasionally affected robot navigation and durability. Feedback from these tests led to corrective measures, improving system resilience and operational reliability. Energy optimization remains critical, particularly under cloudy or nighttime conditions, highlighting the need for enhanced energy storage or hybrid power solutions.

Future developments will incorporate predictive analytics using machine learning. This will enable proactive irrigation management by forecasting weather and soil moisture trends [3]. Enhancements to user interfaces will provide customized insights and recommendations. The ultimate goal is to develop fully autonomous decision-making within the robot, reducing human oversight and increasing operational efficiency.

The development of the smart irrigation robot represents an important step forward in agricultural technology, merging IoT innovations with sustainable energy solutions to improve irrigation methods. Throughout its design and testing phases, the robot has shown considerable promise in sensor precision, autonomous navigation, and remote data handling, while also proving robust enough to endure the challenges posed by various environmental conditions. The progress of this project highlights the importance of ongoing enhancements to optimize its functionality and durability. The proposed smart irrigation robot could serve as a replicable model for wider environmental management and agricultural automation applications.

Keywords: smart irrigation, autonomous robot, environmental sustainability

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Ministry of Tertiary Education, Science and Research

Molecular characterisation of *Colletotrichum* Species causing anthracnose in bananas

Presenter: Mr. Muhammad Oosman Wasim Bhunnoo
Affiliation of presenter: Faculty of Agriculture, University of Mauritius, Mauritius
Contributor: V. M. Ranghoo-Sanmukhiya
Affiliations of contributor: Department of Agricultural and Food Science, Faculty of Agriculture, University of Mauritius, Mauritius

Abstract:

The fungal pathogen *Colletotrichum* is the leading cause of anthracnose which results in significant decreases in crop production worldwide. This research focuses on the molecular characterization of *Colletotrichum* isolates collected from banana fruits in Mauritius. DNA extraction was performed followed by PCR amplification and DNA sequencing of ribosomal genes. BLAST searches were conducted using the NCBI GENBANK database to ascertain species identity. Multiple DNA sequence alignment and analysis were carried out and phylogenetic trees were generated to determine the genetic relationships among the *Colletotrichum* isolates. This study also explored methods to control the spread of *Colletotrichum* during post-harvest storage, including sustainable and green methods. Assays were performed using silver nanoparticles produced by green synthesis and *Trichoderma atroviride* to control the growth of *Colletotrichum*. Silver nanoparticles synthesized from grapefruit and thyme inhibited *Colletotrichum* growth on SDA plates *in vitro*. *Trichoderma Atroviride* inhibited the growth of *Colletotrichum* through mycoparasitism. Biocontrol using either nanoparticles or *Trichoderma* strains has proven promising in inhibiting the growth of *Colletotrichum*. The molecular identification of *Colletotrichum* species and the evaluation of alternative control methods provided valuable insights for managing anthracnose and mitigating its economic impact on banana production in Mauritius.

Keywords: *Colletotrichum*, anthracnose, banana, molecular characterization, silver nanoparticles, *Trichoderma atroviride*, biocontrol

Ministry of Tertiary Education, Science and Research

Characterisation of pigeon pea accessions in Mauritius

Presenter: Ms. Raeesah Abdoula
Affiliation of presenter: Department of Agricultural and Food Science, University of Mauritius, Mauritius
Contributors: N. Boodia[2] and V.M. Ranghoo-Sanmukhiya[3]
Affiliations of contributors: [2]Department of Agricultural Production and Systems, University of Mauritius, Mauritius,[3]Department of Agricultural and Food Science, University of Mauritius, Mauritius

Abstract:
Pigeon pea [*Cajanus cajan* (L.) Millsp.] is a drought-resistant, dry-land crop, which is highly adaptable under rain-fed agricultural conditions, making it a valuable source of income and wood for small-holder farmers in arid and semi-arid regions. As a nutrient-dense legume, pigeon pea contributes to sustainable agricultural practices and helps address food security challenges. Despite its great potential, pigeon pea remains largely underutilised in Mauritius with minimal research focused on its diversification and improvement. Analysing the existing genetic diversity among local pigeon pea accessions is a key precursor to identifying genotypes with distinct and desirable traits for enhanced crop genetic improvement. The present study explored the characterisation and phylogeny of six local accessions of pigeon pea using both morphological characters and molecular techniques. Thirteen morphological traits were used to characterise these accessions, and a hierarchical cluster analysis was performed. Molecular characterisation included both the use of molecular markers for the generation of DNA profiles and phylogenetic analysis of DNA sequences. Random Amplified Polymorphic DNA (RAPD) amplification was conducted using eight Operon primers. DNA barcoding of the accessions was carried out by sequencing the *matK* and *rbcL* genes of the chloroplast. Accessions studied demonstrated a lack of interspecific variation at the genomic level, providing sufficient evidence that they are strains or genotypic variants of a single species. The accessions, being genotypic variants, demonstrate a narrow genetic diversity within the local pigeon pea population. Proper breeding strategies will necessitate the expansion of the genetic pool of pigeon pea accessions in Mauritius without underrating the landraces to prevent the loss of diversity.

Keywords: Pigeon pea, Food security, Sustainable agriculture, Morphological traits, Molecular characterisation, Genetic diversity

Ministry of Tertiary Education, Science and Research

Promoting heat health in the built environment using nature-based and regenerative solutions

Presenter: Dr. Mahendra Gooroochurn
Affiliation of presenter: Mechanical and Production Engineering Department, University of Mauritius, Mauritius

Abstract:

Climate change has placed unprecedented pressure on Small Island Developing States (SIDS) such as Mauritius, which represent less than 1% of the world population in total, and contribute negligible amount of carbon emissions, yet are among the most vulnerable to its effects. It is indeed well recognized that climate adaptation efforts need to be given equal credence to climate mitigation for the very reason that countries like Mauritius have not directly caused global warming but are having to adapt to several of its consequences. One of the serious challenges associated to climate change is temperature extremes, worsening peak summer conditions with detrimental effects on the indoor environmental conditions in residential and commercial buildings. The increased use of air-conditioning and the associated rise in peak electricity demand has been evidenced in Mauritius in recent times, with record peak power demand exceeding the 560 MW threshold.

This is caused by the direct coupling of peak cooling demand with summer temperatures, due to little or no consideration to the crucial passive building design principles, which allow a building to regulate the heat flow dynamics between the interior and the exterior environments through design measures carefully planned through the building architecture and the surrounding infrastructure. The worsening of the indoor environmental conditions, including thermal discomfort, does not pose only an energy performance issue, but more importantly negatively impacts the health, well-being and productivity of the occupants. This takes the form of office workers unable to perform at their best, students' learning experience being adversely impacted at school and in general uneasiness and challenging conditions for persons in their homes, especially for vulnerable, low and middle-income segments of the population who do not have the luxury in investing in costly HVAC systems and to meet the significant increase in electricity bills. However, the installation of air-conditioning systems, even if powered by renewable energy systems is not a sustainable solution to the problem, as the fundamental approach to work with and for nature should be privileged through nature-based solutions (NbS) and through systems design helping to regenerate natural systems, as favored by one of the pillars of the circular economy (See Figure 1).

Figure 1: CE Economy Pillars [Source: Ellen McArthur Foundation]

This presentation aims at illustrating nature-based and natural system regenerative solutions for the built environment in the tropical content of Mauritius, to sensitise on their application and spur uptake by the construction industry. The targeted audience is also community-based initiatives led by NGOs to develop climate resilience in vulnerable areas, given that the proposed approach is the best way to remedy sustainably to the pressing social and environmental problem of thermal stress in the built environment for which we are ill-prepared.

Keywords: Climate resilience, heat health, built environment, passive building design, nature-based solutions.

Ministry of Tertiary Education, Science and Research

The contribution of recycling waste plastics products economy and its impact on climate change in Small Island Development States (SIDS) for a Greener Mauritius

Presenter: Mr. Joseph Essèmou-Abalè Kossi Assogbavi
Affiliation of presenter: University of Mauritius, Mauritius
Contributor: R. P. Gunputh
Affiliation of contributor: University of Mauritius, Mauritius

Abstract:

Background and Objectives. To what extent would the recycling of waste plastic products contribute to climate change and attract more tourists? Mauritius produces some 120,000 tons of waste plastic products annually among which 3000 tons are recycled annually. Indeed, waste plastic products could be recycled in other forms of products to produce moveable properties due to their strength, and they are also less expensive than iron and steel that SIDS import from other countries adding to costs. Over and above the study shows that once waste plastics have been disintegrated into granules which may be revalorize into domestic products because of its malleability and durability producing lesser and lesser carbon dioxide (CO_2) emissions and Green House Gases (GHGs) in the long run than any other products because climate change is not occurring due to natural cause only but by human activities (Moreno and Becken, 2009). Climate change with precipitation level as proxied by rainfall negatively impact on tourist arrivals (Filho). As a result the recycle of waste plastic products would be plus value in a recycling economy to which the Mauritian economy is targeting in the small and long run to fight against climate change and the contribution of waste plastics would have a positive impact because weather and environment and climate change are important factors in leisure demand and tourist hospitality with an impact on tourism as a business (Siddiqui and Imran, 2018).

Methodology. There is an abundant literature Patrice Guillotreau, 2023) on waste plastic products, its reuse a recycling but the literature on waste plastic products and its impact on climate change in the SIDS is week? The empirical research is carried out with questionnaires where a number of applicants responded online (n=150) and data was collected as prima data coupled with secondary data to reflect to what extent waste plastic products is an important form of recycling economy capable of fighting against climate change and rise in temperature contributing to Foreign Domestic Products and the Mauritian Gross Domestic Products (Rajapakse, 2016).

Findings. The contribution of waste plastics in renewable energy should not be tackled in isolation but under the lens of climate change and it has been found that it is not only a form of recycling economy but it has a positive impact on key sectors in the socio-economic development of Mauritius with a more climate resilient tourism development (Scott and Gosslink, 2022), and enhance a resilient cultural industry economy creating employment for SMEs.

Implications of Our Work. The collection of waste plastic products in producing domestic products may encourage SMEs and MSMEs to flourish in Mauritius creating employment for the unemployed. It is also, *inter alia*, carbon free, safer, and lesser expensive making a cleaner Mauritius in protecting its beaches, rivers and fauna and flora contributing collaterally to various emerging sectors of the Mauritian economy. With unused waste plastic products thrown in the nature climate change has a significant impact on tourists' arrivals in Mauritius (Sookram, 2009; Sharma, 2022). This achievement would definitely lead to a cleaner Mauritius, with a positive influence on the number of tourist arrivals in the country which is one of the pillars of the socio-economic development of Mauritius, otherwise if the SIDS ignore the use of waste plastic products as an alternative domestic product we would pay it in a very costly way.

Keywords: Waste plastics, SDGs, Green Economy and SMEs

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4. Rajapakse, R.P.C.R. 2016, The relationship between FDI, GDP and international tourists' arrivals for Sri Lanka: An analysis of granger causality, International Journal of Research in Economics and Social Sciences, 6(5), pp. 183-193

National Research Week 2025

Uniting Research, Industry and Innovation

Ministry of Tertiary Education, Science and Research

POSTER PRESENTATIONS
(Silver Economy)

VENUE
Paul Octave Wiehe Auditorium

Ministry of Tertiary Education, Science and Research

Isolation and identification of pathogens from non-healing diabetic foot wounds and their sensitivity against fungal endophytes from local plants

Presenter: Ms. Bhavna Rakhal
Affiliation of presenter: Clinical Bacteriology, Victoria Hospital, Mauritius
Contributor: R. Jeewon
Affiliation of contributor: Department of Health Sciences, Faculty of Medicine and Health Sciences, University of Mauritius

Abstract:

Diabetes mellitus (DM) is a chronic disorder with pandemic dimensions, with around 280,442 cases in Mauritius. Type 2 diabetes mellitus results from the interaction between genetic and environmental factors which trigger insulin resistance, followed by severe health complications including non-healing foot wounds (NHFW), gangrene, amputation, among others. Diabetic foot ulcers (DFU) are polymicrobial and multidrug-resistant (MDR) resulting in treatment failure. 80% of the population worldwide depends on indigenous and traditional medicine as they have been validated to confer therapeutic benefits in clinical trials. Plant species harbour fungal endophytes, which, however, do not harm their internal tissues but can produce similar bioactive compounds with bioactive metabolites as their hosts. Bioactive molecules from plants have been shown to lower blood glucose level by improving beta cell function, glucose (re)absorption and glucagon-like peptide-1 homeostasis. This study was conducted in two diabetic foot care centres in Mauritius with an inclusion of hundred patients. Twenty-eight bacterial isolates were recovered from non-healing diabetic foot wounds which were identified through Bruker Matrix-Assisted laser Desorption/ Ionization Time-of-Flight Mass Spectrometry (MALDI-TOF MS) Biotyper apparatus. Thirty-four fungal endophytes were isolated from *Curcuma longa L.*, *Allium sativum L.*, *Ocimum tenuiflorum L.*, *Azadirachta indica A Juss.*, *Carica papaya Linn.*, *Morinda citrifolia L.*, *Apium graveolens L.* and *Momordica charantia L.* Plants which were used for antimicrobial assays. The presence of bioactive compounds in the selected plants was also recorded. *Staphylococcus aureus* (*S. aureus*) (n=19) was the most common gram-positive pathogen and *Pseudomonas aeruginosa* (*P. aeruginosa*) (n=32) the most common gram-negative pathogen. *S. aureus* was sensitive to eleven fungal endophytes while *Acinetobacter radioresistens*, *Enterobacter cloacae*, *Enterococcus aerugenes*, *Proteus penneri* and *Enterobacter asburiae* were resistant to all fugal endophytes. The presence of flavonoids was observed in all the selected plants while phlobatanin was identified only in. *Curcuma longa L.* was distinguished for its highest antioxidant activity (80%) while *Allium sativum L.* displayed the least antioxidant activity (26%). NHFW are polymicrobial and continue to hamper wound healing. *S.aureus* has been the most common inhibited pathogen while *Carica papaya Linn* exhibited a fungal endopohyte with highest inhibition properties.

Keywords: Fungal bioactive metabolites, pathogens

Ministry of Tertiary Education, Science and Research

DAY 2
Tuesday 15 April 2025
University of Technology, Mauritius

THEME
Global Economic Interactions
and Health Innovations

VENUE
UTM Conference Room

Ministry of Tertiary Education, Science and Research

Introduction

Day 2 of the National Research Week 2025 was held at the University of Technology, Mauritius which comprised of two sessions (2 and 3). Session 2 focused on Global Economic Interaction: Trade, Finance and Development and session 3 was based on Health and Wellness: Bridging Knowledge and Impact.

Both sessions aimed to foster dialogue, collaboration and innovation among researchers, policymakers and industry champions and to gain new insights on these themes. Session 2 allowed the opportunity to explore the evolving dynamics of international trade, financial networks, fintech, economic interdependence and the impact of globalization on national economies. As for session 3, participants were able to gain new knowledge on key challenges and opportunities in pre-clinical and clinical research, public health and safety, and holistic well-being. This session brought together researchers, healthcare professionals, policymakers, and industry leaders to explore transformative solutions for healthier societies.

Key activities included keynote speeches mainly from international speakers, guest speeches from the related industry speakers and researchers including doctoral students' presentations on their latest research. The pictures below provide a glimpse of the event held at the UTM.

Ministry of Tertiary Education, Science and Research

Highlights

Proceedings of the National Research Week 2025

Keynote Addresses

Dr. Satish Kumar,

Indian Institute of Management
Nagpur, India

Dr. Satish Kumar is a Professor in the Finance and Accounting area at the Indian Institute of Management Nagpur (IIMN), India. He brings over 21 years of teaching and research experience from prestigious management institutes in India and abroad. Dr. Kumar earned his doctorate from the Indian Institute of Technology (IIT) Roorkee in 2012. His teaching and research interests span Financial Accounting, Corporate Finance, Business Research Methods, Supply Chain Finance, Project Finance, Small Business Finance, Consumer Economics. His research work is featured in top-tier journals, including **FT 50, A, and A**-category journals in the ABDC ranking.

Additionally, Dr. Kumar has conducted executive sessions for senior leaders, including Vice Presidents and senior professionals, from leading organizations such as Indian Oil, Wipro, Tech Mahindra, Honeywell, BPCL, Adani Group, L&T, Amazon, Axis Bank, Genpact, Oracle, and Ambuja Cement. His extensive experience spans both short- and long-term executive programs, training over 2,000 senior executives across diverse industries through Management Development and Certificate programs.

Dr. Kumar has further received several prestigious awards for his research and teaching excellence from various international organisations:

1. Basant Kumar Birla Distinguished Research Scholar Award (1st Prize, Business Management, 2023)
2. Careers360 Outstanding Researcher in Economics, Econometrics, and Finance (2023)
3. AIMS International Outstanding Global Management Researcher Award (2024)
4. AIMS International Best Researcher Award (2018)

Ministry of Tertiary Education, Science and Research

Keynote Addresses

Mr Rajeev HASNAH,
First Deputy Governor,
Bank of Mauritius

Mr Rajeev Hasnah was appointed, with effect from the 2nd of December 2024, First Deputy Governor of the Bank of Mauritius. He is the Chairperson of the Board of Directors of the Mauritius Investment Corporation Ltd and also sits on the Monetary Policy Committee.

Mr Hasnah started his career as an Economist in the City, London. Throughout his career, Mr Hasnah has demonstrated a commitment to excellence and innovation, whilst also showcasing his competence in regional diplomacy and public administration. He was Deputy Executive Director and Chief Economist at the Competition Commission of Mauritius, and Commissioner at the COMESA Competition Commission. As a Chief Finance Officer in different corporate entities listed on the Stock Exchange of Mauritius, Mr Hasnah spearheaded critical restructuring and investment initiatives.

Mr Hasnah is a thought leader in Mauritius in the field of economics and finance. A Charterholder from the CFA Institute, Mr Hasnah also holds an MSc in Economics and Finance from Warwick Business School, United Kingdom, and a BSc (Hons.) in Economics and Finance from the University of Mauritius.

Ministry of Tertiary Education, Science and Research

Keynote Addresses

Dr. Tomoko Soga, Associate Professor (Neuroscience)
The Director of the Animal Research Platform and Leader
of the Social Stress and Mental Health Research group
School of Medicine and Health Sciences
Monash University Malaysia

Associate Professor Tomoko Soga is the Director of the Animal Research Platform and leader of the Social Stress and Mental Health Research group. She joined Monash University in 2006 from the National Institute of Neuroscience, National Center of Neurology and Psychiatry, Japan. She obtained her BSc and MSc from Kyoto Institute of Technology. Upon obtaining her PhD from Nippon Medical School, she was a postdoctoral fellow at The Rockefeller University in New York, USA. Her research focus has been on the neuronal mechanisms of depression, in particular brain serotonergic pathways in social stress-induced depression.

Dr. Lawrence Callahan,
Chief Scientist Trials of Life

Larry Callahan obtained a Bachelor's Degree in Chemistry from Roosevelt University and a Ph.D. in Chemistry from the University of Chicago. His thesis was on the mechanism of the B-Z DNA transition. Larry also synthesized non-hydrolysable analogs of Adenosine Phosphosulfate (APS), and Phospho-Adenosine Phosphosulfate (PAPS) After his Ph.D. Larry worked at the FDA/CBER. He was the first to show that CD4 based therapies were unlikely to be effective against HIV, worked out the mechanism of polyanionic substances inhibiting HIV and explained the role of electrostatics within HIV's gp120 V3 loop in controlling both the pathogenicity and infectivity of HIV. Larry also worked at USP and developed methods and monographs to analyze biotech products. He rejoined the FDA where he was responsible for ISO 11238 substance standard and the Global Substance Registration System (GSRS). The GSRS is used by companies and regulators throughout the world. Larry is committed to improving global health.

Ministry of Tertiary Education, Science and Research

PRESENTATIONS
(Global Economic Interactions: Trade, Finance and Development)

VENUE
Conference Room

Ministry of Tertiary Education, Science and Research

HEC Research Fund and Research for Impact

Presenter: Dr. (Mrs) Anjusha Durbarry, Research Officer
Affiliation of presenter: Higher Education Commission
Email address of presenter: adurbarry@hec.mu
Contributors: Dr. A. Moorgawa and Dr. N. Sadeer
Affiliations of contributors: Higher Education Commission

Abstract/Presentation:

This presentation provided an overview of the Higher Education Commission's (HEC) strategic transition from funding traditional research to prioritizing Research for Impact. Since 2018, the HEC has launched seven call-for-application cycles under the Research Fund, resulting in the approval of 131 research projects with a combined project value amounting to MUR 189 million. The Research Fund encourages inclusive participation, engaging *interalia* students, women researchers, as well early-career researchers, aligning with Sustainable Development Goals (SDGs). Additionally, the presentation emphasized the Commission's capacity-building initiatives focused on research for impact. Emphasis was placed on Result-Based Management approach and impact pathways to guide project design. The presentation highlighted the Commission's commitment to supporting research that drives impact.

Keywords: HEC's Research Fund, Research for Impact, Results-Based Management, Capacity Building

Ministry of Tertiary Education, Science and Research

The Bridge between Academia and Health Care Research

Presenter: Ms Tina Sharma, COO-C-Lab
Affiliation of presenter: Healthcare
Email address of presenter: tina.sharma@c-care.mu

Abstract:

Tina Sharma, COO of C-Lab—the diagnostics arm of C-Care Group—spoke about breakthroughs in genetic science, from the cloning of Dolly the Sheep to technologies like Next Generation Sequencing (NGS), are revolutionising diagnostics and patient care. She highlighted real-world examples, such as efforts to revive extinct species, and linked them to innovations at C-Lab, where genetic tools are used to detect and monitor cancer, personalise treatment, and save lives. Emphasising collaboration between academia and healthcare, she urged students and researchers to help shape the future of personalised medicine through curiosity, ethics, innovation, and partnerships that drive real-world impact.

Keywords: Genetics, Diagnostics, NGS, Healthcare Innovation, Academia, Collaboration, Personalised Medicine, PCR, Dodo, Future of Healthcare, C-Lab, C-Care

Ministry of Tertiary Education, Science and Research

The Need for Diversity in Clinical Research

Presenter: Dr. Lutchmee Nobaud
Affiliation of presenter: CEO, Clinear Research Ltd
Email address of presenter: lutchmee.nobaub@clinear.com

Abstract:

Clinical research shapes the future of medicine — but without diversity, it risks falling short on safety, equity, and scientific validity. Persistent disparities in participation across ethnicity, gender, and geography compromise outcomes and widen global health inequities. Overreliance on homogeneous populations undermines real-world applicability. Today's evolving regulatory landscape — from ICH-GCP to the FDA's Diversity Action Plans and EMA's inclusivity frameworks — reflects a global shift. Meaningful progress requires inclusive trial design, community engagement, and capacity-building in underrepresented regions. Positioned at the crossroads of Africa, Asia, and Europe, Mauritius stands as a strategic hub for globally relevant, ethically grounded, and diverse clinical research.

Keywords: Clinical Research, Diversity, Underrepresented Populations, Gender, Equity in Healthcare, Regulatory Frameworks

Ministry of Tertiary Education, Science and Research

PRESENTATIONS
(Financial Technology
and Economic Development)

VENUE
Conference Room

Ministry of Tertiary Education, Science and Research

Bridging the Digital Payment Divide Among Merchants: Adoption Insights from a Small Island Developing State

Presenter: GUNNOO Leenshya[1]*, and BINDAH Eric[2]
Affiliation of presenter: [1] University of Technology Mauritius, [2] University of Mauritius
Email address of presenter: leenshya.gunnoo@utm.ac.mu

Abstract:

This study examines the adoption dynamics of Mobile Payment Services (MPS) among merchants in Mauritius, a small island developing state transitioning towards a cashless economy. Despite the growing importance of MPS, merchant adoption remains understudied both locally and globally. This research proposes a conceptual framework integrating the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT), with Attitude as a mediating variable.

The study investigates the direct and indirect effects of Facilitating Conditions, Perceived Security, Perceived Experience, and Performance Expectancy on merchants' Intention to Adopt MPS. A survey of 261 merchants using quota and convenience sampling was conducted, with reliability analysis confirming strong internal consistency.

Findings indicate that Attitude significantly influences adoption intention, highlighting its critical role in shaping merchant behaviour. Performance Expectancy had a positive but non-significant impact on adoption intention, suggesting that expected performance benefits alone may not drive adoption. Facilitating Conditions showed no meaningful relationship with adoption intention, while Perceived Security had a negative and significant effect, emphasizing security concerns as a major barrier. Perceived Experience negatively but non-significantly affected adoption intention. Attitude mediated the effects of these determinants, reinforcing its central role. Interestingly, while Perceived Security positively influenced Attitude, its indirect effect on adoption intention through Attitude was negative.

The study extends traditional technology acceptance models by incorporating Attitude and contextualizing adoption dynamics in a post-pandemic emerging economy. However, limitations include focusing on existing MPS users, non-probability sampling, and the exclusion of financial institutions perspectives. Future research should adopt longitudinal and comparative approaches.

Practically, the findings guide policymakers and financial institutions in fostering positive attitudes toward MPS adoption through enhanced security, education, and support initiatives. This research offers valuable insights for advancing digital payment integration in Mauritius and other developing economies.

Keywords: Mobile Payment Services, Adoption Intention, Merchants, Technology Acceptance, Mauritius

Ministry of Tertiary Education, Science and Research

Fintech's Role in Financial Inclusion: How Digital Banking is Reshaping Access to Capital in Emerging Markets

Presenter: HENRIETTE-BOLLI Gaël[1]* and TUYAU Cédric[2]
Affiliation of presenter: [1]Open University of Mauritius, [2]University of Seychelles
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Abstract:

Financial inclusion remains a critical challenge in emerging markets, where traditional banking infrastructure often fails to reach underserved populations. The research examines the transformative role of financial technology (FinTech) in expanding access to capital through digital banking solutions. Specifically, it investigates how mobile banking, digital lending platforms, and blockchain-based financial services reshape financial accessibility in regions with limited banking penetration. This research aims to analyse the mechanisms through which digital banking fosters financial inclusion, the regulatory challenges that arise, and the socioeconomic impact of these innovations.

A qualitative research approach will be adopted, utilising case studies of key FinTech firms operating in emerging markets. Data from industry reports, policy documents, and stakeholder interviews will be collected, including financial regulators, FinTech entrepreneurs, and consumers. A thematic analysis will be conducted to identify patterns in how digital banking solutions influence financial inclusion. Additionally, secondary data from financial institutions and regulatory bodies will be examined to assess trends and policy developments.

Preliminary findings suggest that FinTech-driven digital banking enhances financial inclusion by reducing transaction costs, enabling microfinance accessibility, and fostering credit-scoring innovations through AI and big data. Furthermore, digital wallets and decentralised finance (DeFi) solutions have created alternative financial ecosystems, allowing individuals without traditional bank accounts to access essential financial services.

However, challenges such as regulatory barriers, cybersecurity risks, data privacy concerns, and digital literacy disparities remain significant obstacles. The research will conclude that digital banking holds great potential to bridge financial gaps in emerging economies. However, a collaborative effort between policymakers, financial institutions, and technology firms is essential to ensure sustainable and inclusive economic growth. Future research should focus on quantifying the long-term socioeconomic impacts of FinTech adoption in different regulatory environments and exploring strategies for mitigating digital banking risks.

Keywords: FinTech, Digital Banking, Financial Inclusion, Emerging Markets, Access to Capital

Ministry of Tertiary Education, Science and Research

Reskilling and talent development of FinTech professionals in Mauritius

Presenter: Marie Belinda Carlise Poussin-Deojee[1]* and Diroubinee Mauree-Narrainen[2]
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Abstract:

Mauritius is actively capitalizing on transformative initiatives and opportunities to develop a thriving FinTech hub. Regulated by the Financial Services Commission, FinTech refers to the innovative technologies designed to enhance and automate financial services. The country has made significant strides toward establishing itself as a FinTech hub by implementing a strong regulatory framework, introducing key licenses, and forming a Technical Committee on FinTech. These efforts have positioned Mauritius as a leading financial center in the Middle East and Africa, as evidenced by its ranking in the Global Financial Centres Index 35. However, FinTech companies operate in a dynamic and turbulent environment characterized by Volatility, Uncertainty, Complexity, and Ambiguity. This landscape necessitates that FinTech firms remain responsive and agile to evolving market conditions. Additionally, Mauritius faces a critical shortage of STEM skills, which are essential for FinTech advancement. This shortage is largely attributed to declining enrolment in STEM subjects at both secondary and tertiary education levels. The primary aim of this research is to develop Mauritius as a knowledge hub by addressing the skills and talent gaps necessary for FinTech to contribute effectively to the country's knowledge economy. A cross-sectional survey was conducted via Google Forms, collecting numerical data from 28 FinTech leaders and 91 employees in Mauritius. Using a purposive sampling strategy, the study targeted key stakeholders and analyzed the data using SPSS. The study introduces the Knowledge, Talent, and Skills Prototype Model, a strategic framework designed to bridge the skill gap by emphasizing continuous education, professional training, and the practical application of knowledge in real-world settings. This model aims to foster a sustainable pipeline of skilled professionals, ensuring that the FinTech sector in Mauritius remains competitive and innovative.

Keywords: FinTech, skills, talent development

Ministry of Tertiary Education, Science and Research

SMEs Tax Compliance Behaviour in the Digital Era: A Bibliometric Analysis

Presenter: SIHLONGONYANE Silungile Vuyisile[1]*, BELAHOUAOUI Rida[2], and RAMDHONY Dinesh[3]
Affiliation of presenter: [1]University of Mauritius, Department of Finance & Accounting, [2]GEC Marrakech Business School, [3]University of Mauritius, Department of Finance & Accounting
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Abstract:

Tax compliance is a critical component of economic stability and development as a large share of any state's budget is financed by tax revenue. Given the vital role of SMEs in economic growth, understanding their tax compliance behaviour, challenges, and determinants is essential for policymakers and tax authorities. This study conducts a bibliometric analysis to present the current landscape of tax compliance research, focusing on SMEs in the digital era. The study aims to map the existing literature on tax compliance among SMEs, focusing on identifying the research trend, key themes, influential authors, countries and organizations and highlighting gaps in the literature. Publications for the periods 2015 and 2025 were collected for analysis. The initial search gave 322 publications and after screening to consider only relevant publications, 126 publications were available for analysis. The VOSviewer software was used to do citation, co-citation, co-authorship, bibliographic coupling and co-occurrence analyses. The analysis shows a growing interest in the research on SME tax compliance in the digital era, with emerging themes like digital transformation, block chain, e-government, tax compliance costs, trust and power and subjective norms. These emerging themes highlight areas of interest in the field of SME tax compliance. The analysis also shows lack of collaborative work among authors, countries and organizations as shown by the co-authorship analysis. The bibliographic coupling analysis shows a strong connectedness of the publications, that is there is a high degree of similarity in the references cited by the publications. There is also lack of collaborations amongst authors and countries especially emerging economies. This study provides a novel bibliometric perspective on tax compliance research, identifying critical gaps for future studies. It provides valuable insights for policymakers, tax authorities, and scholars aiming to improve compliance strategies for SMEs.

Keywords: Tax compliance, SMEs, Digital era, Bibliometric analysis, VOSviewer

National Research Week 2025

Uniting Research, Industry and Innovation

Ministry of Tertiary Education, Science and Research

PRESENTATIONS
(Foreign Direct Investment and Globalisation)

VENUE
Conference Room

Ministry of Tertiary Education, Science and Research

What matters most for economic growth – FDI or trade?
Evidence from developing and island economies

Presenter: BOODOO Bibi Fatimah[1]*and Prof (Dr.) Boopendra SEETANAH[2]
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Abstract:

This thesis studies the relative importance of Foreign Direct Investment (FDI) and Trade Openness on economic growth utilizing a panel of 25 developing and 15 Island Economies for the period 1996 to 2019. It demonstrates that for developing and island economies, Trade is more significant in explaining economic growth. In fact, the coefficient of trade openness is higher in island countries as compared to developing ones owing to the former's huge dependence on trade liberalization and efficient allocation of resources due to comparative advantage. This research analyses both the short-run and long-run effects among the variables by employing the Autoregressive Distributed Lag (ARDL) Model. The findings indicate that in developing countries, in the short-run, FDI has positive but insignificant effects on economic growth while a negative link is observed between Trade and economic growth. Nevertheless, in the long run, positive relationships are witnessed between FDI, Trade and Growth which support the idea that these variables take time to show a positive and significant effect on the dependent variable. Trade has a positive impact on growth in island economies owing to participation in global trade and diversifying of the countries' export base. FDI is also positive and significant and is used to fund infrastructural development and technology adoption. These results are consolidated by the Granger Causality test where a uni-directional causality link is found between FDI and GDP in developing economies and a bi-directional causality relationship in Island economies. Moreover, this study sheds light on the other important factors driving economic growth in developing and island economies. These results bode well with governmental authorities who will try improving their economy as well as their locational advantage to attract FDI flows.

Keywords: Foreign Direct Investment, Trade Openness, Gross Domestic Product, Developing Economies, Island Economies

Ministry of Tertiary Education, Science and Research

The Impact of Trade Liberalisation on Poverty in Africa: An empirical analysis

Presenter: R. Subramanyan[1]*, B. Seetanah[2] and V. Tandrayen-Ragoobur[3]
Affiliation of presenter: [1,2]Department of Finance and Accounting, University of Mauritius; [3]Department of Economics and Statistics, University of Mauritius
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Abstract:
Although trade liberalisation is being actively advocated as a crucial element of development initiatives, its impact on the poverty reduction is ambiguous. Empirical studies also demonstrate the theoretical ambiguity of the impact of openness regarding the trade-poverty relationship (Le Goff and Singh, 2014). With the opening of economies, trade liberalisation in African countries has improved significantly (Yameogo and Omojolaibi, 2021). Yet, it appears that the substantial gains from opening up economies have been limited in African countries. There is also scant evidence for the case of Africa with few studies have confirmed the benefits of trade to African economies (Sani and Yunusa, 2019; Manwa *et al.* 2019). This study therefore analyses the impact of trade liberalisation on poverty in 30 Sub Saharan African economies over the period 1990-2023 using the panel ARDL model. The study is judged to bring in a value addition given that the continent remains the poorest in the world (Pedro, 2023; Irrum, 2023) and yet resourceful. The results show that the coefficient of the trade openness is not statistically significant in the short run. However, trade openness has a significant impact on poverty in this region in the long run. A 1% increase in trade openness reduces poverty in the long run by 0.03%. The findings suggest that trade openness should not be seen in isolation and complementary measures are required in order to enhance their impact on poverty. Sub-Saharan African countries could continue implementing relevant policies, such as those that support human capital accumulation, allow effective governance and encourage trade openness.

Keywords: trade, poverty, Sub Saharan Africa

Ministry of Tertiary Education, Science and Research

Impact of exchange rate and exchange rate volatility on tourism demand- A gravity model

Presenter: IMAMBOCCUS Rookayyah[1*], SEETANAH Boopen[1], NUNKOO Robin[2] and KHAN JAFFUR Zameelah[1]
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Abstract:
Tourism is one of the largest sectors internationally and thus has attracted the attention of many researchers, who have investigated the key determinants of tourism demand. Exchange rate and its volatility are also deemed as important factors of tourism demand. The tourism industry is an international business by nature and thus, travellers to a particular country will have to convert funds to the currency of the destination country. Hence, unfavourable exchange rates and exchange rate volatility might result in changes in travel patterns, particularly in vacation scheduling. Theoretically, an appreciation in the exchange rate will cause a decrease in inbound tourist arrivals as the country will be considered a costly destination. On the other hand, a country with a highly volatile exchange rate may face a decrease in inbound tourism demand as a highly volatile exchange rate generates an environment of uncertainty and prospective tourists may change their choice to travel to that particular country.

Hence, this study innovatively employs an extended gravity model to investigate the impacts of both variables on tourism demand for 39 destinations during the period 2010 to 2019. The Gravity model interestingly takes into account both inward and outward tourism. The results of the Generalized Method of Moments indicate that the demand related variables namely, the income and population in the destination countries and the dummy for common language have significant and positive impacts on the dependent variable. Exchange rate is found to be an insignificant factor of tourism demand. Exchange rate volatility, the relative price, the distance between the home and host countries and the dummy for the pandemic have negative and significant impacts on the arrivals. Since exchange rate volatility has a significant impact on the dependent variable, there is a need for more robust monetary and fiscal regulations especially in tourism-dependent countries.

Keywords: tourism demand, exchange rate, exchange rate volatility, gravity model

Ministry of Tertiary Education, Science and Research

PRESENTATIONS
(Health and Wellness: Bridging Knowledge and Impact)

SUB THEME
Public and Occupational Health

VENUE
Conference Room

Ministry of Tertiary Education, Science and Research

Unveiling the Initiating Factors of Substance Abuse Among Mauritian Male Adolescents: A Public Health and Mental Wellbeing Perspective

Presenter: SUNT Nitish
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Abstract:

Substance abuse among adolescents poses a serious public health concern in Mauritius, with increasing trends in the consumption of opioids, cannabis, and synthetic drugs. This study aimed to investigate the initiating factors that predispose Mauritian male adolescents to substance abuse, with an emphasis on behavioural, familial, and socio-economic determinants. A cross-sectional, questionnaire-based survey was conducted among 39 male adolescents aged 11–18 years who were undergoing rehabilitation in four Non-Governmental Organisations (NGOs) across the island. Data was analysed using descriptive and inferential statistics through SPSS. The results revealed that low self-esteem, maladaptive peer pressure, inadequate parenting, and dysfunctional family structures significantly contribute to the initiation of substance use. Cigarette smoking and alcohol intake were commonly identified as gateway behaviours leading to illicit drug use. Additional contributing factors included histories of legal conviction, child abuse, and parental mental illness. The study also identified a marked absence of effective social support and engagement from the health system in addressing adolescent substance abuse. This research underscores the multifactorial nature of adolescent drug use and the urgent need for integrated, multi-level prevention strategies. These include early psychological interventions, school-based prevention education, community awareness initiatives, and family-centred support systems. The findings enrich the body of knowledge in behavioural science and mental health by identifying key social determinants and providing evidence-based recommendations for policy and practice. Addressing these underlying factors is essential to reducing the long-term mental health, social, and economic consequences of drug addiction among youth. The study advocates for a holistic public health model that integrates mental well-being, policy reform, and cross-sector collaboration to combat adolescent substance abuse in Mauritius.

Keywords: adolescent substance abuse, mental wellbeing, peer pressure, public health

Ministry of Tertiary Education, Science and Research

A phenomenological study of smoking cessation among Mauritian doctors

Presenter: Kumaren Pillay Samoo[1], Jay Surunder Dobee[1] and Marie Chan Sun[2]*
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Abstract:

Health professionals are aware of the widely disseminated health dangers of smoking and the well-documented health benefits of smoking cessation. Nonetheless, they can be seen smoking in public places and even in workplaces in various parts of Mauritius. There is thus a need to understand this controversial situation and to look into challenges faced by health professionals in their attempt to stop smoking. The aim of this study was to unveil the essence about the lived experience of smoking cessation attempts by medical doctors. Its objectives were to explore their experience of trying to stop smoking and to look into the contexts which typically influenced their smoking cessation journey. The study population for this qualitative research comprised of a purposeful sample of participants who were smokers with at least 3 smoking cessation attempts. Data was collected through in-depth interviews, after ethical clearance was obtained, until saturation of data. The investigators performed "bracketing" as the process of setting aside personal experiences, biases, preconceived notions about the research topic. Data was analyzed using thematic analysis. All 16 participants mentioned that their working environment was a major hindrance to stop smoking attempts. All the participants also put forward that at one point or another in their cessation process, peer pressure was the cause of their failure. The other barriers to smoking cessation included cravings, lack of support, weight gain, fear of relapse and lack of information on quitting methods. The participants of this study explicitly highlight the lack of information and lack of support for successful smoking cessation. Strategies must be implemented to provide psychological and motivational sessions for enhanced self-efficacy to stop smoking. These strategies will reduce the burden of non-communicable diseases, thus contributing to resilient workforce with economic gains.

Keywords: Phenomenology, Smoking cessation, Medical doctors, Peer pressure, Mauritius.

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Ministry of Tertiary Education, Science and Research

Sustaining the Nursing Education Workforce: A Systematic Review of Occupational Well-Being, its related Stressors, and Retention Strategies for Nurse Educators

Presenter: Dr. BHURTUN Hanish[1]*, Professor SAARANEN Terhi [2]*, Dr. VAUHKONEN Anneli [2]*, Dr. KÄHKÖNEN Outi [2]*
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Abstract:

The exploration of work satisfaction among nursing faculty members remains underexplored in nursing education research despite directly impacting faculty retention, job satisfaction, and student outcomes. This systematic review based on mixed-methods analysis synthesizes evidence from 15 studies which identified major stress factors and intervention approaches for nurse educator occupational well-being. The database searches (CINAHL, PubMed, ERIC, PsycINFO, SCOPUS & Web of Science) initially retrieved a total of 850 publications. After removing duplicates and systematically screening using the PRISMA protocol, 15 original publications were identified. The findings highlighted significant contributors to stress, including excessive workloads, role ambiguity, emotional labour, inadequate institutional support, and faculty-to-faculty incivility. The research findings also showed that burnout and secondary traumatic stress affect nursing educators thoroughly because exhaustion and work satisfaction decline significantly, and this raises their professional abandonment rate. Organizations should implement intervention strategies according to the Job Demands-Resources (JD-R) model which aims to reduce the strain between high job requirements and inadequate resources. The implementation of mentorship programs combined with self-care programs and leadership development initiatives and resilience-building strategies acts as key techniques for improving professional well-being among nursing educators. These strategies help reduce stresses related to workload and moral distress. This mixed-method systematic review underlines how institutions should enact support systems through policies that generate work-life balance and sufficient staffing with positive workplace environments. The need for sustained nursing education workforce requires faculty well-being to become a primary strategic objective because current research about this topic remains fragmented. Additional research involving empirical studies should create targeted interventions which effectively help nurse educators overcome their distinctive work pressures and maintain their job satisfaction rates.

Keywords: Occupational well-being, Educators, Job satisfaction, Burnout and stress, Faculty retention

Ministry of Tertiary Education, Science and Research

The role of physical activity in stress regulation and academic performance: An integrative review of coping strategies, resilience, and cultural contexts.

Presenter: Mr. VALAYDUM Nagaissen[1], Mrs. RAMNARAIN AYRGA Hema[2], TAKA Ramneesh[3] and Dr. BHURTUN Hanish[4]
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Abstract:
Background: Despite consistent evidence that physical activity is related to decreased stress and enhanced academic performance, the interplay between physical activity, coping strategies, and psychological mediators (self-efficacy, resilience, etc.) has not been examined. Recent global challenges, such as the COVID-19 pandemic, have shed more light on the need for effective interventions in managing stress and promoting academic success in students.

Purpose: This review aims to synthesize evidence regarding the interplay between physical activity, stress management, and academic performance, with special emphasis on the mediating roles of coping strategies, resilience, and cultural contexts.

Method: A systematic review of 12 studies was performed using five databases according to PRISMA guidelines. The articles were screened and appraised with the Hawker et al. (2002) checklist and analysed thematically.

Results: Four themes emerged from the analysis: physical activity as a stress regulation tool, physical activity as a mediator of adaptive coping and resilience, physical activity as a means of emotional regulation and academic outcomes, and cultural and institutional influences on physical activity.

Discussion: Physical activity alleviates stress, improves recovery, and enhances academic performance through adaptive coping and resilience. However, its efficacy is context-dependent in cultural and demographic terms.

Conclusion: A holistic intervention to enhance mental well-being and academic success is physical activity integrated with coping strategies and resilience training. For diverse student populations, the recommendation is for tailored, culturally sensitive approaches.

Keywords: Physical Activity; Stress Regulation; Academic Performance; Psychological Mediators; Coping Strategies

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Uniting Research, Industry and Innovation

Ministry of Tertiary Education, Science and Research

PRESENTATIONS
(Emerging Topics in Health)

VENUE
Conference Room

Ministry of Tertiary Education, Science and Research

Nutraceuticals derived from local underutilised exotic fruits: Sensory Analysis and Consumer Insights

Presenter: VALAYDUM Nagaissen[1], RAMNARAIN AYRGA Hema[2], TAKA Ramneesh[3] and Dr. BHURTUN Hanish[4]
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Abstract:

There is an increasing scientific and consumer interest in nutraceuticals derived from polyphenol-rich fruits, owing to their potential to promote wellness through antioxidant, anti-inflammatory, and disease-preventive properties. Locally available *Psidium guajava* (pink common guava), *Psidium cattleianum* (red and yellow strawberry guavas), *Syzygium cumini* (java plums) and *Annona muricata* (corossol), were formulated into infusion bags, and the respective physicochemical, phytochemical, antioxidant, and sensory properties of the infusions were characterised. The fruits were oven dried and coarsely ground, which were followed by brewing them in boiling hot water for varying time periods. The phytochemical analyses and antioxidant assays revealed that they were rich in secondary metabolites and high antioxidant capacities. Total phenolic content, total flavonoid content, total proanthocyanidin content, total vitamin C content, and total sugar content were quantified spectrophotometrically. The total phenolic content was significantly different ($p < 0.05$) between the formulations of all fruits except for *P. guajava*. The antioxidant capacities were assessed by the 2,2-Diphenyl 1-picrylhydrazyl (DPPH), 2,2'-azino-bis (3-ethylbenzothiazoline-6-sulfonic acid) (ABTS), and iron chelating assay. The radical scavenging capacity of the formulations was significantly different for all the formulations ($p < 0.05$). Sensory Quantitative Descriptive Analysis (QDA) of the infusions was conducted by nine trained panelists, who agreed on 19 sensory attributes. Statistical analyses through spider web, revealed that the infusions did not show significant difference in their magnitude for sensory attributes except for colour. Multiple factor analysis showed that the better liking of the *Psidium guajava* infusion was related to its fruity after taste. Consumer acceptance showed that neither healthy eating patterns nor variety seeking tendencies influenced the overall liking. It also demonstrated that attributes such as odour positively impacted the liking of the infusions. These findings can successfully contribute to the marketing of these healthy beverages and the promotion of the nutraceutical sector.

Keywords: Fruit infusions, phytochemical analyses, antioxidant assays, Sensory quantitative descriptive analysis, Consumer hedonic.

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A Review of Fingerprint Patterns, Multiple Intelligences, and Their Role in Autism Spectrum Disorder

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Abstract:
This review examines the connection between fingerprint patterns, multiple intelligences, and autism spectrum disorder (ASD), emphasizing their significance in comprehending this neurodevelopmental condition. ASD is characterized by developmental variations that impact social interaction, communication, and behavior. Individuals with ASD exhibit diverse cognitive development, resulting in varying strengths across different domains. In recent years, researchers have begun exploring the connections between cognitive abilities in ASD and alternative biological markers such as fingerprints.

Fingerprint patterns have been recognized as potential biomarkers in various neurodevelopmental and psychiatric disorders, with distinctive variations observed in individuals with ASD. The review delves into Howard Gardner's theory of multiple intelligences, which posits that human intelligence is not monolithic but rather comprises several distinct domains such as linguistic, logical-mathematical, spatial, bodily-kinesthetic, musical, interpersonal, intrapersonal, and naturalistic intelligence. By synthesizing research from fields of neurobiology, psychology, and education, this paper examines how individuals with ASD may exhibit atypical patterns in both their fingerprint formations and intelligences across various domains. The review also explores how these differences could inform diagnostic tools, early intervention strategies, and educational frameworks tailored to the unique cognitive profiles of individuals with ASD. By integrating these fields, the review aims to provide a comprehensive understanding of how fingerprint patterns and multiple intelligences can offer novel insights into the neurodiversity of autism, thereby contributing to better clinical outcomes and more personalized interventions.

Keywords: Autism Spectrum Disorder (ASD), multiple intelligences, fingerprints, cognitive development, intelligence theory, neurodevelopmental disorders

Ministry of Tertiary Education, Science and Research

Health Promotion in Mauritius: Let's Play!

Presenter: GRANT Fiona [1]*, ELAHEEBOCUS Roushdat[1], RAMPAT Smita[1], JAUNBUCCUS Shehzad[1]
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Abstract:
Mauritius faces significant health challenges, with a high prevalence of obesity, diabetes, and cardiovascular diseases. These diseases are well documented but less is known about the mental health of Mauritian citizens (such as subjective well-being, depression, anxiety, or psychological illness). Moreover, it is widely accepted that health promotion strategies that are free, easily accessible, engaging, and enjoyable would be efficient in addressing these health issues. The aim of this study was to evaluate the effectiveness of a novel digital intervention, *BehaviourCoach2.0*, in promoting holistic health in Mauritius. *BehaviourCoach2.0* is an innovative mobile application which incorporates exergaming elements and adopts a holistic definition of health, ensuring that both physical and mental well-being are addressed. Additionally, all features are tailored to the Mauritian context. Based on the Monopoly board game, this application invites participants to digitally roll a dice, then in turn to engage in a number of health activities (cardio, body strengthening, stretching and relaxation, social and mental wellbeing), and accumulate points and rewards upon completion. It provides a gamified health experience that tracks and records players' performances in various fitness and wellness tasks. A national study ($N = 893$) was conducted to measure: (i) the evaluation of *BehaviourCoach2.0*, (ii) the system usability and technology use, (iii) the indices of physical health and subjective well-being, and (iv) self-efficacy for health promotion. Main findings suggested that *BehaviourCoach2.0* was positively evaluated by participants for its excellent system usability. Other factors that influenced the high ratings were the fun and enjoyable element, the visual appeal and the ease of navigation of the game. Reports also highlighted the ability of the application to contribute to increased physical activity and subjective well-being. Results will be further discussed to highlight the role of digital tools in the promotion of overall health in Mauritius, the opportunities and challenges.
Keywords: health, wellbeing, gamification, exergaming, digital health

Ministry of Tertiary Education, Science and Research

Electronic waste as an environmental and public health hazard: Investigating public awareness

Presenter: RAMASAMY COOLEN Preeya V. [1]*, MAKOONDLALL-CHADEE Toshima[1], AUGUSTE Millena[1]
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Abstract:
The electronics industry heavily depends on contemporary technologies for a luxurious lifestyle and is the world's largest and fastest-growing industrial sector. Due to technological advancements, urbanization, industrialization, population growth, and economic development, electronic waste, or "e-waste," is one of the emerging environmental health threats that is spreading quickly throughout the world (Needhidasan et al., 2020). Recycling and disposal are difficult, time-consuming, and possibly dangerous tasks (Rautela et al., 2021). Considering the local context, it is estimated that only about 2-5 % of the 7,000 to 8,000 tons of e-waste generated annually is recycled and 0.4% landfilled (MESWMCC, 2020), an indication of low public participation to e-waste recycling strategies.

The theory of planned behaviour posits that that an individual's behaviour is best predicted by their behavioural intention, which is in turn influenced by their attitude toward the behaviour, subjective norms, and perceived behavioural control (Conner, 2001). A variety of factors, including education, media effect, and social background influence beliefs. Education campaigns, communication strategies, and behavioural change via easily available recycling options and incentives are needed to improve e-waste management (Bokhoree et al., 2012; Fairleigh, et al., 2023). This study therefore aimed to comprehensively evaluate public awareness on regarding e-waste and e-waste management in Mauritius. A thorough quantitative approach was used for this purpose. The main data collection tool used was Google Forms Survey questionnaires, which allowed for the efficient capture of a variety of viewpoints. Two non-probabilistic sample techniques were used to collect data from 384 respondents.

The examination of survey answers showed a notable lack of public awareness and understanding of e-waste, as indicated by responses to key questions. 60% of respondents admitted to not knowing what e-waste is, while 18% claimed to be aware, and 22% were unsure. Moreover, most participants (82%) did not know that electronic waste contained hazardous materials, with only 18% recognizing this information. 41 respondents admitted to being extremely unaware of the potential environmental and health effects of improper e-waste disposal. The inadequate knowledge probably leads to incorrect disposal methods and emphasizes the essential requirement for broader education on the risks e-waste poses. This research findings provide a foundation for growing strategies to improve public consciousness and participation in sustainable e-waste management practices.

Keywords: e-waste, public awareness, environmental and public health

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Ministry of Tertiary Education, Science and Research

POSTER PRESENTATIONS
(Global Economic Interactions)

VENUE
Conference Room

Ministry of Tertiary Education, Science and Research

Financial inclusion as a catalyst for economic development evidence from Mauritius

Presenter: Bibi Fatimah BOODOO[1]*, Prof (Dr.) Boopendra SEETANAH[2], and Dr. Sheereen FAUZEL[3]
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Abstract:
Financial inclusion is crucial for promoting economic growth, alleviate poverty and improving social equality. It is central to target 8.10 of the UN SDGs, stating the bolstering of domestic financial institutions' ability to promote and increase everyone's access to banking, insurance, and financial services. This study examines the impact of financial inclusion on economic development in Mauritius, employing a dynamic time-series analysis. Using data spanning from 1990 to 2022, econometric techniques such as the Augmented Dickey Fuller (ADF) test are applied to assess stationarity while bounds test has been applied to determine co-integration. By employing the Autoregressive Distributed Lag (ARDL) Model, the research examines the long run effects among the variables. Financial inclusion, measured as domestic credit to private sector by banks (% of GDP), is pivotal to integrate the unbanked population into the mainstream economy and foster inclusive economic growth. The findings indicate a significant positive relationship between financial inclusion and economic development. Other explanatory variables which may influence economic development are incorporated, such as education. To expand financial inclusion, the government should enlighten awareness of financial literacy as well as promotion of digitalization to boost economic development. The Granger Causality test has further revealed a uni-directional causality between financial inclusion and economic development. The causal relationships imply that specific economic policies may reinforce development outcomes, which makes labour market and finance reforms essential parts of an all-encompassing development plan. These results offer essential policy insights, helping decision makers in designing policies that guarantee an equal and effective financial system to promote long-term economic growth.

Keywords: Financial Inclusion, Economic Development, ARDL Model, Granger Causality

Ministry of Tertiary Education, Science and Research

Logistics Performance as a determinant of Inward Foreign Direct Investment in Mauritius

Presenter: Muthoora Yadhav[1]*, Seetanah Boopendra[2], and GOPY-RAMDHANY Narvada[3]
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Abstract:

With the globalisation of production where the production process of a product is divided into various parts and each part is undertaken in a different country in which MNCs undertake FDI, the logistics performance (LP) of these countries involved in the global value chain (GVC) must be adequate to move each component in a timely and efficient manner until the final product is gathered and delivered to the final consumer. In this study, LP as a determinant of inward FDI in Mauritius has been analysed using time series analysis over a period of 42 years from 1980 to 2022. For this purpose, a composite indicator called the Mauritius Logistics Facilities Index (MLFI) has been generated by combining four variables namely seaport infrastructure, airport infrastructure, road infrastructure and information infrastructure using Principal Component Analysis (PCA). The dependent variable inward FDI has been proxied by FDI net inflows and the main independent variable LP has been proxied by the MLFI, plus five control variables namely trade openness, market size, education, wages and economic freedom have been added to the regression equation. Applying the Auto-Regressive Distribution Lag (ARDL) model following the mix stationarity of all the variables at I(0) and I(1), a positive and significant relationship between inward FDI and LP is found in the long-run while the relationship is insignificant in the short run. Moving to the control variables, a positive and significant relationship has been found in the long run between trade openness and inward FDI, between education and inward FDI, and between economic freedom and inward FDI. In contrast, a negative and significant relationship has been found in the long run between wages and inward FDI, while the long run relationship between market size and inward FDI is insignificant. In the short run, with the exception of economic freedom, all other variables have insignificant relationships with inward FDI.

Keywords: Foreign Direct Investment (FDI); Logistics Performance (LP); Mauritius Logistics Facilities Index (MLFI); Trade Openness; Market Size; Education; Wages; Economic Freedom; Auto-Regressive Distribution Lag (ARDL); Stationarity; Long Run; Short Run; Positive and Significant; Negative & Significant; Insignificant

Ministry of Tertiary Education, Science and Research

Assessing the Impact of risk on Foreign Direct Investment in the Mauritian Context - A non-linear framework

Presenter: Kilvanee Mootooperian[1], Boopen Seetanah[2], Zameelah Khan Jaffur[3], Reena Bhattu Babajee[4]
Affiliation of presenter: University of Mauritius
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Abstract:

The concept of investment has emerged as a fundamental tool globally. FDI has been a crucial weapon in the economic development of countries, mainly developing ones. This study endeavours to shed light on the risk-FDI nexus in the case Mauritius, through the combination of different types of risk (economic, financial and political). The Principal Component Analysis (PCA) was firstly employed to generate a comprehensive country risk index for Mauritius. The risk and FDI nexus is then explored using a dynamic time series approach using annual data from a time interval of 1980 – 2019. The existence of potential asymmetric effects of risk on FDI is test using a non-linear ARDL (NARDL) model. Both long run and short run have been studied where the findings reveal that the negative changes are significant as compared to the positive changes of risk towards FDI Inflows. The regression results also conclude the presence of asymmetry in the risk-FDI linkage. Furthermore, the graph generated from the cumulative dynamic multiplier confirms that the magnitude of the negative shock of risk is stronger. Finally, the stability and the diagnostic testing corroborate the use of the NARDL in testing the risk-FDI linkage.

Keywords: Foreign Direct Investment, country risk, non-linear ARDL, Mauritius

Ministry of Tertiary Education, Science and Research

The Role of AI in Enhancing Risk Management in Fintech: A Path to Financial Stability

Presenter: HENRIETTE-BOLLI Gaël[1]* and BOODHUN Yudhansingh[2]
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Abstract:

The rapid evolution of financial technology (Fintech) has led to the widespread adoption of artificial intelligence (AI) in risk management, enhancing fraud detection, credit assessment, and regulatory compliance. However, while AI-driven solutions boost efficiency and predictive accuracy, they also introduce new challenges related to algorithmic bias, data privacy, and systemic risks. This study will explore the role of AI in risk management within Fintech, assessing its benefits, limitations, and regulatory implications.

The research will adopt a qualitative approach, relying on a comprehensive review of academic literature, industry reports, and regulatory guidelines to analyse the effectiveness of AI-driven financial risk models. It will examine real-world applications of AI in fraud detection, credit scoring, and market risk prediction, evaluating the ethical and regulatory challenges associated with these technologies. A comparative analysis of regulatory frameworks in major financial hubs will further inform best practices for AI governance in Fintech.

The research highlights how AI enhances risk management by enabling real-time fraud detection and dynamic credit scoring. However, potential challenges such as data security vulnerabilities, lack of explainability in AI-driven decisions, and regulatory gaps necessitate robust governance mechanisms. The research will propose policy recommendations to ensure the responsible deployment of AI in financial risk management, balancing innovation with consumer protection and economic stability. This study will provide valuable insights for policymakers, financial institutions, and Fintech innovators seeking to leverage AI while addressing regulatory and ethical concerns.

Keywords: AI in Fintech, risk management, fraud detection, credit scoring, regulatory compliance

Ministry of Tertiary Education, Science and Research

Enablers and Limitations of Green Supply in the Tourism Industry

Presenter: SICHARAM Prajeshsingh[1]*, LADSAWUT Jeynakshi[1], and COLLET Luciani Anne[1]
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Abstract:

Green consumerism in Mauritius' tourism sector is influenced by a complex interplay of motivations, barriers, and stakeholder actions. This study integrates qualitative insights from key industry stakeholders that explores the drivers and constraints of adopting eco-friendly practices among the tourism supply chain in Mauritius. The findings of this study reveal that while companies are motivated by both intrinsic factors, such as environmental ethics and corporate social responsibility, and extrinsic influences, including consumer expectations, the latter remains a secondary driver. Despite growing interest in sustainable tourism, companies face significant challenges, including infrastructural limitations, high costs of sustainable materials, and resistance from employees and customers to adopt green consumerism. Consumer demand plays a nuanced role in shaping green practices. While some businesses perceive customer interest in sustainability, many initiatives stem from a deep-rooted commitment to environmental stewardship rather than direct market pressure. Nevertheless, green consumerism has influenced service modifications, such as the adoption of hybrid transport, sustainable dining options, and waste reduction strategies. Employee engagement is pivotal in operationalising sustainability efforts, with training programs fostering innovation and reinforcing pro-environmental behaviours. However, key obstacles persist. Infrastructure deficits, lack of government incentives, and resistance to behavioural change hinder widespread adoption of sustainable practices. Additionally, willingness to pay a premium for eco-friendly services varies among tourists, reflecting a gap between pro-environmental attitudes and actual purchasing behaviours. The study underscores the need for collaborative industry efforts, policy support, and strategic interventions to mainstream sustainability. The findings align with the Value-Belief-Norm Theory, highlighting the role of individual values, beliefs and personal norms in shaping environmental actions. A holistic approach that integrates stakeholder cooperation, regulatory support, and consumer awareness is essential for fostering a more sustainable tourism sector in Mauritius.

Keywords: Green Supply Chain, Green Consumerism, Sustainable Tourism, Responsible Behaviours

Ministry of Tertiary Education, Science and Research

Assessing the Impact of Foreign Value Added on Regional Value Chain Integration:
Empirical evidence from Africa

Presenter: Kawthar Emambucus
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Abstract:

Value chains have transformed the way firms engage in international production networks, taking advantage of low production costs in countries to specialise in specific tasks along the production chain and eventually increasing their share of exports both regionally and globally. The value chain integration stems from the concept of vertical specialisation, initially shaped by Hummels et al. (2001), and essentially represents the disintegration of production and trade in intermediates. Vertical specialisation can occur in two main ways, namely by using foreign inputs in exports, also known as backward participation, and forward participation, which is the share of intermediates that are further re-exported to third countries. While empirical studies are rather sparse and are divided into qualitative and firm-level determinants of GVC participation, other studies have described the determinants of GVC participation as structural or policy factors and non-policy factors affecting trade in value-added. Besides, no empirical insight has been given to the small island economy of Mauritius on its integration along the value chain. Consequently, this research aimed to shed light on GVC and RVC integration for Mauritius. The objective of the current study was to assess the extent to which GVC participation had an impact on domestic value added or the contribution to the GDP of the Mauritian economy. This study essentially assessed the integration of Mauritius into Global Value Chains by investigating the long-run relationship between Foreign Value Added or backward participation on Domestic Value Added, that is, part of exports created in the domestic economy or the share of a country's exports that contributes to GDP and is thus a measure of economic upgrading. Using a VECM approach, the results showed that imported foreign value added contributed to an increase in domestic value added or economic upgrading by 0.24 percent.

Keywords: GVC, RVC, Vertical specialisation, backward participation, forward participation

Ministry of Tertiary Education, Science and Research

Effect of high stress hormone levels on neural tube closure during embryonic development.

Presenter: NURSIMULU Deeksha Aarti[1*], PUGO-GUNSAM Prity[2], and SCHNEIDER-STOCK Regine[3]
Affiliation of presenter: [1]Department of Bioscience, University of Mauritius, Mauritius; [2]Department of Bioscience, University of Mauritius, Mauritius; [3]University Hospital Erlangen, Germany
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Abstract:
Published research suggests that too much stress during pregnancy might elevate the chances of preterm births and babies with low birth weight. High incidence of LBW (20.7% in 2023) in Mauritius is a major public health concern. LBW infants face a twentyfold increase in complications, including neural tube defects as well as cognitive and motor development delays. This study explored the effects of heightened stress hormone on neural tube closure, a critical step for proper brain maturation. The chick embryo animal model is used to examine how significant stress exposure affects the Sonic Hedgehog (SHh) signalling pathway essential for neural differentiation and maturation. Fertile chick eggs were incubated for three days, followed by an injection of 15μg of corticosterone into the yolk sac to simulate high stress conditions. The eggs were further incubated for four hours before collecting the embryos for analysis. Macroscopic image evaluation of chick embryos revealed that those in the control group (0.5% DMSO) displayed normal neural tube closure and flexion, indicating typical development as opposed to embryos treated with 15μg of corticosterone. Distances measured between the first five pairs of somites showed statistically significant increases ($p<0.05$) with corticosterone-exposed embryos suggesting potential impairment in somite segmentation and neural tube closure. RT-qPCR analysis of SHh pathway gene markers indicated a significant upregulation of the *Ptch1* receptor in corticosterone-treated embryos, while levels of the *Shh* ligand and *Gli1* were significantly reduced. These findings suggest that corticosterone adversely affects embryonic development by inhibiting the SHh signalling pathway, disrupting neural tube closure and neural crest cell migration, affecting the maturation of neuronal structures essential for the proper functioning of the central and peripheral nervous systems. These results underscore the significant impact of elevated stress levels on proper neural tube and brain maturation, which might subsequently affect cognitive and motor development.

Keywords: neural tube, embryonic development and stress

Ministry of Tertiary Education, Science and Research

Wellbeing of Women in Mauritius: Investigating the Role of Sociodemographic Characteristics on Wellbeing

Presenter: P. Saddul[1]*, Dr. F. Grant[2]
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Abstract:

Women comprise 52% of the Mauritian population, and their wellbeing is an outcome of significant societal importance. Several studies have found that wellbeing is closely linked to better health, longevity and social connectedness. The current research examines the state of wellbeing among adult women in Mauritius, aiming to determine how sociodemographic and psychological factors—such as age, education, marital status, and perceived social support—along with Gender-based Violence (GBV), influence individual scores on various subscales of wellbeing.

This study is non-experimental and cross-sectional in design, using a quantitative survey to assess the variables. The sample consisted of 457 Mauritian women. Measures included demographic variables (age, education level, and marital status), psychological variables (perceived social support, psychological wellbeing, life satisfaction, and perceived wellness), and GBV. The results show that perceived social support is significantly correlated with all dimensions of wellbeing. Age and marital status were positively correlated with life satisfaction. Additionally, married women and those with higher education levels reported higher psychological wellbeing. Age, education level, and marital status significantly influenced participants' perceived wellness. Psychological and verbal abuse was found to be the most prevalent form of GBV. GBV was found to have a negative correlation with all dimensions of wellbeing.

This project represents a significant step toward understanding the wellbeing of women in Mauritius. It contributes valuable knowledge about how various sociodemographic factors influence women's wellbeing. The findings can inform social agendas and campaigns aimed at promoting wellness and empowering society with resources to improve women's overall wellbeing.

Keywords: Women, wellbeing, quantitative, mental health, Gender-based Violence.

Ministry of Tertiary Education, Science and Research

Humanizing Healthcare: A Systematic Review on the Impact of Arts and Humanities in Medical Education

Presenter: KEENOO Bibi Sumera[1]* and SOODHUN Mohamud Ayman Khan[1]
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Abstract:

Medical education increasingly recognises the importance of humanistic qualities, such as empathy, communication, and well-being, in producing competent, compassionate physicians. Medical Humanities (MH) and Health Humanities (HH) integrate arts-based and reflective practices into health professions education to develop these personal competencies. This systematic review synthesises findings from 52 original studies published between 2000 and 2024 that evaluated the impact of MH/HH interventions on medical students, interns, and residents.

Searches were conducted using PubMed and Google Scholar, following PRISMA 2020 guidelines. Studies assessed outcomes in empathy, communication, observation, ambiguity tolerance, resilience, and well-being using qualitative and quantitative methods. Most interventions occurred in the United States, involved visual arts or narrative practices, and were delivered to preclinical medical students.

Findings show strong evidence for improvement in empathy and clinical observation skills through structured humanities modules. Moderate support was found for enhancing resilience, ambiguity tolerance, and self-care. Humanities interventions such as forum theatre, reflective writing, visual arts analysis, and service-learning projects fostered deeper emotional insight and improved interpersonal effectiveness among medical learners.

The review highlights a growing global trend toward integrating human-centered approaches in health education. It also reveals a need for more research in developing countries and long-term evaluations of impact. This synthesis offers clear implications for health policy, curriculum reform, and the design of emotionally intelligent learning environments.

Keywords: Medical humanities, empathy, health education, resilience, observation skills, systematic review, humanism in medicine

Ministry of Tertiary Education, Science and Research

Re-envisioning Health and Wellness: Integrating Spiritual Insights from the Pātañjala Yoga Sūtras

Presenter: DABEE Rajendrakumar
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Abstract:

For millennia Indian thinkers have been reflecting on the nature, purpose and goal of human existence. They came to the understanding that man is fundamentally a spiritual being, inextricably connected with his environment. A meaningful life (*puruśārtha*) is one that enables realization of this Truth, healthy body and mind being primordial to its pursuit. However, with life comes suffering (*duḥkha*). The Sāṅkhya Philosophy categorizes suffering as external (*adhibhautika*), internal (*ādhyātmika*) and supernatural (*adhidaivika*). While WHO's definition of what is health is holistic, modern healthcare adopts primarily a reductionist approach to human suffering. It addresses the *adhibhautika*, minimizes the *ādhyātmika* while largely overlooking the *adhidaivika*. Moreover, there is a supramental dimension to the *āḍhyātmika* which is ignored. Thus, when healthcare fails, afflicted and desperate patients and their loved ones, resort to unconventional, potentially harmful and exploitative, alternatives. A more inclusive definition of health, on the other hand, which acknowledges the metaphysical dimension of man based on Sāṅkhya-Yoga would pre-empt such incidents while enabling him to achieve the spiritual goal (*kaivalya*). A comprehensive review of literature on the meaning of health and various approaches to well-being indicates that inclusion of the metaphysical dimension of suffering is limited and varied. Moreover, the term 'spirituality' is variously understood. None, however, attempt to present an integrative approach to health and well-being from the perspective of the *duḥkhatraya*. Adopting a qualitative approach, this paper proposes a model inspired from the *Pātañjala Yoga Sūtras*. Hermeneutically analysing selected aphorisms (*sūtras)* from the first and second chapters *(samādhi and Sādhana pāda)* it addresses the metaphysical aspect of suffering. The research recognizes inherent limitations and mitigates them through triangulation. Ultimately the paper contributes to contemporary discourse on the conception and perception of Health and Well-Being for a spiritually meaningful life, informs health-policy makers and invites new approach to health and wellness.

Keywords: Good life, Spirituality, Duḥkha (Suffering), Pātañjala Yoga Sūtras, Integrative Healthcare

Ministry of Tertiary Education, Science and Research

Investigating the relationship between Safety Climate and Safety Behaviour in a Textile-based organisation in Mauritius

Presenter: KODYE-DOMAH Dayalutchmee[1]*, SOBHA Leena Devi[2]
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Abstract:

A safe and healthy work environment is a fundamental human right and a pillar for sustainable development. Despite the tremendous advancements made worldwide in the field of occupational safety and health (OSH), work-related illnesses and accidents continue to occur on a regular basis, which impact on employees, businesses, the community, and eventually on the economy of the country. The International Labour Organization (ILO) reported that an estimated 2.78 million people die at work each year as a result of inadequate safety procedures, management systems, human error, and structural inefficiencies. In recent decades, it has been well documented that safety climate is associated with safety behaviour and accidents in the workplace. This study set out to assess the maturity level of safety climate in a textile-based organisation in Mauritius and examine how it relates and correlates to safety behaviour. There were 218 respondents who participated in this quantitative study, from which data was collected using a questionnaire. The safety climate, safety behaviour, and the respondents' sociodemographic traits were all recorded using a validated questionnaire. According to the study's findings, the organisation's safety climate had an adequate level of maturity and there was a strong correlation between the safety climate and other sub-dimensional factors. The study also demonstrated a positive link between safety climate and safety behaviour. This study underlined that safety behaviour might be enhanced by raising the level of safety climate. As a result, raising the safety climate effectively lowers the frequency of workplace accidents.

Keywords: Sustainable Development, Occupational Safety and Health, Workplace Accidents, Safety Climate, Safety Behaviour

Ministry of Tertiary Education, Science and Research

Application of Vision Transformers and Explainable AI for Artefact detection in Esophagael Endoscopic images

Presenter: BISSOONAUTH-DAIBOO Preeti [1]*
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Abstract:

Esophageal cancer (EC) remains the disease that has one of the highest incidence and highest mortality rates in global cancer statistics, emphasising the imperative to enhance diagnostic precision and reliability through the use of advancing technologies. While AI enhanced systems can improve the early detection of EC considerably, the prevalence of artefacts (1 in 4 frames) during endoscopy procedures compromises the developed systems significantly, leading to unreliable medical decision making. Vision transformer (ViT) networks have demonstrated outstanding performance in handling medical images by presenting distinctive features advantageous for image processing. However, the application of ViT for detecting and classifying artefacts in endoscopic images, particularly in classifying colour misalignment artefacts is still subject to continual refinement and enhancement. Our work aims to investigate the implementation of ViT for classification of colour misalignment artefacts in esophagus endoscopy images. Moreover, even though ViT has been a major breakthrough, its acceptance for real world applications is often jeopardised due to the lack of interpretability of how the classification results have been reached. Consequently, Explainable Artificial Intelligence (XAI) techniques have been explored to understand the criteria used to achieve the outcome. Several variants of the ViT and Data Efficient image Transformer (DeiT) networks have been fine-tuned and applied to our dataset in order to improve and evaluate their performance in colour misalignment classification in esophagus endoscopic images. Furthermore, XAI methods have been implemented to provide the criteria used by the network in reaching the classification results. Our fine-tuned ViT model, achieves an accuracy of 93.46%, precision of 93.48%, recall of 93.46% and F1 score of 93.46% surpassing InceptionResNetV2, a state-of-the-art model based on CNN, with an accuracy of 89.10%, precision of 89.10%, recall of 89.10% and F1 score of 88.23%. The GradCAM XAI technique has also highlighted the deterministic features used by the ViT model.

Keywords: Vision Transformer, CNN, Explainable AI, Artefact detection, Esophageal Endoscopic images

Ministry of Tertiary Education, Science and Research

The Plastic Paradox: Toxic Waste or Daily Necessity? Unveiling the Environmental and Human Health Impacts among Mauritian citizens

Presenter: T. Makoondlall-Chadee[1]* and J. Appadoo[2]
Affiliation of presenter: [1] School of Sustainable Development and Tourism, University of Technology, Mauritius; [2] Sodnac Quatre-Bornes
Email address of presenter: jelenappadoo@gmail.com

Abstract:

Plastics have taken the role of a wide range of products and are now found in everyday household items, technology, medical supplies, and packaging. A world without plastics seems inconceivable today. The numerous beneficial qualities that plastics provide as a material have been cited as the reason for its extensive use, yet plastic pollution remains one of the pressing environmental and health related challenge of our time. Over the past forty years, the amount of plastic produced and used worldwide has increased to astounding levels (Barbir, et al., 2021) with the global plastic production growing from 1.5 million metric tons in 1950 to over 400.3 million metric tons in 2022. With this trend it is forecasted that by 2050 it is predicted that 34 billion metric tons of plastic would be produced worldwide. As suggested by (Pilapitiya & Ratnayake, 2024) due to its durability, it is unfortunately confirmed that plastics remain within the environment for long periods of time before it undergoes fragmentation or degradation into micro or nano plastics which in turn carry impacts on the environment and human health (Barrowclough & Eugui, 2021). In this talk, we explore the level of awareness of residents of Mauritius, a small island developing state in the Indian Ocean, particularly vulnerable to plastics pollution. The work focuses on gathering their insight about the harmful effects if plastics, from toxic chemicals in our food and water to the destruction of our marine ecosystems. Furthermore, the objectives were to explore the attitudes and behaviours of the citizens towards plastic usage and sustainable practices. Through a voluntary quantitative survey among 302 participants, key findings revealed that the general awareness about the direct impacts of plastic pollution on environment and health is high in Mauritius taking into consideration most respondent was young and educated. Results obtained indicatively suggested that Mauritian through the participants revealed that they are making progress in changing their behaviour to reduce their plastic consumption and through research and data we uncover the gap in knowledge and education that influence proactive actions. From the findings of this study, we can contextualise the dangers of plastic pollution and review how to drive collective responsibility of on and all towards shifting to sustainable alternatives for a cleaner and healthier future for Mauritius, which could serve as a baseline for authorities.

Keywords: plastic pollution, microplastics, environment impacts, human health, behavioural and climate change

Ministry of Tertiary Education, Science and Research

DAY 3
Wednesday 16 April 2025 (morning)
Mahatma Gandhi Institute

THEME
Cultural and Ethical Foundations for a Sustainable Society

VENUE
Subramania Bharati Lecture Theatre,
Mahatma Gandhi Institute, Moka

Ministry of Tertiary Education, Science and Research

Introduction

The National Research Week at MGI was held on 16 April 2025 from 9.00 a.m to 12.00 noon. The theme chosen by MGI and approved by Mauritius Research and Innovation Council was 'Cultural and Ethical Foundations for a Sustainable Society'. The rationale for such a selection was to brainstorm on the various strategies to be employed in the maintenance of cultural and ethical values in Mauritius to enable MGI to better situate itself in its role of fulfilling its mission and objectives amongst the present and future generations. The pressing need of establishing moral and ethical values among the population with the advent of the unstoppable fast growing digitalized and AI-invaded society was another backdrop for the choice. Consequently, the panel discussion also focused on 'Social Innovation for a Sustainable Society in the Fast-Growing Digital World'.

The above Research event was divided into four main activities: Opening session, Keynote address, Presentation of paper and Panel discussion. A light refreshment was served during the registration period from 9.00 to 9.30 a.m.

In the opening session, Dr. the Honourable Kaviraj Sharma Sukon, Minister of Tertiary Education, Science and Research, Prof T Bahorun, PhD, GOSK, Executive Director of MRIC, Dr. Veedotma Koonjal, Director (MGI) and Dr. Jeevendiren Chemen, Head Centre for Research & Coordinator of National Research Week (MGI) were present and they addressed the audience on the need and relevance of the National Research Week and the role of MGI in the research arena of Mauritius and in the region, inter-alia.

The opening session was followed by an online Keynote speech by Mr Marabin Maindan Muthiah on the theme, 'Cultural and Ethical Foundations for a Sustainable Society, on the Google Platform. The Speaker commended the initiatives of the Government and the MGI for organizing such an event and argued the need to anchor cultural and ethical values in the present and future generations. He elaborated on the relevance of Fine Arts and Performing Arts in instilling cultural and ethical values in the early childhood years.

Ministry of Tertiary Education, Science and Research

Introduction

Mr Muthiah also critically examined the strengths, such as the rich cultural and ethical traditions of societies, the weaknesses, such as the erosion of traditional values and suggested to re-integrate cultural ethics into education to foster community-based sustainability practices, and to encourage intergenerational dialogues. The presence of Mr Marabin Maindan Muthiah as the keynote speaker added substantial value to the National Research Week.

The keynote speech was followed by two parallel sessions of presentation of research papers by academic staffs from MGI and other sister institutions. A total of 12 papers were presented by academics from MGI, MIE, UoM and UdM. The papers presented focused on themes such as Religious Values, Philosophical Perspectives, Communication Studies, Children Education, Gender issues, Mauritian Literature, Performing Arts, Bhojpuri and Creole language, inter alia. Some 120 participants were present in the Subramania Bharati Lecture Theatre at MGI, of which 70 hailed from MGI itself and some 40 participants from other institutions (MIE, OUM, UoM, Polytechnics, UTM, UDM) and the public.

The Research events ended with a panel discussion on 'Social Innovation for a Sustainable Society in the Fast-Growing Digital World' with Dr. Chemen as the Moderator and five panellists from MGI and other sister institutions, namely Open University of Mauritius and University of Technology, Mauritius. The diverse backgrounds of the five panellists made the panel discussion very thought provoking.

Ministry of Tertiary Education, Science and Research

Keynote Address
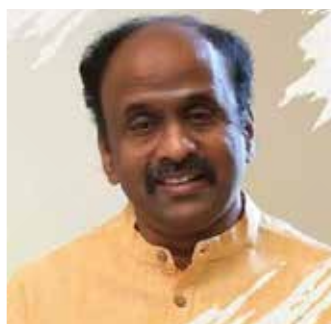
Mr Marabin Maindan Muthiah,
Author, Poet, Social Reformer and Public Speaker
Namadhu Nambikkai, Coimbatore, India

Mr Marabin Maindan Muthiah is an accomplished Poet, Author, Popular Speaker and an Activist advocating the cause of culture and tradition. He became a public speaker at the age of 16 and has been delivering lectures on nuances of Indian culture and Tamil literature for more than 4 decades. With a vast experience of addressing more than 2000 stages, he has also developed unique modules for his training sessions for students to impart values and traditional aspects.

So far, he has penned 76 books on various themes including literature, self-development, culture, poetry, spirituality and biography. He is also the Publisher and Editor of a 20-year-old monthly journal 'Namadhu Nambikkai' propagating leadership qualities and acquaintances, with cultural treasures of the east. He has been honoured with more than 25 awards from various esteemed forums, organisations and the State Government of Tamilnadu, India.

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PRESENTATIONS

VENUE
Subramania Bharati Lecture Theatre,
Mahatma Gandhi Institute, Moka

Ministry of Tertiary Education, Science and Research

Beyond GDP: The Ancient Wisdom of Purusārtha as Tomorrow's Sustainability Blueprint

Presenter: Dr. (Mrs) Vedika Hurdoyal Chekori
Affiliation of presenter: School of Indological Studies, Mahatma Gandhi Institute
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Abstract:

The proposed title intends to examine the ancient Indian philosophical framework of *Purusārtha* not merely as theoretical wisdom but as a practical paradigm for re-imagining modern sustainable development.

By analyzing the four *Purusārtha* namely, *Dharma* (righteousness), *Artha* (prosperity), *Kāma* (desire), and *Mokṣṣa* (transcendence), the study demonstrates how this integrated approach offers solutions to contemporary challenges in economic measurement and wellbeing.

The research aims to explore how the *Purusārtha* can transform our understanding of progress beyond GDP towards more holistic measures like Bhutan's Gross National Happiness (1972), the UN's World Happiness Index (2012) and the OECD Better Life Index (2011). Using empirical case studies and comparative analysis, it will investigate as to how communities applying these principles demonstrate higher wellbeing indicators while maintaining ecological footprints.

This interdisciplinary approach is an attempt towards social innovation through humanities, offering policymakers, entrepreneurs, and communities a framework that balances ethical boundaries, material sufficiency, mindful enjoyment, and seeking deeper meaning that are essential dimensions of progress in the 21st century.

Keywords: Purusharthas, GDP, Sustainability, Well-being, SIDS, Holistic.

Ministry of Tertiary Education, Science and Research

A Dharmic Approach to AI Ethics; Insights from the Bhagavadgita and Valmiki Ramayana

Presenter: Ms Rajshree Beneymadoo
Affiliation of presenter: School of Indological Studies, Mahatma Gandhi Institute
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Abstract:

Artificial Intelligence (AI) raises critical ethical challenges, such as bias, accountability, autonomy and societal impact. While Western ethical frameworks like utilitarianism (maximizing overall good) and deontology (focusing on duties and rights) dominate AI ethics, this study explores alternative perspectives based on Hindu ethical principles. Through qualitative textual analysis and hermeneutic interpretation of the Bhagavadgītā and the Vālmīki Rāmāyaṇa, the study investigates how dharma (duty), karma (action and consequences) and nyāya (justice) inform responsible AI development. The Bhagavadgītā provides guidance for ethical decision-making in complex, ambiguous situations, while the Vālmīki Rāmāyaṇa offers insights into just leadership and moral accountability. Findings suggest that these texts advocate for fairness, responsibility and collective well-being in Artificial Intelligence governance, offering a contrast to individualistic approaches in Western models. This research proposes a dharma-based ethical framework that prioritizes human-centered values in Artificial Intelligence, highlighting the relevance of Indian ethical principles in addressing modern technological dilemmas.

Keywords: AI ethics, Bhagavadgītā, Vālmīki Rāmāyaṇa, Artificial Intelligence Governance, Hindu ethical principles

Ministry of Tertiary Education, Science and Research

The Mauritian Creole Constitution 1968 - Its impact in a Multicultural Society

Presenter: Dr. Rajendra Parsad Gunputh
Affiliation of presenter: University of Mauritius
Email address of presenter: rpgunput@uom.ac.mu

Abstract:

The young Republic of Mauritius took a new initiative and a heavy challenge in bringing the old colonial Mauritian Constitution 1968, based on Westminster model, written in English as the official language with a Creole version (Auguste Toussaint, 1971). The original version was translated by eminent experts, scholars and academics of the University of Mauritius in a Creole version; and Creole is taught as a new module at Ordinary Level for Mauritian students for their School Certificate.

Creole, as a national language, has a very long history behind it as a similar approach developed gradually in most neighbouring islands in the Indian Ocean (Agalega, Chagos, Seychelles, Rodrigues, Reunion) with more than 2 million speakers in only this region of the globe; and is one of the most influential languages in Mauritius though English is the official language on the small island of Mauritius and different countries have their own Creole (Haiti, Fidji) (Baker 1972).

The main research question is whether Creole may adapt itself in mot curriculum development as a regional and as an international language on the assumption that it is spoken in most islands of the Indian Ocean (Adone.1994)? As a source of primary data, a questionnaire is specially designed where a certain number of applicants (n= 90) would fill in strict confidentiality with a Likert Scale coupled with secondary data (1,2 and 3) followed by some field work with interviews with academics and researchers, who had the huge task of translating the Constitution 1968 in Creole and who contributed in writing for the first time a dictionary in Creole. In addition, what should be amended in our law and legislation for legal debates to be officially used in Creole in Mauritian courts, and in Parliament and the National Assembly of the Republic of Mauritius?

What shall come out of this presentation will definitely shed more light on some cultural aspects in our democratic society; and its impact on the Mauritian multicultural/cosmopolite culture and tradition (Kriegel, Sibylle; Baker, Philip (2013).

Keywords: Creole Constitution 1968, Creole dictionary, Treaty Capitulation 1810

Ministry of Tertiary Education, Science and Research

Vasudhaiva Kutumbakam & Ubuntu: Ethical Synergy for Sustainable Peace and Unity in Mauritius

Presenter: Mr Roshan Boodnah
Affiliation of presenter: School of Indological Studies, Mahatma Gandhi Institute
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Abstract:

Modern socio-political differences and ecological deterioration can be addressed by two philosophical approaches: ***Vasudhaiva Kutumbakam*** (the world is one family) and ***Ubuntu*** (I am because we are). Both of these concepts provide healthy foundations for harmonious cohabitation. These ideologies, which originated in India and Africa, seek balance between the individual and the group, well-being and duty and peace and conflict. In a multicultural Mauritian nation, the ethical principles of *Vasudhaiva Kutumbakam* and *Ubuntu* provide a revolutionary foundation for **sustainable peace.** These ethics emphasize interconnectedness, respect for diversity and the common weal of all—principles that are seminal to forging **social cohesion** in diversity. This study uses case studies and philosophical reflection to highlight the importance of reframing peace as an **ethical construct** that includes human dignity and social harmony, rather than only the absence of violence. Sustainable peace is not an aspiration; it is an ethical imperative.

Keywords: Vasudhaiva Kutumbakam, Ubuntu, sustainable peace, social cohesion, ethical construct

Ministry of Tertiary Education, Science and Research

An Exploration of the Determinants and Mechanisms of Religious Environmentalism in Mauritius using a Multilevel Interdisciplinary Framework

Presenter: Mr Vencatessen Ponin
Affiliation of presenter: PhD Canditate, Université Des Mascareignes
Email address of presenter: vnponin@student.udm.ac.mu

Abstract:

This research focuses on the influence of spiritual/ religious values and worldviews on environmental concern in the Mauritian context. It makes use of a multi-level interdisciplinary paradigm to explore the determinants and processes leading to religious environmentalism by combining appropriate quantitative and qualitative methodologies and by integrating ideas and theories drawn from different streams of research including psychological theories of environmentalism, value theories as well as the social and cognitive psychology of religion. A mixed methods approach consisting of surveys and in-depth interviews is being employed for the data collection. Results will be analysed via a range of tools such as factor analysis, correlational analysis, structural equation modelling and thematic analysis. Research is expected to contribute to the ongoing efforts seeking to probe the determinants, mechanisms and pathways of spiritual and religious environmentalism and will assist policymakers to better engage religious communities in efforts to promote sustainability and environmental stewardship.

Ministry of Tertiary Education, Science and Research

Building a Sustainable Society through Performing Arts Education and Promotion of Culture: The role of MGI and RTI

Presenter: Dr. Papayah Goorimoorthee
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Email address of presenter: pgoorimoorthee@mgi.ac.mu
Contributors: Dr. Adi Sankara Peruman, Head Centre Technology-Enabled Learning; Mr Karamlall Mantadin, Director, RTI
Affiliation of Contributors: Mahatma Gandhi Institute

Abstract:

There has been a growing interest among policy makers and scholars to consider culture and performing arts as crucial elements of sustainable development. This academic paper explores the symbiotic relationship between culture and innovation, specifically examining how creative sectors can contribute to the sustainable development of a nation. This study aims to define the state of the experiences that tackle the issues of SDGs via performances, creativity and innovations. The authors draw from the literature on sustainability, the arts and culture highlighting the transformative power of performing arts in fostering cultural sustainability and the role of MGI and RTI as cultural and educational institutions of Mauritius.

In conclusion, this research contends that the creative sectors can serve as catalysts for transformative change in a nation's journey towards sustainability. This paper contributes valuable insights to the discourse on the intersection of culture, innovation, and sustainability. By recognizing and leveraging the intrinsic link between culture, education and innovation, policymakers, business leaders, and cultural practitioners can collaboratively chart a course of action for a more resilient and vibrant future for the nation.

Ministry of Tertiary Education, Science and Research

Communication Strategies to Support the Circular Transformation of Businesses in Mauritius

Presenter: Mrs Nooreen Lallmamode Ittoo
Affiliation of presenter: School of Fine Arts, Mahatma Gandhi Institute
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Affiliation of Contributors: [1] Dr. Mahendra Gooroochurn, Mechanical & Production Engineering, University of Mauritius; [2] Mrs Nalini Gopaul, School of Fine Arts, Mahatma Gandhi Institute; [3] Mr Nirmal Hurry, School of Fine Arts, Mahatma Gandhi Institute

Abstract:

This research paper's scope is to shed light on the potential communication strategies that can be adopted to facilitate communication amongst SME's focusing on sustainability. A comprehensive review of data and research findings from academic journals, business reports are presented, together with practical experience with communication strategies for presenting circular design practices at art exhibitions such as Nou Le Morne Festival, Natural Fibre Exhibition and an International art exhibition "Global Warming/ Warning" at Flic-en-Flac beach. The communication strategies adapted to the local context to meet the barriers and challenges identified will be discussed by outlining the communication strategies that can be considered in existing projects within the private and public sectors through sustainable art exhibitions in event branding. Our contribution through the paper is to address the reforms needed within organisations (Private and public) to support the strategies formulated for SMEs in the circular economy transformation of Mauritius.

Keywords: Circular SME's business model, Green marketing strategies, sustainable art exhibitions, Industry 4.0

Ministry of Tertiary Education, Science and Research

The Way Forward for Bhojpuri Language in Mauritius

Presenter: Mr Jayganesh Dawosing
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Email address of presenter: jai@mgi.ac.mu

Abstract:
'What are the challenges and opportunities for the revitalization and sustained use of Mauritian Bhojpuri in contemporary Mauritius?'

This question allows exploration of factors such as language shift, cultural identity, government policies, education, media representation, and the role of younger generations in preserving the language.

A mixed-methods approach will be used to analyse the sociolinguistic status of Mauritian Bhojpuri and suggest ways to promote its preservation and evolution. Thematic analysis of interviews and focus group discussions will be used to identify common concerns and trends.

Expected Outcomes: Insights into the current state of Bhojpuri in Mauritius along with recommendations for language preservation and promotion.

By embracing strategic approaches to education, media, and cultural recognition, Mauritius can help ensure that Bhojpuri continues to thrive, offering a lasting connection to the past while evolving for the future.

Keywords: Mauritian Bhojpuri, Language Revitalization, Sociolinguistics, Cultural Identity, Language Preservation

Ministry of Tertiary Education, Science and Research

Ethics, Coastal Communities and Blue Resilience: An Examination by Case Studies

Presenter: Miss Helvina Neerunjun
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Email address of presenter: henna.neerunjun@mgi.ac.mu

Abstract:

The island of Mauritius is highly exposed and susceptible to natural hazards such as tropical cyclones, storm surges and rising sea-levels, necessitating a focus on blue resilience to protect the coastal communities and ecosystems. Some nature-based projects have been carried out to build coastal capacity towards climate extremes in Mauritius, including coral reef ecosystem monitoring and mangrove restoration at various sites across the island. Since coastal communities are disproportionately affected by the impacts of climate change, they possess traditional norms of sustainability, often grounded in local resources and community-led practices, and on which they have historically relied to protect their nature-dependent livelihoods and ecosystems.

Problem Statement: However, responses to climate extremes in the recent past encourage much reflective thinking on the way local communities interact with nature and advocate for ecological transformation and how these modes of living can be re-organised in an environment-friendly way to foster sustainable development in coastal regions. Although the youngest generations are extremely aware of changes in their environment, few of them are able to demonstrate awareness of ethical considerations that arise from human-environment interactions.

Research Methodology: This study uses expert opinions, literature review, focus group discussions and case studies to argue that shared ethical responsibility can promote resilient communities who are able to protect the ecological and economic values of coastal regions.

Research Questions: Firstly, it will investigate the role of local perspectives, such as know-how, past challenges and adaptations that emerge from local cultures, in resilience-building strategies. Secondly, it will explore how local participation can be an effective means of achieving morally conscious decision-making that addresses community needs and serves as a model for other blue resilience building initiatives.

Research Outcome: Ultimately, this study seeks to demonstrate how meaningful community engagement and ethical practices can support climate change adaptation in Mauritius.

Keywords: Climate Change Adaptation, Resilience, Ethical Responsibility, Coastal Zones, Mauritius

Ministry of Tertiary Education, Science and Research

Bridging Ethics and Arts in Narration using Digital Storytelling Tools in Early Childhood Education

Presenter: Mrs Deepa Sookara-Ramchurn
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Abstract:
Digital storytelling tools have been deemed highly effective within the multicultural environments like Mauritius where the conventional narratives bridge with new pedagogical approaches to promote ethical awareness. This research analyses how digital storytelling encourages creativity, cultural fairness, and moral awareness among pre-primary children through narrative practices in constructing sustainable social values and Mauritian multiculturalism. The study is conducted in three pre-primary schools and applies mixed methodology such as interviews and audio recordings of digital narratives to explore the degree to which such tools associate ethics systems with freedom of creativity for encouraging inclusive representation and presenting multicultural diversity. Anchored in the multicultural issues and history of sustainability within Mauritius, the study considers how digital story-making techniques empower the early childhood learners.

Ministry of Tertiary Education, Science and Research

The role of Francophone Mauritian Literature in Sustainable Development of Human Phenomenon

Presenter: Mrs Anisha Badal Caussy
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Abstract:

My presentation presents a critical case for the role of Francophone Mauritian Literature as a reflection of human phenomenon as sustainable development. From the theoretical perspectives of Lacan's mirror stage, my presentation focuses on the social injustices inflicted on specifically the indentured in Francophone Mauritian literature. The literary texts of Khal Torabully's *Coupeuses d'Azur* and Nathacha Appanah's *Les Rochers de Poudre d'Or* showcase the human phenomenon of agonies and plight of indentured during indentured times in Mauritius that was a global concern during the 1800s to 1900s. The presentation focuses on literature's goal of educating to present the condition for sustainable development. Even in our twenty-first century, Francophone Mauritian literature continues to foster a culture of sustainability. The role of Francophone Mauritian literature provides the reflection space to project past human phenomenon for past sustainability scenarios in our present context, continuing a culture of sustainability.

Keywords: Francophone Mauritian literature, human phenomenon, mirror stage, sustainable development

Ministry of Tertiary Education, Science and Research

Investigating the Role of Social Innovation in Promoting Gender Equality among Victims of Gender Based Violence in Mauritius

Presenter: Dr. (Mrs) Zareen Beebeejaun Muslum
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Abstract:

The study on the role of social innovation in promoting gender equality among victims of gender-based violence (GBV) in Mauritius reveals significant insights. Social innovation initiatives, such as support groups, empowerment programs, and community awareness campaigns, have played a crucial role in aiding GBV survivors. These initiatives offer safe spaces for victims to share their experiences, access mental health services, and gain vocational training, fostering economic independence. This research highlights that social innovation has helped shift societal attitudes towards GBV, promoting greater gender sensitivity and reducing stigma.

Methodology: A qualitative approach has been used using the following:

1. Semi-Structured Interviews allowed the researcher to explore participants' experiences and perspectives while maintaining flexibility to delve deeper into specific topics. For example, interviews with GBV survivors or service providers revealed how innovative solutions have impacted their lives.
2. Key Informant Interviews (KII): These were conducted with individuals who have specialized knowledge or experience, such as policymakers, NGO workers, or community leaders. They provided insights into the design, implementation, and effectiveness of social innovations.
3. Thematic Analysis: Data from interviews was analyzed thematically to identify patterns and themes. It helped in understanding the broader impact of social innovations on GBV prevention and response.
4. Participatory Approaches: Engaging participants in the research process ensured that their voices are central to the findings. This is particularly important in GBV research to empower survivors and respect their agency.

Outcomes of the research: Successful programs have resulted in increased reporting of GBV cases and improved legal support for survivors. However, the study has recommended the following:

1. Women-Run Services: Initiatives like women-operated taxi services provide safe transportation options for women, reducing harassment and threats.
2. Technology-Facilitated Solutions: Apps and digital tools have been developed to assist survivors, offering discreet ways to seek help and access resources.
3. Development Marketplace: The World Bank's initiative funds evidence-based research and interventions to prevent and respond to GBV globally.
4. Changing Social Norms: Efforts to challenge harmful gender stereotypes and promote equality can reduce GBV over time.

These innovations demonstrate the power of creativity and collaboration in tackling such a pervasive issue. However, challenges remain, including limited funding, cultural resistance, and the need for more comprehensive policies. The findings underscore the importance of continued investment in social innovation to sustain progress and ensure holistic support for GBV survivors, ultimately contributing to gender equality in Mauritius.

National Research Week 2025

Uniting Research, Industry and Innovation

Ministry of Tertiary Education, Science and Research

PANEL DISCUSSION
Social Innovation for a Sustainable Society in the Fast-growing Digital World

VENUE
Subramania Bharati Lecture Theatre,
Mahatma Gandhi Institute, Moka

Ministry of Tertiary Education, Science and Research

Speakers:

- Dr. Perienen Appavoo, Senior Academic, Head of Research Office, Open University of Mauritius
- Dr. (Mrs) Deepika Faugoo, Senior Lecturer, School of Management & Finance, University of Technology, Mauritius
- Dr. Sheilana Devi Ramdoo, Senior Lecturer, School of Performing Arts, MGI
- Dr. Rajendrakumar Dabee, Senior Lecturer, Head, School of Indological Studies, MGI
- Mr Krishma Lutchoomun, Senior Lecturer, School of Fine Arts, MGI

Moderator:

Dr. Jeevendiren Chemen, Associate Professor & Head of the Centre for Research and Coordinator, National Research Week - MGI

Dr. Chemen introduced the topic by highlighting on the key words in the above topic, namely **Social Innovation, Sustainable Society and Fast-growing Digital World.** Dr. Chemen argued on the unstoppable massive waves of technologies that are about to crash on the societal spheres, values, ethics and systems. He also elaborated on the already existing prevalent chaotic situations of the society – unequal distribution of wealth, policies failing, shrinking of working-age population, stalling education levels, rampant inflation, energy shortages, stagnant incomes, breakdown of trust and so on, which add to difficult containment of the society. Dr. Chemen argued on the massive disruptive waves due to the unprecedented technological innovation and upheaval by AI and synthetic biology with massive repercussion on the society and asked the panellists to explore ways the society need to reorganize itself. Is there a need to change the mindset of the society? Should we revisit our political structures to avoid collapse of societal systems? How to keep a balance between technological innovation and social values? are some of the questions that Dr. Chemen threw to the panellists to intervene.

Dr. Appavoo argued the prerequisites of a happy family to make a contended society that would fight back all the evils of the society. According to him, it is also imperative for a society to go back to the past and restore all the good values which were prevalent. Dr. Faugoo explained how it was important to use modern technical tools such as AI and ChatGPT to solve social and economic problems of the society with a view to achieve SDGs and to reduce the gaps between the haves and the have-nots. She also argued that it is very essential to empower the society with appropriate knowledge and values to enable human beings make sustainable choices for the benefits of future generations. For Dr. Dabee, true innovation begins with the inner transformation in a reawakening of our real nature (ātma), which reorients societal structure towards ethical and spiritual harmony. He further added that a sustainable society should be rooted in a metaphysical vision of oneness (advaita) where life is valued above profit and technology, and guided by dharma. He concluded by saying that Vedānta urges us to treat technology as a means, not an end, to preserve human identity through self-knowledge from a sustainable society. According to Mr Luchoomun, social innovation should aim at the creation and implementation of new ideas and strategies with a view to address urgent needs of individuals facing economic and social challenges and to ultimately uplift marginalized communities. He argued that Arts, in its myriad forms, serve as a powerful catalyst for social changes and possess the unique ability to foster internal transformation within the individuals. For him, Art functions not only as a therapeutic outlook but also as a valuable educational tool and a medium of expression that can inspire provoking thoughts needed as a transformation power in the development of a more sustainable society. According to Dr. Ramdoo, the philosophy of continuous improvement is one of the building blocks for the sustainability and the organization of a better society. The fields of Arts in general and precisely the Performing Arts education can foster a continuous improvement within each individual with a view to prepare them to face the challenges of the society in future.

The floor was then opened to the audience for interactions and reactions. Dr. Chemen, the Moderator concluded the discussion by highlighting briefly on the arguments put forward by the different panelists. He also added the need to look into reforms and regulations of policies related to technology, to foster a new culture of togetherness, to slow developments, if need be, to give more time for the preparedness of the society and to allow criticism from relevant parties.

Ministry of Tertiary Education, Science and Research

DAY 3
Wednesday 16 April 2025 (afternoon)
Mauritius Institute of Education

THEME
EduTech Evolution: Shaping Education with Technology

VENUE
Frank Richard Lecture Theatre

Ministry of Tertiary Education, Science and Research

Introduction

Day 3 and Session 5 of the National Research Week 2025 titled "EduTech Evolution: Shaping Education with Technology", was held on 16 April 2025 in the afternoon at the seat of the Mauritius Institute of Education (MIE) in the Frank Richard Lecture theatre. The session, organised by the MIE, in collaboration with the Open University of Mauritius (OUM), and Polytechnics Mauritius Ltd (PML), under the Ministry of Tertiary Education, Science, and Research, had the following objectives:

- Examine the transformative role of technology in education through research and innovation.
- Foster dialogue on emerging trends such as AI in education.
- Gamification, STEM advancements, and inclusive learning.
- Promote interdisciplinary collaboration and evidence-based strategies for tech-enhanced education.
- Formulate policy recommendations to guide future integration of educational technology.

The session brought together more than 125 participants from various higher education institutions to explore the impact of technology on teaching and learning. Fifteen carefully selected research-based TED Talk presentations showcased cutting-edge research from multiple TEIs. The session served as a platform for academia, researchers, policymakers and other stakeholders to collaboratively recommend strategies to align education with technological evolution.

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Highlights

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Highlights

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PRESENTATIONS

SUB-THEMES
- Technology-driven education
- STEM variations and beyond
- Impact of technology on inclusive education
- Interdisciplinary education
- AI in education
- Gamification in education

VENUE
Frank Richard Lecture Theatre

Ministry of Tertiary Education, Science and Research

The rise of the Artificially Intelligent Learner (AIL) versus the fail of Academic Integrity

Presenter: Mr Mrinal Sohoraye
Affiliation of presenter: Open University of Mauritius
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Abstract:

The rise of the Artificially Intelligent Learner (AIL) versus the fail of Academic Integrity. Higher education institutions have faced years of academic dishonesty with plagiarism plaguing the records of thousands of students. In recent times, a number of plagiarism detection tools (PDTs) have invaded the market and promise to deliver universities from the copy/paste culture prevalent at all strata of academia, from undergraduate to post-doctoral programmes. The present study analyses the similarity reports of some local universities by adopting a multi-pronged approach and lists down some of the most common uses of AI in submitted works. The paper calls for a paradigm shift from over-reliance on technology to using a blended approach combining artificial and human intelligence to counter AI. Institutions will need to put in place dedicated teams of staff with adequate training to have an overarching lead over creative defaulters who undermine academic integrity with AI.

Keywords: AI, academic, integrity, turnitin

Ministry of Tertiary Education, Science and Research

The transformative role of IoT in Learning and Teaching

Presenter: Dr. Anshu Prakash Murdan
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Abstract:

The integration of the Internet of Things (IoT) into educational settings offers transformative potential, yet its adoption is impeded by significant challenges including data privacy concerns, digital equity, and teacher preparedness. This research work explores how IoT facilitates personalised and immersive learning experiences, illustrated through compelling case studies from around the world. IoT-enabled devices such as interactive whiteboards, wearables, and smart sensors are shown to enhance student engagement, optimise classroom environments, and enable data-driven educational practices. However, to fully realise IoT's benefits, issues like data security, the cost of infrastructure, and bridging the digital divide must be addressed. By equipping students for a technology-driven future and promoting inclusive, adaptive learning environments, IoT emerges as a pivotal element in the evolution of education, offering a gateway to revolutionary teaching methods and improved educational outcomes.

Keywords: Internet of Things (IoT), Personalized Learning, Educational Transformation, Digital Equity

Ministry of Tertiary Education, Science and Research

From concrete to digital: The pedagogical shift in Mathematics education

Presenter: Dr. Khemduth Singh Angateeah
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Abstract:

Over the past decades, there have been few significant changes in the teaching and learning of mathematics in our schools despite the considerable advancements in educational technology. Similarly, the quality of performance in mathematics at primary and secondary levels in Mauritius has remained relatively stagnant. While learning theories promote the use of the Concrete-Pictorial-Abstract (CPA) approach in elementary mathematics, the global trends emphasize the optimal use of digital tools in mathematics education. One such tool is GeoGebra, a dynamic software that enables students to explore mathematical concepts from multiple perspectives. This presentation, based on multiple case studies, explores the current trends in mathematics education. It discusses the benefits and potential of technology integration, including augmented reality, in enhancing mathematics education.

Keywords: Pedagogy, Mathematics Education, GeoGebra, Augmented Reality

Ministry of Tertiary Education, Science and Research

The Impact of AI on Education and Personal Development of Students in Higher Education Institutions

Presenter: Ms Chitisha Gunnoo
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Email address of presenter: cgunnoo66@gmail.com
Contributors: Sandhya Gunness
Affiliations of contributors: University of Mauritius

Abstract:
This study investigates the multifaceted impact of artificial intelligence (AI) on education and personal development within higher education institutions (HEIs) in Mauritius. It aims to understand how students utilise AI tools and the implications for their learning experiences and personal growth.

Research Questions:
- How do students incorporate AI tools into their academic tasks, such as writing and research?
- What are the perceived effects of AI on teamwork and collaboration among students?
- In what ways does AI contribute to the development of skills like critical thinking and self-awareness?
- How can AI be effectively harnessed to enhance educational outcomes and personal development?

Qualitative interviews provide deeper insights, showing that AI positively influences critical thinking, adaptability, and self-awareness, enabling students to reflect on their learning and establish personal growth objectives. Survey results indicate that students frequently employ AI tools for writing, research, and time management, leading to better task organisation and enhanced learning efficiency. However, the findings reveal limited effects on teamwork and collaboration, with AI primarily viewed as a means for individual productivity. These results suggest that AI can be a valuable asset for fostering personal development when used thoughtfully and responsibly.

Keywords: Artificial Intelligence; Higher Education; Personal Development; Student Engagement

Ministry of Tertiary Education, Science and Research

Simulation based medical education (SBME) offers a controlled environment for students to learn technical and non-technical skills

Presenter: Dr. (Ms) Poonam Bunwaree
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Contributors: Prof (Dr.) Ganessen Chinien
Affiliations of contributors: University of Mauritius

Abstract:

A 3-day emergency short course in Medicine was carried out at the University of Mauritius in July 2024. The participants were medical practitioners. Simulations were carried out using high fidelity simulators. The participants provided feedback at the end of each day. There were 15 doctors who assisted the course. They had an average of 6 years of working experience. All the participants rated their experience as positive. 93% of the doctors found that the simulations were close to real life scenarios. 13 out of the 14 respondents were likely to participate in similar training sessions in the future. The participants reported that the hands-on experience was an addition to their prior knowledge in dealing with lifesaving procedures. The limitations identified were the limited time allocated to each scenario and the need for more mannikins and/or smaller groups for a better hands-on experience. SBME is a useful tool which allows students to learn technical skills and build up on their prior knowledge. However, students' negative experiences must be analysed to improve the quality of teaching.

Keywords: Simulation, medical education, skills

Ministry of Tertiary Education, Science and Research

Reimagining Equity in Medical Publishing through Artificial Intelligence and Digital Mentorship

Presenter: Dr. (Ms) Bibi Sumera Keenoo
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Abstract:

Problem Statement: Structural inequalities in academic publishing disproportionately exclude researchers from low- and middle-income countries (LMICs), hindering diversity and representation in medical education literature. Key Idea/Findings. This narrative review explores how AI-assisted peer review, open-access models, and digital mentorship programmes can reduce biases, improve accessibility, and build capacity in global medical education publishing. AI tools enhance transparency in manuscript evaluation, while digital mentorship bridges knowledge gaps for early-career researchers.

Relevance: This study demonstrates how education and technology intersect to address epistemic injustice in scholarly publishing. The findings offer innovative, scalable solutions that empower marginalised voices in medical education, paving the way for a more inclusive academic ecosystem.

Keywords: Artificial intelligence, medical education, equity, digital mentorship

Ministry of Tertiary Education, Science and Research

The role of virtual laboratories in science education: A paradigm shift

Presenter: Dr. Atchia M C Shakeel
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Contributors: Dr. Anwar B Rumjaun
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Abstract:

Practical work is the cornerstone of science education, yet its accessibility remains a challenge, particularly in resource-constrained settings and during school closures. This talk explores how virtual laboratories (VLs) serve as transformative platforms in science education, in this technological era. Drawing from our research, which used a qualitative interpretivist methodology to examine teachers' and students' experiences with both physical and virtual science practical work, we will share some findings on the potential of VLs to enhance engagement among learners, overcome logistical barriers, and foster deep conceptual understanding. As education systems worldwide grapple with the shift towards blended and online learning, we argue that virtual laboratories are not merely substitutes but powerful complements to traditional methods. This discussion will provide critical insights into the integration of VLs, their impact on learning outcomes, and their implications for future-ready science education and policy.

Keywords: Virtual Laboratories, Science education, Technology, Education policy

Ministry of Tertiary Education, Science and Research

Technology-driven Competency Development in Vocational Education: A Model for Mauritius

Presenter: Dr. (Ms) Disha Hawley Bissonauth
Affiliation of presenter: Polytechnics Mauritius Ltd
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Abstract:

Global education is evolving, and vocational education now emphasises innovation, competencies, and entrepreneurship. In Mauritius, industry demands are driving a shift from traditional teaching methods to technology-driven approaches aimed to cater to 21st-century learners. This study identifies a gap between teachers, who often rely on conventional methodologies, and students, who are more technologically adept. It aims to develop a competency-based vocational training model that integrates technology to enhance lifelong learning. The proposed research adapts an existing framework where education is driven by industry needs, requiring collaboration between government authorities, businesses, and students to respond to technological advancements. This research adopts an action research methodology to examine how technology-driven education fosters innovation, adaptability, and competency development. Findings will highlight the benefits of a modernised vocational education system while addressing potential challenges, such as teacher training gaps, Learning Management software's practicalities and implementation barriers. The study will provide recommendations to bridge the gap between educators and students and offer practical insights for shaping future education policies and strategies in Mauritius.

Keywords: vocational education, technology-driven learning, innovation in education, teacher-student gap, digital transformation

Ministry of Tertiary Education, Science and Research

Redefining Online Teaching: Insights into Adoption Challenges and Opportunities in Mauritius' Higher Education

Presenter: Ms Leenshya Gunnoo
Affiliation of presenter: University of Technology, Mauritius
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Contributors: D Padachi and Thakoor Sharma Geerawo
Affiliations of contributors: University of Technology, Mauritius

Abstract:

The adoption of online teaching in Mauritius' publicly funded Higher Education Institutions (UoM, UTM, and UDM) faces challenges despite increasing digitalization. While technology offers opportunities for enhanced learning, the factors influencing its adoption remain complex and not well understood, particularly the role of digital competence, perceived usefulness, and infrastructural support.

Key Idea/Findings: This study reveals that higher digital competence among academics correlates with lower adoption, likely due to comfort with existing tools. Perceived usefulness remains a strong motivator, while facilitating conditions and infrastructure alone do not ensure sustained use. A mixed-method analysis, combining focus groups with ten academics and an e-survey of 106 faculty members, highlights the need for a holistic strategy integrating technical, cultural, and motivational support.

Relevance: Understanding these dynamics is crucial for shaping effective policies and strategies to enhance online teaching adoption. The findings offer valuable insights for policymakers, educational administrators, and academic leaders to develop targeted interventions, improve infrastructure, and foster an environment that supports technology- driven education, ultimately enhancing accessibility and quality in higher education.

Keywords: Online Teaching Adoption, Digital Competence, Higher Education Institutions (HEIs), Infrastructure and Technology

Ministry of Tertiary Education, Science and Research

Integrating technology in education for learners with dyslexia in Zimbabwe: An exploratory study

Presenter: Mr Peter Makaya
Affiliation of presenter: University of Technology, Mauritius
Email address of presenter: makaya.peter@umail.utm.ac.mu
Contributors: D. Mauree-Narrainen and L N. Poorunder
Affiliations of contributors: University of Technology, Mauritius

Abstract:

Problem Statement: Dyslexia is a prevalent disorder in Zimbabwe that present difficulties in reading, writing, listening, and phonological processing affecting numerous learners by posing difficulties in achieving academic success and equitable access to education. Although Zimbabwe has demonstrated heightened commitment to addressing this condition, educational institutions particularly primary schools lack tailored interventions and technological resources including assistive technologies, which obstruct the delivery of effective support to dyslectic learners. This study aims to bridge the accessibility gap and enhance academic success for learners with dyslexia by leveraging technology.

Findings: Preliminary findings reveal that the integration of innovative technologies, particularly speech-text applications, and adaptive e-learning platforms, enhances reading and writing outcomes, and promotes academic success and equitable access to learning for dyslectic learners. Relevance: The study underscores the importance of policy reforms to integrate assistive technologies into the Zimbabwean national curriculum and invest significant resources in teacher training to attain tailored solutions for dyslexic learners' needs.

Keywords: Assistive Technology, Dyslexia, Education, Training

Ministry of Tertiary Education, Science and Research

EduTech: The neocolonial model of education

Presenter: Dr. (Mrs) Tejwant Mohabeer
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Abstract:

Europeans used education to colonize countries referred to today as "underdeveloped"/ "developing" nations. Education was used as an imperialistic tool to serve the political-economic capitalistic needs of the colonized by annihilating and deculturing the colonized onto-epistemically. A core deliberate feature of the colonizer's models of education was to inculcate a culture of dependency on the colonized. Despite 'in/dependence,' 'former' colonial countries are in relentless pursuit of "western-like development." Just as technology facilitated the accelerated expansion of European colonization, the neocolonial model of education mandates the use technology in education in "underdeveloped"/ "developing" countries through imposed educational policies via the International Financial Institutions to keep nations "dependent" and "underdeveloped"/ "developing" whilst maintaining their 'global order.' The purpose of this presentation is to engage in an alternative narrative of Edutech to raise critical questions about the purpose of education amidst vast global inequality and destruction emanated by technology.

Keywords: Capitalism; neocolonial; dependency; global order

Ministry of Tertiary Education, Science and Research

The evolving role of positive psychology in technology-driven teacher training

Presenter: Dr. Vikash Baichoo & Mr Satyen Beedassy
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Contributors: Sharone Ramasawmy
Affiliations of contributors: Mauritius Institute of Education

Abstract:

As technology reshapes education, integrating psychological insights into teacher training has become crucial. In this presentation we explore how positive psychology and technology-driven education can improve teacher's ability to engage and motivate learners through the use of digital tools and gamification (Salmon, 2019). Principles of positive psychology such as flow and positive emotions can be incorporated into AI driven learning platforms to transform learning (Seligman & Csikszentmihalyi, 2000). Through technology and gamified learning experiences teacher training can be made more engaging and tailored to the needs of learners in the digital age. Our presentation discusses ways to combine psychology with technology-enhanced pedagogies to empower educators to face modern day teaching challenges.

Keywords: Technology-driven education, AI in teacher training, Positive psychology in education

Ministry of Tertiary Education, Science and Research

Learning through Virtual Reality

Presenter: Ms Sweety Anoucheka Gangabissoon
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Contributors: G. Bahadur
Affiliations of contributors: Student Union - UoM MPhil/ PHD

Abstract:

Training through Virtual Reality (VR) is the new trend. VR is a highly advantageous tool since it involves entering into an entirely new, computer-generated digital world, making of it a "special interest for education as it facilitates the teleportation of conscience, which immerses users into synthetic spaces which boosts engagement in learning experiences" (Mystakidis & Christopoulos, 2022.) The future of education lies in adopting virtual reality tools to help the practical classes as education adapts to a more challenging society. The Gen Z prefers technological devices for their learning mode and VR comes in as the tool which suits the requirements of their cognitive abilities. VR tools have been tested with medical students of the University of Mauritius and the study demonstrated that the students are highly motivated to learn through them as they showed a high level of usability and would also recommend for their implementation in the curriculum.

Keywords: Educational Technology, Virtual Reality, AI driven education, Gamification

Ministry of Tertiary Education, Science and Research

Stepping-up or pushing-back? Negotiating technology integration in Mauritian classrooms

Presenter: Dr. (Mrs) Wedsha Appadoo-Ramsamy
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Abstract:

In a performativity-driven education system, educators have to negotiate the complexities of integrating technology, responding to macro-policy narratives and meeting micro-institutional expectations. Drawing insights from Teacher Agency: A Case Study of Mauritius (2022), this presentation highlights the ways in which Mauritian educators step-up (optimising the use of technology for pedagogical use) or push-back (resisting constraints that deprofessionalise their roles) ((Buchanan, 2015) when enacting their agency in this performativity-driven space. This presentation foregrounds the possible difficulties and challenges experienced by educators and questions whether meaningful technology integration is achievable within a results-driven educational landscape with varying micro-institutional structures.

Keywords: teacher agency, technology in education, technology integration, performativity culture

Ministry of Tertiary Education, Science and Research

The national policy towards technology-driven education: Insights from teachers in the Mauritian education system

Presenter: Dr. Ajay Ramful
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Contributors: Dr. (Mrs) Tejwant Mohabeer
Affiliations of contributors: Mauritius Institute of Education

Abstract:

The latest available data indicates that literacy and numeracy rates are substantially low in Mauritius. This is highly problematic for the Mauritian education system which is a performativity-oriented system which aims to internationally benchmark itself. Given that students' performance tends to be the primary measure of success, teaching is heavily exam-oriented with considerable reliance on the textbook. National policymakers argued that the deployment of Edutech would enhance teaching and learning and increase students' performance. However, according to the latest available data this national outcome has not been achieved. Findings from a mixed-methods study focusing on teaching and learning at both primary and secondary will be shared. This presentation engages with the national policy move to deploy technology in teaching and questions the effectiveness of technology-driven education in achieving the desired literacy and numeracy levels, followed by recommendations to improve teaching and learning.

Keywords: Technology; educational policy; teaching; performativity

Ministry of Tertiary Education, Science and Research

PLENARY SESSION AND DISCUSSION

The future of EduTech

VENUE
Frank Richard Lecture Theatre

Ministry of Tertiary Education, Science and Research

Recommendations for the future of technology in education were made following the plenary session and discussion:

1. **Balance use of technology with human oversight and input.**
- Promote a blended approach that combines artificial and human intelligence to safeguard academic integrity.
- Create academic integrity teams to detect and manage AI use and misuse.
- Redefine/Review assessment practices to further the use of technology in assessment and evaluation
- Reduce over-reliance on plagiarism detection tools due to its limitation in relation to the use of AI

2. **Invest in Continuous Professional Development for staff on Digital Competences**
- Prioritise capacity building for academic and non-academic staffs in view of developing digital competences
- Prioritise capacity building for academic staff in emerging technologies, such as AI, IoT, VR, and 3D Printing.
- Integrate positive psychology with technology into training to enhance learner engagement and motivation.
- Support teacher agency by providing autonomy and support to meaningfully integrate technology despite performativity pressures.

3. **Expand Access through Inclusive and Assistive Technologies**
- Promote assistive technologies (e.g. text-to-speech and adaptive learning platforms) to support learners' learning needs, including dyslexia.
- Address infrastructure and training gaps to ensure inclusive access to educational technologies, for digital equity.

4. **Ensure Data Security, Ethics, and Equity**
- Address privacy, cybersecurity, and ethical concerns in deploying IoT and AI tools.
- Develop clear policy frameworks to regulate data use, particularly in student performance monitoring and predictive analytics.
- Prioritise digital equity by bridging the digital divide in under-resourced communities.

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5. **Enhance Learning through Immersive and Practical Technologies**
- Integrate Virtual Reality (VR) and high-fidelity simulations to enhance practical and technical skill development in fields like medicine and science, among others.
- Promote Virtual Laboratories (VLs) as complementary tools in TE to overcome limitations of physical labs, particularly in resource-constrained settings.

6. **Foster Innovation and Skills for Industry 4.0/5.0**
- Align educational practices with industry-driven competency models, especially in vocational education.
- Embed digital literacy, soft skills, and innovation training into curricula to better prepare students for the workforce.
- Encourage collaboration between educational institutions, industry, and government to co-create relevant tech-driven learning ecosystems.

7. **Support Equitable Global Participation in Knowledge Production**
- Leverage AI-supported peer review and digital mentorship to democratise academic publishing and support researchers.
- Tackle epistemic injustices by creating space for diverse voices and non-Western knowledge systems in global education discourse.

8. **Rethink Purpose and Ethics of EdTech in a Postcolonial Context**
- Question techno-solutionist approaches that perpetuate dependency and neocolonial power structures.
- Promote critical digital literacy among educators and students to interrogate the societal impacts of technology.
- Ensure that technology in education empowers rather than displaces local contexts, cultures, and knowledge systems.

9. **Develop Comprehensive, Context-Sensitive Policies**
- Policies must go beyond infrastructure and consider motivation, institutional culture, pedagogical alignment, and local needs.
- Foster flexible and adaptive education systems that can respond to emergent technological, cultural, and socio-political shifts.

National Research Week 2025

Uniting Research, Industry and Innovation

Ministry of Tertiary Education, Science and Research

DAY 4
Thursday 17 April 2025
Université des Mascareignes

THEME

Tech Horizons – Pioneering Future Technologies

VENUE

Université des Mascareignes
Rose Hill Campus

Ministry of Tertiary Education, Science and Research

Keynote Address

Prof. Krishna Busawon,
Northumbria University, United Kingdom

Digital twins technology and applications

Presenter: Prof. Krishna Busawon
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Abstract:
A digital twin, as the name suggests, is a virtual replica of physical systems or objects that is continuously updated with real-time data. This allows for simulations, predictions, and optimization. The application of digital twin technology has been expanding rapidly and is transforming how businesses and industries operate. Digital twin technology is closely linked to advancement in IoT (Internet of Things) technology. It is predicted that the number of connected IoT devices will reach 29 billion by 2030, up from 9.7 billion in 2020. As a result, digital twin technology is expected to grow at a similar pace. Over the past few years, the technology has expanded to encompass more applications, use cases, and industries. The digital twin market is projected to generate substantial revenue by 2030, with estimates ranging from $180 billion to $250 billion. The aim of this talk is to provide an overview of digital twins and explore their potential applications in the context of Mauritian economic development. Specifically, we will examine how digital twins can be applied in sectors such as healthcare, the blue economy, smart/intelligent transportation, weather forecasting, and more.

Keywords: Digital twins, simulations, intelligent transportation, IoT

Ministry of Tertiary Education, Science and Research

PRESENTATIONS

VENUE
Université des Mascareignes
Rose Hill Campus

National Research Week 2025
Uniting Research, Industry and Innovation

Ministry of Tertiary Education, Science and Research

A Netnographic Study on Social Media for Sustainable Talent Management and Decent Work Promotion

Presenter: Swaleha Peeroo
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Abstract:

Providing decent work for sustainable talent relationship management (STRM) through social media (SM) has become essential for attracting, engaging, and retaining the right candidates, with a view to fostering economic growth. SM serves as a key tool for employer branding and talent acquisition, enabling organizations to reach both active and passive job seekers. However, limited research explores HR professionals' perspectives on using SM to promote decent work in the context of Small Island Developing States (SIDS). This qualitative study examines how talent management professionals from the private sector in Mauritius leverage SM for STRM. A netnographic study analyzed the SM platforms and career websites of conglomerates, followed by semi-structured interviews with Talent Management Specialists.

Findings indicate that all conglomerates use SM for talent attraction, with Facebook (100%) and LinkedIn (75%) being the most utilised platforms. YouTube (42.9%), Instagram (28.6%), and Twitter (rarely used) play a secondary role. Organizations employ SM for recruitment, corporate reputation building, and CSR communication. HR specialists view Facebook as ideal for mass recruitment at the operational level, while LinkedIn is preferred for executive and middle-management hiring. The study also highlights the growing use of SM by Generation Y and Z in job applications.

Despite its benefits—global reach, cost-effectiveness, and user-friendliness—HR professionals remain sceptical about SM's role in employee retention. This study provides Mauritian organisations with strategic insights on using LinkedIn and Facebook to build long-term trust-based relationships with current and potential talent.

Keywords: Social Media, Sustainable Talent Relationship Management, Netnography

Ministry of Tertiary Education, Science and Research

Building Smart and Resilient Infrastructure in Mauritian Cities

Presenter: Dr. Yashwaree Baguant
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Abstract:

Urbanisation brings many benefits, such as diversity, market efficiency, jobs, education, and health improvement. It is these benefits that attract a continuous flow of people from rural to urban areas. By 2050, it is calculated that "cities will be home to two-thirds of the world's total population" (UNDESA, 2018). Cities and towns are seriously affected by a number of key issues related to sustainability and urban planning. These issues are making cities in the world and their infrastructure more increasingly vulnerable to disasters. Disaster management, traditionally focused on response and recovery, needs a strong partnership with urban planning to create proactive and preventative measures. This fosters disaster risk reduction (DRR) and builds urban resilience. By incorporating DRR principles and smart technologies into urban planning, cities can become more resilient. Due to the above reasons, a study was carried out to assess the resiliency of cities and their infrastructure in the Mauritian context and the role of urban planning in building smart and resilient cities. A review of the existing literature and the different case studies was undertaken in order to carry out this assessment. A survey was conducted carried out among the main stakeholders (local authorities, public sector…). The main issues and problems were identified, and recommendations were made. This research proposes recommendations in which urban planning can be used as a tool to build smart and resilient cities in Mauritius, a SIDS country. The research explores the critical and growing role of urban planning in building resilient cities and infrastructure in the Mauritian context. The findings will highlight the importance of integrated planning and stakeholder collaboration in building smart and resilient infrastructure in the Mauritian context and will contribute in achieving SDGs.

Keywords: Urbanisation, smart infrastructure, resilient infrastructure, Mauritian Cities

Reference:

UNDESA, 2018. https://www.un.org/development/desa/en/news/population/2018-world-urbanization-prospects.html. Accessed on 6th April 2025

Ministry of Tertiary Education, Science and Research

Assessing Grassroots Flood Risk Management Strategies and Spatial Variability of Cyclone Freddy's Impacts in Chikwawa, Malawi

Presenter: Japhet Khendlo
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Email address of corresponding author: jtkhendlo@student.udm.ac.mu
Contributors: Roodheer Beeharry and Rajeshwar Goodary
Affiliation of contributors: Doctoral School, Université des Mascareignes

Abstract:
Climate change is intensifying extreme weather events, notably in Sub-Saharan Africa. The Chikwawa District in Malawi has experienced frequent flood-related disasters over the past decade. In 2015, inundations claimed 176 lives and caused $340 million in damages. The 2019 swamping resulted in 447 deaths and $22 million in losses. In 2021, cyclone Ana led to 60 fatalities and $35 million worth of damages, while the 2022 floods caused 52 deaths and $31 million in damages. In 2023, floods linked to cyclone Freddy were catastrophic, whereby 1,400 people lost their lives and caused $506 million in material harm. This study examines the multiformity of cyclone Freddy's impact in Chikwawa. Data was collected through focus group discussions and interviews involving 467 participants from 36 randomly selected villages. Geographically Weighted Regression (GWR) assessed the influence of the geographic variables, namely land use, slope, drainage density, and river proximity, on flood severity in a GIS environment. The findings show that 83% of households were submerged, 70% lost household items, and 65% of homes, 90% of which were made of unburned bricks, collapsed. Income losses affected 85% of households, while 10% lost their businesses permanently. The GWR model accounts for 83% of the variation in flood risk (R^2=0.832, adjusted R^2=0.752). Notably, 40% of the most affected villages were not located near main rivers. Flood mitigation measures were absent in 57% of villages, while others adopted early warning systems, maintained storm drain, constructed retention walls, and promoted afforestation. These findings underscore the need for enhanced flood resilience strategies across vulnerable communities.

Keywords: Climate change, flood-related disasters, socio-economic disparities, spatial variability, Geographically Weighted Regression.

Ministry of Tertiary Education, Science and Research

Fostering Student Entrepreneurship at Université des Mascareignes Collaborative Ventures: Success Stories and Lessons Learned - Case Studies of Successful Academia-Industry Partnerships

Presenter: Swaleha Peeroo
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Affiliation of contributors: Université des Mascareignes

Abstract:
Entrepreneurship plays a vital role in driving innovation and economic development. Recognizing this, the Université des Mascareignes (UdM) embarked on a transformative journey through the Programme ENTREPRENDRE, an initiative of the Agence Universitaire de la Francophonie (AUF) aimed at fostering student entrepreneurship. Building on this foundation, UdM was selected by its parent ministry to serve as the pilot university for implementing this project at the national level, marking a significant step in integrating entrepreneurship into higher education. As part of this initiative, UdM established the Pôle Étudiant Entrepreneur Mascareignes (PEEM), a dedicated hub where students receive mentorship, training, and industry exposure to develop their business ideas. This initiative aligns with the Statut National Étudiant Entrepreneur (SNEE), a government policy that formally recognizes student entrepreneurs and provides them with structured support to balance academic and entrepreneurial pursuits. Through PEEM, students gain access to a robust ecosystem that connects them with experts, funding opportunities, and research-driven entrepreneurship programs. By combining policy-driven support (SNEE) with academic initiatives (PEEM and Programme ENTREPRENDRE), UdM is nurturing a new generation of innovators. Master's and PhD students, in particular, are encouraged to engage in entrepreneurship, leveraging their research to create solutions with real-world impact. This integrated approach strengthens the link between higher education, innovation, and start-up creation, ensuring that students are well-equipped to contribute to the socio-economic development of Mauritius.

Keywords: Entrepreneurship, Student Entrepreneur, Start-up, Innovation

Ministry of Tertiary Education, Science and Research

Nexus between Smart tourism and economic development of Mauritius: Prospects and Challenges

Presenter: Randhir Roopchund

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Abstract:

The tourism sector is one of the main economic pillars contributing significantly to the economic growth of our country. The global pandemic has steered the tourism sector to enhance the use of digital technologies and platforms, improving the competitiveness of hotels and tourist experience. This study explores the link between smart tourism and economic development, shedding light on the prospects and challenges of its implementation in the Mauritian context. It employs qualitative research and content analysis to assess the potential impact of smart tourism on industry development. There is a lack of academic studies, particularly in the Mauritian context, examining smart tourism and its potential benefits and challenges. This study is highly instrumental as it may assist policymakers and tourism operators in leveraging new technologies while enhancing their understanding of the concept. However, it also highlights several challenges and presents policy recommendations for both the government and tourism operators.

Keywords: Smart Tourism, Economic Development, Prospects and Challenges

Ministry of Tertiary Education, Science and Research

Transformational leadership for Education 4.0 in the Mauritian higher educational context

Presenter: Randhir Roopchund
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Abstract:

The current study seeks to analyse the nexus between transformational leadership for achieving Education 4.0, which uses high-end technology to improve the overall quality of education and the overall student experience. Mauritius ambitions to become a knowledge hub and attract globally recognised universities in the future. However, Mauritian universities lag in embracing the latest technologies and educational platforms to align with digital approaches to teaching and learning pedagogies. The implementation of Education 4.0 entails transformational leadership that may provide the right impetus for organisational change and development. The study analyses the nexus between the two and provides effective recommendations for growth and development. The study uses qualitative research, content analysis, and interviews to collect data, alongside a thematic approach. The study may be very helpful for both embracing transformational leadership and Education 4.0 in the Mauritian context. The limitations may be in terms of technological infrastructure and financing requirements.

Keywords: Transformational Leadership, Education 4.0, Education

Ministry of Tertiary Education, Science and Research

Development of a climate resilient framework for Infrastructure Tech Horizons: Pioneering Future Technologies Smart Cities and Infrastructure

Presenter: Manta Devi Nowbuth
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Abstract:

A climate-resilient framework for infrastructure is a set of guidelines that aim to mainstream climate change in the design of infrastructure as a mitigation strategy. The main goal of such a framework is to minimise the vulnerability of a community, enhance adaptive capacity and ensure sustained socio-economic development in the face of growing impacts of climate change. Several international organisations are encouraging and guiding countries to develop their own climate-resilient frameworks as part of the adaptation strategy.

This study was undertaken in 3 stages. The first two study areas, La Laura-Malenga and St Pierre, were analysed using the UNDRR Scorecard for resilient infrastructure and cities to evaluate their relative vulnerability to flood. Next, site surveys were conducted at both sites to assess their vulnerability to floods. Finally, several climate-resilient frameworks for infrastructure were developed based on the findings of surveys and UNDRR analysis.

The findings confirmed the comprehensive approach of the UNDRR scorecard and the importance of field surveys in shaping a local climate-resilient framework. This framework was structured around prevailing climate conditions, evaluation of the infrastructure's vulnerability, a flood risk assessment, and adaptive strategies to be adopted by the concerned local authority and the community.

One of the main challenges was the lack of clear information, in particular, the lack of working tools such as flood risk map, flood prone areas and information about latest flood depths. This study recommended the development of a national climate-resilient framework to make communities more climate-resilient.

Keywords: Climate change; climate-resilient infrastructure; Infrastructure design; UNDRR Scorecard.

Ministry of Tertiary Education, Science and Research

Mathematical modelling of sigmoid functions

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Affiliation of contributors: Université des Mascareignes

Abstract:

Sigmoid functions play a crucial role in mathematical modelling, particularly in fields such as artificial intelligence, statistics, and control systems. These functions exhibit an S-shaped curve and are widely used for classification problems, logistic regression, and neural networks. Mathematically, a general sigmoid function is represented as:

$$S(x) = \frac{1}{1 + e^{-x}}$$

This standard logistic function smoothly maps any real-valued number to a range between 0 and 1, making it suitable for probability estimation. Variants of the sigmoid function, such as the hyperbolic tangent function (tanh) and the arctangent function (arctan), provide alternative scaling properties:

$$tanh(x) = \frac{e^x - e^{-x}}{e^x + e^{-x}} \text{ and } arctan(x) = tan^{-1}(x)$$

Key properties of sigmoid functions include smooth differentiability, monotonicity, and asymptotic behaviour. The derivative of the logistic sigmoid is given by:

$$S'(x) = S(x)\big(1 - S(x)\big),$$

which is useful in gradient-based optimization algorithms such as backpropagation in neural networks. Additionally, parameterized forms, such as

$$S(x) = \frac{1}{1 + e^{-k(x - x_0)}}$$

which allow for control over slope and translation, making sigmoid models adaptable for various applications.

This paper explores the mathematical modelling of sigmoid functions, their derivatives, and their applications in real-world problems, demonstrating their significance in scientific and engineering domains.

Keywords: sigmoid functions, mathematical modelling, S-shaped curve

Ministry of Tertiary Education, Science and Research

A study of Recycled Concrete Aggregates for Road Base Construction in Mauritius

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Abstract:

The depletion of natural aggregates and the increasing volume of construction and demolition (C&D) waste demand innovative solutions for sustainable construction practices. This study evaluates the feasibility and environmental benefits of incorporating Recycled Concrete Aggregates (RCA) into road base construction in Mauritius. Laboratory analyses were conducted on seven design mixes of RCA blended with conventional crushed aggregates (CRU), assessing key properties such as compaction, durability, and compliance with Road Development Authority (RDA) standards. The optimal mix of 30-40% RCA with 60-70% CRU demonstrated reliable performance for high-traffic roads while achieving a 3.8-6.3% reduction in energy consumption and a 1.9-3.5% decrease in CO_2 emissions. Additionally, the research highlights the scalability of RCA in addressing natural resource scarcity and reducing landfill contributions in small island states. A lifecycle assessment, supported by SEVE software, quantified the environmental gains, emphasizing reduced energy demands and minimized carbon footprints compared to traditional practices. The study underscores the role of policy, industry investment, and standardized guidelines in mainstreaming RCA adoption in infrastructure projects. By combining environmental stewardship with technical reliability, this work advances sustainable development goals and sets a precedent for integrating recycled materials into construction sectors worldwide. This research offers a transformative approach to road construction, balancing performance and sustainability while contributing to a circular economy in regions with limited aggregate resources.

Keywords: Recycled Concrete Aggregates; Road Base; Circular Economy, Life Cycle Assessment

Ministry of Tertiary Education, Science and Research

Digital Transformation in Higher Education: A Hybrid Learning Approach for practical-oriented module—Database Design and Development—a case study at Université des Mascareignes

Presenter: Shameera Lauthan

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Abstract:

The rapid advancement of digital technologies has necessitated innovative teaching approaches in higher education. This study investigates the integration of a hybrid learning model for the practical-oriented module *Database Design and Development* at Université des Mascareignes. The objective is to evaluate the effectiveness of this blended approach in enhancing student engagement, autonomy, and practical skills in database design while addressing the challenges of traditional face-to-face learning.

A hybrid learning framework combining in-person sessions with online instructional activities was developed, incorporating pedagogical models such as Bloom's Taxonomy, Dale's Cone of Learning, and Agile methodology. The study was conducted with 25 undergraduate students, divided into two groups. Data was collected through performance assessments, student feedback, and engagement tracking via the university's learning management system. Both qualitative and quantitative methods were applied to analyze learning outcomes, participation rates, and the overall effectiveness of the hybrid approach.

Findings indicate that students exhibited improved conceptual understanding, problem-solving abilities, and engagement. The hybrid model facilitated greater flexibility, enabling self-paced learning, peer collaboration, and interactive activities. The inclusion of real-world application exercises and formative assessments further reinforced students' retention of database design principles.

This study highlights the benefits of hybrid learning in technical education, demonstrating its effectiveness in fostering student-centered learning. The approach presents a scalable model for digital transformation in higher education, offering insights for institutions seeking to enhance practical learning experiences through blended methodologies.

Keywords: Hybrid learning, digital transformation, higher education, database design, blended learning, student engagement, pedagogical innovation.

Ministry of Tertiary Education, Science and Research

Design and Implementation of a Smart Kitchen for Mauritian Seniors: Integrating Voice-Controlled v/s Arduino-Based Automation

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Affiliation of contributors: [1] University of Mauritius; [2] Academy of Design and Innovation

Abstract:

While increased life expectancy reflects improved living standards, an ageing population poses challenges globally, pressing world leaders to find sustainable solutions. Changes in the daily routine reflect transformations from extended to nuclear families where elders live as couples often, alone, or within care settings. In Mauritius, the number of elderly people is increasing rapidly, from 13% of the total population in 2013 to a forecasted 26% by 2040. Since a large percentage of seniors spend most of their time in the kitchen, integrating smart and assistive technologies into the kitchen designed specifically for elders which can be extended easily to the whole house in the future. The study focused on analysing the past kitchen history (how they spent their time) and its evolution and how the integration of smart technology would be helpful to the seniors in the kitchen. A qualitative study using the snowball sampling method on 30 participants aged between 55 to 95 years provided empirical evidence regarding the senior's views of the challenges and benefits of smart home technology use. This led to two conceptual kitchen designs using an Alexa® voice recognition system and Arduino-based smart home automation to use a Mauritian Creole language to communicate. Both smart kitchens were implemented in real life and tested by 10 participants, each completing 10 trials, for each assessment. Conclusively, the success rate of the Arduino smart system was higher than that of the Alexa thus, showing that the Mauritian seniors are more comfortable with a device that comprehends the Mauritian Creole language.

Keywords: Elderly, Smart-kitchen, Automation, Assistive technology, Voice Recognition

Ministry of Tertiary Education, Science and Research

The Breakthrough of Forensic Phonetics in Mauritian context to challenge AI in voice analysis

Presenter: Deepa Roy Sookara-Ramchurn
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Abstract:

Background/Objective: Forensic phonetics is one of the emerging fields of forensic linguistics that has been applied in several international legal cases. However, it has been noted that Artificial Intelligence (AI) has invaded forensic sciences especially in areas such as voice identification and analysis. The research aims to implement forensic phonetics in analysing voice recordings in French and Mauritian Kreol. It also proves that AI does not substitute for human intelligence in voice analysis and instead requires human-centered auditory-acoustic method.

Methods: In the current study, a pilot study of ten subjects (five males and five females) was carried out and they were provided with four French and Mauritian Kreol advertisements to read aloud and were audio-recorded. A sample testing of each subject was carried out following voice recording settings to ensure that data collected were reliable. The auditory-acoustic measures assessed prominent phonetic features of pitch, intonation contours, speech rate, and vowel and consonant quality. Goals were quantification of speaker distinguishing features and probing of within-speaker variability in some linguistic contexts other than AI-augmented inspection. The research validated that human-assisted forensic phonetics provided rich information regarding speaker identification that cannot be achieved through AI tools. For instance, code-switching pronunciation differences in French-Mauritian Kreol were a major challenge for AI-based applications from standardized data (Fraser et al., 2023; Mukattash, 2016). This implies the necessity of more human intervention to facilitate linguistic diversity more optimally.

Results: The study confirmed that AI technologies are not sufficient for high-risk forensic application due to a lack of ability to handle indefinite sound and linguistic variation (Loakes, 2022; Harrington et al., 2022). Although AI systems are generally praised for time savings, they are lacking in some very important respects. AI technology is also not sensitive to language variation and hence does not do so well if speaker classification arises from the use of homogeneous datasets (Loakes, 2022; O'Shaughnessy, 2023). Human processing is more sensitive to subtle matters of phonetic detail, however, such as stress caused by emotion or blocked voices (Fraser et al., 2023). In addition, results generated by AI are non-repeatable and lack transparency, something that undermines their validity in law enforcement investigations that have accountability (Koenecke et al., 2020; Wassink et al., 2022). They indicate the precedence of human performance in forensic phonetics in the handling of complex multilingual setups and minute changes in phonetics over the high rate of adoption of AI methods for voice evaluation.

Conclusion: While this study assumes the challenges of AI in the application to forensic phonetics, the merging of AI packages with human knowledge results in enhanced and more efficient outcomes. Speech enhancement by AI renders speech clearer for noise reduction so that phoneticians are able to employ critical analysis. Automatic transcription packages are capable of dealing with multilingual data sets, i.e., cases like in Mauritius with code-switching French and Mauritian Kreol are feasible. AI possesses the ability to recognize speaker-dependent acoustic characteristics such as pitch and formants that can be contrasted with human interpretation to determine its accuracy. Algorithm transparency and bias are ethical concerns that must be regulated in a way that AI can augment human knowledge and not replace it. In combination with the interpretive skill of phoneticians and computing capability of AI, forensic phonetics is more precise without contravening ethical and legal requirements. The combination ensures that justice is served in legal decisions.

Keywords: Forensic Phonetics, AI Voice Analysis, auditory and acoustic analysis

Ministry of Tertiary Education, Science and Research

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Ministry of Tertiary Education, Science and Research

Towards the Transition to a Sustainable Public Transport System in Mauritius

Presenters: L. Latchoomun and A. Dhunnoo
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Abstract:

The integration of Electric Vehicles into the local power system poses several challenges in the grid operation and planning. The electrification of public transport further exacerbates the situation whereby depot charging of electric buses is favoured in order to reap the advantages of a reduced tariff of electricity especially at night. If the existing CEB generation infrastructure is used to cater for the increasing fleet of electric buses in Mauritius, then the government's target to reduce over 76,000 tons of CO_2-equivalent GHG emissions by 2040 will be unattainable. Through this research work, we investigate the feasibility of charging e-buses through solar energy and providing a planned schedule to charge during their slack times. This is achieved through a limited number of 120 kW DC faster chargers installed on the bus stations and it is only a topping strategy whereby the e-bus is given only sufficient energy to cover a return trip since the maximum range is less than 100 km. The main advantages associated with this opportunistic charge [1,2] topping scheme are that the daily range of the bus is met, the battery of the e-bus needs not be charged to 100% thereby preserving its state of Health and most importantly, there is no waiting time during the charging process. Results of simulation show that by converting 10% of the existing fleet of diesel buses in the northern part of the island and by covering part the existing bus stations with solar panels, it is possible to satisfy the daily demand of 10% of the fleet, thereby relieving the stress on the power grid.

Keywords: Electric Vehicles, Depot charging, opportunity charging and Battery State of Health

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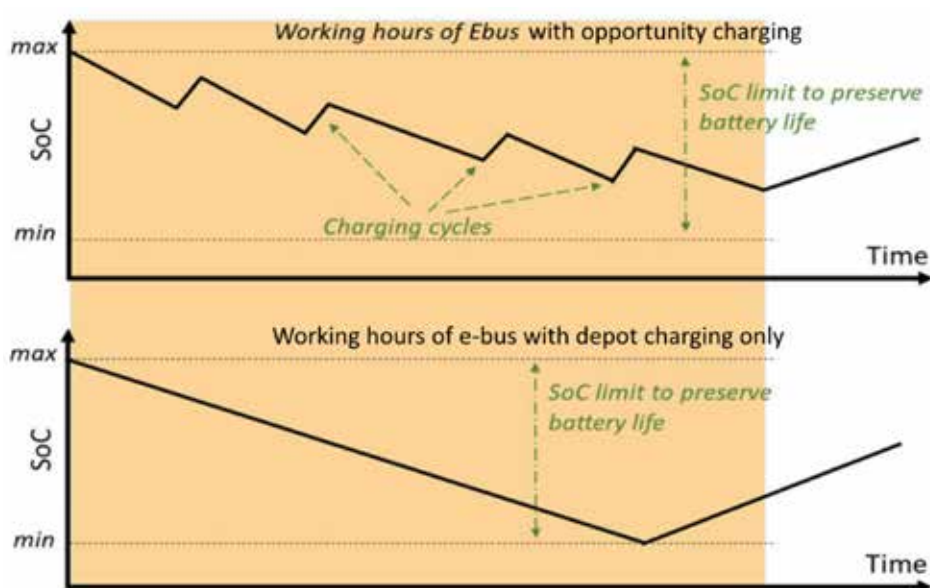
Figure 1: Comparison of Opportunity vs Depot charging

Ministry of Tertiary Education, Science and Research

Class Struggle and Structural Oppression in South Africa: A Postcolonial Analysis of Resistance in Athol Fugard's *Sizwe Bansi Is Dead*.

Presenters: Pontso Kane and Neelam F. Pirbhai
Affiliation of presenters: Université des Mascareignes**,** Centre for Digital Humanities, Beau Plan B18 Pamplemousses Campus
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Abstract:

Studies on colonial Africa demonstrate that class struggle often necessitates widespread and protracted resistance (Fanon, 1963:173; Nkrumah, 1973:108; Seddon, 2009:60). This qualitative study examines the forms of resistance against class struggle in South Africa, focusing on Athol Fugard's play *Sizwe Bansi Is Dead* (1972). Using thematic analysis, the study identifies four primary forms of resistance: (i) the exposure of structural oppression, (ii) the assertion of identity and preservation of legacy, (iii) community creativity and symbolism, and (iv) strategies of survival and defiance. This research, however, specifically explores the exposure of structural oppression as a form of resistance, drawing on postcolonial theory to analyse the psychological and social consequences of the colonial legacy (Ashcroft, Gareth, and Tiffin, 1989). Set in apartheid-era South Africa, the play explores the struggles of Sizwe Bansi, a migrant worker who must adopt a new identity to secure a work permit in Port Elizabeth (Havenga, 2024:1). Despite the increase in motor assembly plants and large numbers of people seeking jobs in this city, the government implemented the Pass Book laws to control the influx (Eke and Obika, 2023:19). To examine how the play articulates resistance, this study integrates computational text analysis using Voyant Tools and AntConc. These tools facilitate the identification of recurring linguistic patterns, keywords, and thematic clusters that reinforce the play's critique of systemic oppression. The findings reveal that the characters challenge unjust labour practices by exposing workplace inequalities through acts of defiance. Furthermore, mimicry and satire (Bhabha, 1994:122-123) emerge as subversive strategies, allowing characters to undermine and reveal the absurdity (Haider, Hamdi, and Oliver, 2020:123) of apartheid policies. By highlighting the intersection of literature and social activism, this study contributes to postcolonial scholarship on resistance narratives. Future research could expand this analysis by comparing the play's resistance strategies to those in other protest literature, further exploring how literature serves as a tool for advocating social justice.

Keywords: Apartheid South Africa, thematic analysis, computational/digital text analysis.

Ministry of Tertiary Education, Science and Research

Engineering Geological Investigations in Regions Underlain by Deposits of Volcanic Origin

Presenter: Rajeshwar Goodary
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Abstract:

Soils of volcanic origin in the fields of Geotechnical Engineering and Engineering Geology are rarely encountered as compared to other global residual soils. As such, research on the behaviour of weathered soils of volcanic origin is almost inexistent, and in literature these deposits are treated the same as conventional residual soils, complying with existing standards which are applicable in developed countries. This paper gives an inventory of volcanic basaltic deposits, and the soil testing methodologies practised on residual materials derived from weathered basalt and agglomerates occurring in the Republic of Mauritius, which is an island of volcanic origin located in the Indian Ocean, and where currently soil testing is carried out in compliance with the British Standard BS 1377. Some comparisons have been made with existing standards of another region, particularly those prevailing in Eastern European Countries. The genetics and geological history of the founding material resulting from the weathering process of volcanic basalt, and the principles adopted to assess the consistencies and strengths of the encountered weathered material on site and laboratory conditions have been overviewed. Laboratory tests, like consolidation and triaxial tests, performed on undisturbed samples of volcanic residual soils may not always be appropriate for this particular family of soils due to the gravelly nature and degree of disturbance during the extraction of the latter. Somehow, adapted site investigation methods, namely standard penetration tests and plate load bearing tests, yield tangible information which are coherent with prevailing site conditions, deemed reliable for design purposes and may be recommended for weathered soils of volcanic origin encountered on the island and possibly for countries underlain by similar deposits.

Keywords: Residual soil, weathered basalt, degree of weathering, Standard Penetration Test, Plate Load Bearing Test.

Ministry of Tertiary Education, Science and Research

Towards the search for Neural Network-based decoding models for Polar codes with improved performance

Presenter: Yogesh Beeharry
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Abstract:

The quest for error control codes with low complexity and acceptable performance trade-offs has been ongoing for several decades. The newly emerged Polar codes have already paved their way in the Fifth Generation (5G) telecommunication systems. Concurrently, the success of Machine Learning (ML) algorithms in various fields has also caught the attention of researchers in the field of telecommunications engineering. As such, the search for ML-based decoding algorithms has gained much attention and is rapidly evolving. This work contributes towards the search for Neural Network (NN) based models with improved performance. The parameters in this work are the optimisation algorithm, the loss function and the activation functions used in the hidden layers. Results show that improved error performances of the order of 0.5 db are obtained in the waterfall and error-floor regions when using the Mean Squared Error loss function with Adam, Adamax, Adam with Nesterov momentum and RMSProp optimisation functions. Other loss functions, such as Mean Squared Logarithmic Error, Binary Cross-Entropy, Huber and Logarithmic Hyperbolic Cosine, also demonstrate their potential for use in the neural Polar decoding problem with these four optimisation functions.

Keywords: Neural Network, Optimisation Algorithm, Loss Function, Activation Function

Ministry of Tertiary Education, Science and Research

A Hybrid Approach to Risk Management: Evaluating Captive and Parametric Insurance on the African Landscape

Presenter: Danisha Marthen
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Affiliation of presenter: University of Mauritius
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Affiliation of contributors: [1] University of Mauritius; [2] Department of Statistics, Athens University of Economics; [3] Conservatoire national des arts et métiers, Paris, France

Abstract:

The agricultural sector in Africa is extremely vulnerable to climate change, representing a significant socio-economic challenge, as over 97% of African farmers lack adequate insurance coverage. Traditional insurance fails to account for the unpredictable nature of climate risks due to its reliance on historical data and claim assessments. While parametric insurance offers faster payouts triggered by pre-defined parameters, it still depends on historical data and is exposed to the concept of 'basis risk'. Captive insurance, a new avenue in the insurance market, operates on a self-insurance mechanism that allows entities to manage their unique risk profiles, including those associated with climate change.

This research aims to provide an insurance coverage tailored to the needs of African farmers by blending Parametric and Captive Insurance, combining the stability of captives with the agility of parametric insurance to address the effects of climate-related risks.

The research methodology aims to model the basis risk while considering the effect of climate change, followed by the integration of a parametric model within an individually owned captive. The proposed model will then be implemented in the African landscape in accordance with regulatory laws and requirements, such as capital requirements and IFRS 17. The model will subsequently be tested against future potential climate-related events.

This research aims to enhance risk management through a hybrid insurance model, addressing climate change impacts while fostering industry innovation. It will also contribute to developing better supportive regulations for blended insurance adoption, promoting sustainability, and enhancing community resilience and climate adaptation.

Keywords: Parametric Insurance, Captive Insurance, Climate Change, basis risk

Ministry of Tertiary Education, Science and Research

Antenna Arrays in Emerging Technologies: Applications and Efficient Numerical Analysis for Large-Scale Systems

Presenter: Keshav Sewraj
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Abstract:

Antenna arrays underpin critical emerging technologies, including 5G, satellite communication, radar systems, ocean monitoring, and radio astronomy, all essential to Mauritius' technological growth. However, designing and analyzing antenna arrays at large scales presents significant computational challenges, notably due to the complex interactions, such as mutual coupling between elements, making traditional numerical methods inefficient.

First, an overview of antenna arrays is presented, highlighting their importance through specific emerging-technology applications relevant to Mauritius, including 5G networks, maritime surveillance, CubeSat communications, and radio astronomy applications, such as the Transient Array Radio Telescope (TART) installed at Université des Mascareignes.

The focus then shifts to computational challenges associated with large-scale antenna array electromagnetic simulations, particularly the effects of mutual coupling, which complicate accurate analysis. To address these challenges, our research focuses on fast numerical electromagnetic solvers based on Directional Cross Approximation (DCA) and static and dynamic Macro Basis Functions (MBFs). These solvers were developed to efficiently handle large antenna arrays while significantly reducing computational cost. Recent work published in IEEE Transactions on Antennas and Propagation (doi:10.1109/TAP.2024.3450317) demonstrates improved memory efficiency and computational scalability over traditional numerical methods while preserving accuracy.

Finally, the presentation will briefly explore broader research avenues in antenna arrays beyond computational electromagnetics, such as antenna optimisation, AI-assisted beamforming, and advanced array configurations, emphasising opportunities for further innovation and the development of local expertise.

Keywords: Antenna Arrays, Fast Numerical Electromagnetic Solvers, Large-Scale Electromagnetic Simulation, Emerging Technologies

Ministry of Tertiary Education, Science and Research

Translation of Kreol Morisien to English and English to Kreol Morisien

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Affiliation of contributors: [1] University of Mauritius; [2] University of East London, United Kingdom

Abstract:

Kreol Morisien, spoken by about 1.5 million people, gained national recognition in 2012 when it was introduced in primary schools. This was followed by its introduction in secondary schools in 2018. The first cohort of students sat for the Kreol Morisien at School Certificate level in 2023. The pass rate stood at an impressive 96.28%. A language once considered taboo in official settings is now poised to make its way into the National Assembly. Kreol Morisien is now widely used by the media, political parties, and religions institutions. It is in this context that we have developed state-of-the-art translation models for translating Kreol Morisien to English and English to Kreol Morisien. A large dataset of parallel sentences was used to train the model. The results indicate that our translation models yield comparable to Google Translate and better than ChatGPT-4.

Keywords: Kreol Morisien, English, Translation, Dataset

Ministry of Tertiary Education, Science and Research

A Social Network Analysis of Nicolas Pike's Travel Writing on Mauritius

Presenter: Neelam F. Pirbhai
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Affiliation of presenter: Université des Mascareignes

Abstract:

"We all connect, like a net we cannot see" —Mickenberg and Dugan, *Taxi Driver Wisdom*, 1995 (cited in Freeman, 2004).

Social Network Analysis (SNA) focuses on relationships between social entities—both human and non-human—rather than focusing on the entities themselves (Freeman, 2004; Tabassum *et al.*, 2018). The primary objective of SNA is to examine patterns of relationships to deduce "the relations among actors and the implications of these relationships" (Tabassum *et al.*, 2018) and to provide "insights into the relationships between groups of individuals" (Li and Corbett, 2024). In the field of Digital Humanities, SNA serves as a mode of distant reading (Moretti, 2005, 2013), transforming textual corpora into networks where nodes represent Social Actors and links symbolise Actions.

This exploratory study, though still in an embryonic stage, analyses social relationships in colonial travel writing about Mauritius. Using Nicolas Pike's 1873 work *Subtropical Rambles in the Land of Aphanapteryx: Personal Experiences, Adventures, and Wanderings in and Around the Island of Mauritius*, we examine the interconnections between entities such as people, places, and concepts as a pilot study. Pike, who was appointed U.S. Consul to Mauritius in 1866 (Pike, 1873), provides a rich primary source for studying colonial perspectives and power dynamics.

The research investigates how network visualisation techniques can illuminate colonial power structures embedded in travel narratives. This research is still in the initial stages with the cleaning of data – both manual and automated using Python – and writing of the literature review level. Findings are not available yet, but the study seeks to identify potential clusters or communities of places/characters that reflect colonial power dynamics in Pike's narrative of Mauritius.

Keywords: Colonial Travel Writing; Digital Humanities; Distant Reading; Python Programming Language

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Ministry of Tertiary Education, Science and Research

Addressing some issues related to Maths teaching at primary school level

Presenter: Prof. Krishna Busawon
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Affiliation of presenter: Northumbria University, United Kingdom

Abstract:

It is widely recognised that the failure rate in mathematics at the primary school level has increased globally over the years, while interest in mathematics at the secondary school level has been declining concurrently. In Mauritius, for example, only 42% of students who took the School Certificate exam in 2015 achieved a good grade (distinction or credit) in mathematics. Research shows that learning difficulties in mathematics can be identified as early as primary school and that prior knowledge in mathematics significantly impacts future academic success. According to the literature, some common reasons for failure in mathematics among primary school students include poverty, social deprivation, poor parenting, and unqualified teachers. However, it is rare to question whether there may be fundamental issues with how mathematics and arithmetic are taught at the primary level. Perhaps some concepts are too complex for young children to fully understand. It is important to recognize that the methods used to teach arithmetic in schools have remained largely unchanged since the early 1900s. In this presentation, we will explore the need to investigate new, coherent, and engaging approaches to teaching basic mathematical operations at the primary school level. We will also offer recommendations on how to rekindle students' interest in mathematics. This could be a crucial first step toward building a strong and resilient society 5.0.

Keywords: Mathematics, failure rate, primary education.

Ministry of Tertiary Education, Science and Research

Development and Societal Impact

Presenter: Purnima Oodhorah
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Affiliation of presenter: PhD student, Mauritius Institute of Education

Abstract:

The study intends to explore in depth the 'development and societal impact' of the current society. Due to its suitability for interpreting experiences, a qualitative paradigm with a social constructivist approach will be employed. The target population will include adolescents and adults. The data will be gathered through a qualitative approach and analysed using thematic analysis. The theory of Social Constructivism will serve as a lens to guide the research.

The study might reveal the emergence of various themes. One main theme is understanding technologies in all their richness and complexity (their functioning, what they were designed to do, and for what purpose they are used). The second theme might involve what drove the expansion of technological culture, with several themes emerging such as global communication, cultural exchange, and innovation.

A mixed method research design will be used and 100 questionnaires as well as 3 group interviews will be carried out as instruments to generate data. Ethical protocols will be followed while carrying the research.

To harness the full potential of future technologies for improving society, significant consideration must also be given to the health sector and human development. There should be a strong emphasis on the proper utilisation of these technologies through awareness campaigns. Stakeholders must ensure they actively seek solutions to mitigate potential health risks, as these advancements will continue to evolve, bringing new innovations. The aim should be to promote a brighter and more sustainable future.

Keywords: Technological impact, social constructivism, human development, sustainable innovation

Ministry of Tertiary Education, Science and Research

DAY 5
Friday 18 April 2025

THEME
Research and Innovation in Action – Bridging Academia and Industry

VENUE
Paul Octave Wiehe auditorium,
University of Mauritius

Ministry of Tertiary Education, Science and Research

Introduction

Day 5 of the National Research Week was dedicated to *"Research and Innovation in Action: Bridging Academia and Industry",* whereby industry-based research, entrepreneurship ecosystem/incubators/incubatees, grants beneficiaries were showcased and steps that need to be taken to bridge the gap between academic research and industry needs were discussed. Day 5 was organised by the Mauritius Research and Innovation Council, Mauritius Institute of Biotechnology Ltd, Higher Education Commission, Polytechnics Mauritius Ltd, Centre for Biomedical and Biomaterials Research and Business Mauritius.

The Opening Ceremony was held in the morning, whereby Prof. Theesan Bahorun, Executive Director of the MRIC gave a welcome address, followed by the Keynote Address by Dr. Manish Diwan, a leading voice in India's biotech ecosystem, providing global insights and inspiration for the development of Mauritius' biotechnology sector. Next, Dr. the Honourable Kaviraj Sharma Sukon, Minister of Tertiary Education, Science and Research, addressed the audience underscoring the government's commitment to advancing research, science and innovation. Another key moment of the ceremony was the signing of a Memorandum of Understanding (MoU) between the Mauritius Institute of Biotechnology Ltd (MIBL) and the University of Mauritius (UoM), marking a new chapter in academic-industry collaboration.

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Highlights
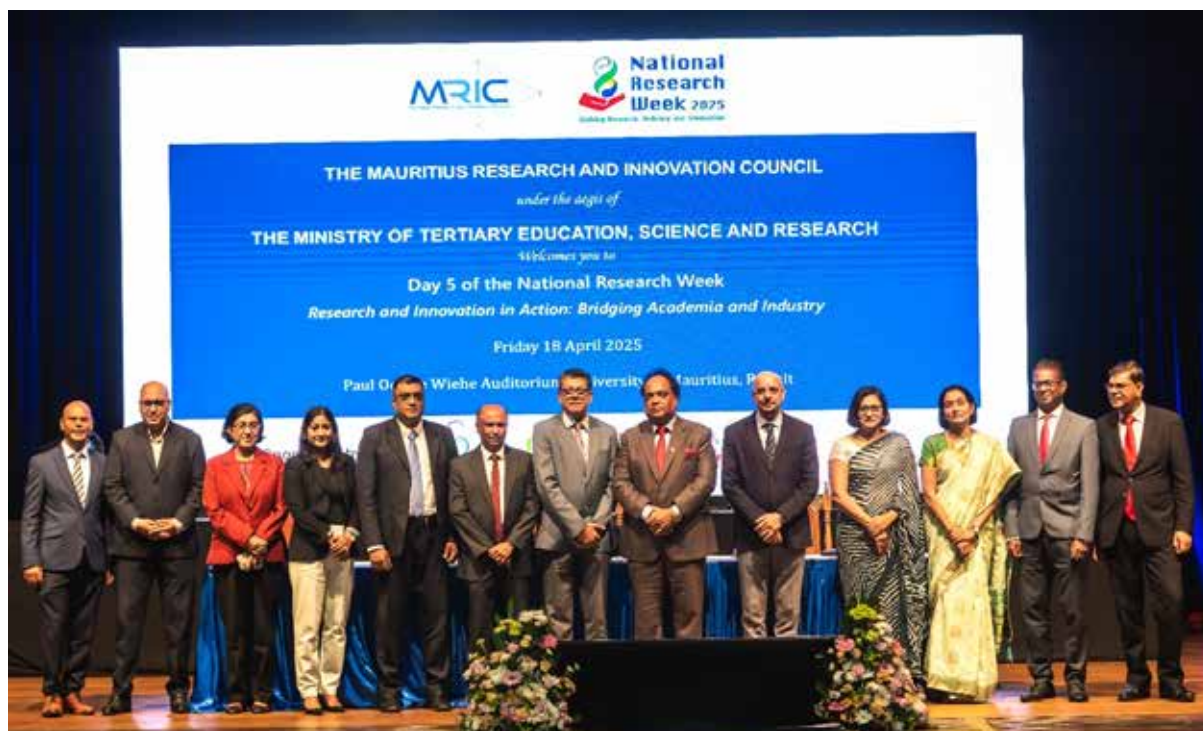
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Highlights

Students from Polytechnics Mauritius Ltd also presented their Capstone projects and incubatees from MRIC accredited incubators showcased their products.

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Highlights

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Keynote Address

Dr. Manish Diwan ,

Head - Biofoundry, NCR Biotech Cluster & Indian Vaccine Corporation Ltd (IVCOL) at BIRAC, Mission Director - Make In India Biotech sector, Department of Biotechnology, Government of India

Dr. Manish Diwan is an accomplished leader with 30+ years of experience driving the innovation ecosystem, grant administration, and project management. He has proven track record of nurturing and empowering the biotech innovation ecosystem through large national programs for the Government of India. Being a key driver of sectoral initiatives such as Startup India and Make in India, Dr. Diwan has played a pivotal role in developing strategic collaborations with national and international stakeholders. His contributions extend to serving on national committees and advisory boards, as well as shaping policy reforms to foster the innovation ecosystem growth. As the principal architect of BIRAC's national flagship schemes, Dr. Diwan has (1) enabled risk funding through grants, equity, and co-investments such as the Fund of Funds, (2) set up incubation centres for capacity building and human resource development (3) promoted deep tech innovations through mentorship, expert guidance, and industry partnerships (4) developed a world class 'iBRIC+ Bioscience Innovation Park' in 200 acres of NCR Biotech Cluster promoting bio-innovation and bio-manufacturing.

Dr. Diwan has also driven several key policy initiatives, including India's BioEconomy mapping, the launch of Global Bio-India as an international marquee showcasing platform, and the establishment of technology clusters with pilot and manufacturing facilities. His efforts have also focused on field validation for startup solutions, facilitating access to regulatory guidance, scaling the ecosystem, and fostering global integration through strategic partnerships. Additionally, he has contributed to the development of the Incubation Manager's Practice School. With a strong background in pharmaceutics, molecular pharmacology, and immunology, Dr. Diwan has successfully led cross-functional teams in drug discovery, translational research, and early clinical development across India, Japan, the USA, the UK, Canada, and South Korea. His leadership has been instrumental in advancing scientific innovation and fostering international collaboration in the biotechnology sector.

Ministry of Tertiary Education, Science and Research

PRESENTATION

VENUE
Paul Octave Wiehe auditorium,
University of Mauritius

Ministry of Tertiary Education, Science and Research

Research Areas for Impact

Presenter: Professor Romeela Mohee, Commissioner
Affiliation of presenter: Higher Education Commission
Email address of presenter: rmohee@hec.mu; commissioneroffice@hec.mu
Contributors: Dr. A. Moorgawa, Dr. (Mrs) A. Durbarry and Dr. N. Sadeer
Affiliations of contributors: Higher Education Commission

Abstract:

This presentation outlines the role of the Higher Education Commission (HEC) in promoting impactful research in Mauritius through strategic funding, stakeholder engagement, and policy alignment. Grounded in the Higher Education Act (2017), the HEC supports interdisciplinary research that addresses national and global priorities, with 131 research projects funded since 2018. These projects span diverse fields including Education, Engineering, Health and Welfare, and Information and Communication Technologies (ICT). A key highlight is the development of the List of Potentially Impactful Research (LPIR), derived from nationwide consultations with industry bodies, academia, and public institutions to ensure research relevance to the local context. Insights from her own research on solid waste management was shared and the audience was apprised on the introduction of new funding schemes such as the 'Research Related to Rodrigues-Outer Island Scheme,' the 'Open Distance Learning (ODL) Research Scheme,' and the 'Research Scheme in Artificial Intelligence.' Additionally, a micro-credential course on 'Research for Impact' was developed to build capacity in research impact and proposal development. The presentation also showcases international examples of impactful research. The integration of Research Impact Assessment (RIA), results-based management, and inclusive participation underscores the Commission's commitment to enabling meaningful academia-industry partnerships and advancing sustainable socio-economic development.

Keywords: Research for Impact, Academia-Industry Collaboration, Research Priority Areas, Impact Assessment, Inclusive Research

Ministry of Tertiary Education, Science and Research

PANEL DISCUSSION

Success Story – Highlighting research projects funded by the HEC that exemplify successful industry applications

SUB-THEME
Industry-Based Research

Session by
Higher Education Commission

VENUE
Paul Octave Wiehe auditorium,
University of Mauritius

National
Research
Week 2025
Uniting Research, Industry and Innovation

Ministry of Tertiary Education, Science and Research

Panellists:
1. Professor (Dr.) A. Bhaw-Luximon
2. Assoc. Prof. (Dr.) B. Y. R. Surnam
3. Assoc. Prof. (Dr.) Y. K. Ramgolam
4. Assoc. Prof. (Dr.) B. Ramasawmy-Molaye

Affiliation of panellists: University of Mauritius

Moderators:
1. Dr. A. Moorgawa, Ag Head Research and Planning Division, Higher Education Commission
2. Dr. (Mrs) A. Durbarry, Research Officer, Research and Planning Division, Higher Education Commission

Introduction

In this session, research projects funded by the HEC that exemplify successful industry applications were highlighted and the speakers for the session included four academics from the University of Mauritius.

Discussion:

The core of the session featured four HEC-funded research presentations from University of Mauritius academics:
1. Prof. Dr. A. Bhaw-Luximon: Development of 2.5D and 3D nano hybrid scaffolds for regenerative medicine (bone and skin regeneration), including a video presentation.
2. Assoc. Prof (Dr.) Y. R. Surnam: Recycling of PET and coconut fibre to produce eco-friendly construction products.
3. Dr. Y. Ramgolam: Creation of a Risk Management Framework to improve the bankability of solar PV systems in Mauritius.
4. Assoc. Prof (Dr.) B. Ramasawmy-Molaye: Design and commercialisation of EcoPEC Food Freshness Retainer™, a pectin-based edible coating for extending the shelf life of tropical fruits and vegetables.

Outcomes of Discussions/Recommendations:
- Emphasis was placed on measurable research outcomes and societal benefits, aligning HEC-funded research with economic and environmental priorities.
- Reinforcement of a national research partnership framework was encouraged to ensure strategic alignment between research institutions, government priorities, and industrial needs.

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ROUND TABLE DISCUSSION

Integrating Industry Needs with Academic Research focused on aligning research agendas with market demands

Session by
Mauritius Institute of Biotechnology Ltd

VENUE
Paul Octave Wiehe auditorium,
University of Mauritius

Ministry of Tertiary Education, Science and Research

Panellists:
1. Mr. Hanzy Mundil, Business Development Manager, Noveprim Group - A Charles River Company, Mauritius
2. Dr. Sanchita Mukherjee, Director & COO, Rigel Bioenviron Solutions Pvt Ltd, India
3. Dr. Manish Putteeraj, Senior Lecturer, University of Technology, Mauritius
4. Dr. Veda Sunassee, Chief Executive Officer, African Leadership College (ALC) Mauritius and African Leadership University (ALU) Rwanda and representative of Association of Private Higher Education Institutions (APHEI)

Moderator:
Mr. Raj Makoond - Program director at ECLOSIA group, Mauritius

Introduction

In his opening remarks, Mr. Raj Makoond emphasized the critical importance of connecting research with industry and innovation to drive economic development. He highlighted that successful economies around the world are leveraging strong research-industry linkages to fuel growth, competitiveness, and societal impact. Mr. Makoond underscored the need for Mauritius to learn from international best practices and adopt similar approaches to ensure that research outputs are not only academically valuable but also commercially viable and aligned with national development priorities.

Discussion:

1. The first panellist spoke about the importance of bridging the gap between knowledge creation in academia and scaling innovations in industry by understanding their respective operating environments. For instance, Charles River Laboratories International Inc (CRL) operates within San Diego's major biotechnology hub, leveraging the Triple Helix model, which fosters collaboration between academia, industry, and government. This model has contributed significantly to the region's success in biotechnology and could be adapted to our local context to strengthen similar efforts. Another example highlighting CRL's involvement in translational research is its Memorandum of Understanding (MoU) with Singapore General Hospital to advance the development of cord blood-derived allogeneic chimeric antigen receptor (CAR) T-cells for cancer treatment. This collaboration exemplifies CRL's commitment to supporting the translation of scientific discoveries into clinical applications. The panellist emphasized that capacity building and support for translational research—ranging from pre-clinical studies to in vivo research—are essential. In this regard, MIBL is playing a crucial role in facilitating the translation of academic research into industrial applications.

2. Dr. Putteeraj emphasized that globally, approximately USD 90 million is invested in preclinical research. He highlighted the importance of integrating in-vitro, in-silico, and in-vivo approaches, as they complement each other in advancing scientific discovery. In Mauritius, there is a pressing need to strengthen in-vivo research. To support this effort, the University of Technology, Mauritius, in collaboration with CRL, is establishing a vivarium for fish and rodents on campus. Fish models offer practical advantages for manipulation, while rodents are particularly valuable due to their 90% genetic similarity with the human brain, making them ideal for neuroscience and translational research.

3. Dr. Sanchita briefly shared the story behind the establishment of Rigel in the Indian biotechnology sector. As part of a Green Initiative, a patent emerged from academic research, leading to the creation of a startup focused on producing high-value Bio-CNG, bioplastics, and biofertilizers from organic waste. The project is supported by BIRAC (Biotechnology Industry Research Assistance Council). She highlighted that one of the major challenges in translating academic research into industry is the upscaling phase. While academic research generates valuable insights, transitioning to industrial application requires finding the right partners and optimizing the process to meet industry standards. The upscaling process must be feasible, cost-effective, and commercially viable. Dr. Sanchita also mentioned that the Rigel team, in collaboration with MIBL, has conducted a feasibility study in Mauritius on organic waste and is currently in discussions with the private sector for potential technology transfer.

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4. Dr. Sunassee highlighted that the African Leadership University (ALU) is among the few institutions that adopt an industry-first approach in designing their curriculum, ensuring graduates are equipped with practical, in-demand skills. He also pointed out that only 0.2% of Mauritius' GDP is allocated to research, while countries like Singapore are investing nearly ten times more. This disparity calls for a critical reflection on national priorities. Although Mauritius ranks 55th on the Global Innovation Index and holds the top position in Africa, countries like Zanzibar are outperforming in aligning research efforts with national development needs. Dr. Sunassee emphasized the need to clearly define our priorities – he mentioned to invest our youth, to train to cater for the needs of Africa. He also noted a significant gap in collaboration between public and private universities, which hinders the development of a robust research ecosystem. Furthermore, limited research funding remains a major challenge that must be urgently addressed.

Outcomes of Discussions/Recommendations:
During the final remarks, the following key points were highlighted:

- Preclinical Research: There is an urgent need for a clear legal framework to support translational research. Institutions like the Mauritius Institute of Biotechnology Ltd (MIBL) are actively working to bridge the gap between academia and industry to promote innovation.
- Capacity-Building and Funding: Establishing a national consortium could be an effective strategy to pool resources and fund collaborative research projects.
- Technology Upscaling and Investment: Dr. Sanchita emphasized that scaling up technology involves high risk, which can deter private investors. Therefore, the government should consider introducing support schemes to de-risk such investments. Additionally, increased funding for research and development (R&D) is essential.
- Private Sector Collaboration: More financial support is needed for research, and stronger collaboration with the private sector is crucial to building a sustainable research and innovation ecosystem.

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PANEL DISCUSSION

Creating Value through Research: Building a Collaborative Innovation Ecosystem for Mauritius

Session by
Mauritius Research and Innovation Council

VENUE
Paul Octave Wiehe auditorium,
University of Mauritius

Ministry of Tertiary Education, Science and Research

Panellists:
1. Mr Roshan Seebaluck, Manager, CIPDI, Polytechnics Mauritius Ltd
2. Mr Michel Cordani, Co-Founder, La Plage Factory
3. Ms Lillka Cuttaree, Director, Blossom Factory (JKC Foundation)
4. Mr Thierry Lincoln, Founder, Dodobird.ai
5. Dr. Manish Diwan, Head of Biofoundry, BIRAC (India)
6. Mr Vidia Mooneegan, CEO, Dayforce Mauritius
7. Dr. Brinda Ramasawmy, Associate Professor, Faculty of Agriculture, University of Mauritius

Moderator:
Dr. Vickram Bissonauth, Research Coordinator, Mauritius Research and Innovation Council (MRIC)

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Introduction and Context

Over the past decade, the Republic of Mauritius has pivoted towards becoming a knowledge-based economy. With GDP per capita exceeding USD 11,000 and steady growth in the services and ICT sectors, the government recognizes that sustainable socio-economic development hinges on a robust innovation ecosystem.

The Mauritius Research Council's (MRIC) - National SME Incubator Scheme (NSIS), launched in 2017, represents a cornerstone of this strategy. To date, NSIS has invested MUR 60 million, supported over 400 project proposals and helped the creation of 50 startups—of which 25 remain operational after three years of creation. Despite these strides, challenges persist in translating research outputs into market-ready solutions. The panel discussion critically analysed key issues and provided diverse stakeholder insights for charting a strategic pathway for future progress.

Session Objectives and Structure

The discussion unfolded across five thematic segments—ecosystem evolution, culture of innovation, funding dynamics, inclusivity and clustering, and international collaboration—each introduced by a brief presentation and followed by moderated dialogue. The outcomes of each of the segments provided key insights on how to consolidate the current entrepreneurial innovation ecosystem. The discussion segments were as follows:

1. **Assess Current Ecosystem Health:** Evaluate NSIS achievements, sectoral penetration and capacity gaps using quantitative metrics and qualitative insights.
2. **Identify Barriers to Commercialization:** Unpack the 'valley of death' between prototype development and market entry, focusing on finance, regulation and skills.
3. **Showcase International Models:** Leverage lessons from India's Biotechnology Industry Research Assistance Council (BIRAC) and other incubator networks to inform local adaptation.
4. **Policy and Programmatic Recommendations:** Generate actionable proposals for MRIC, government ministries and private stakeholders to accelerate research-to-market pathways.

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Detailed Discussion Themes

## (a) Ecosystem Evolution and Key Performance Indicators

Panellists opened by highlighting the growth of MRIC's National SME Incubator Scheme. Since its launch in 2017, the programme has allocated MUR 60 million in grants. These funds have supported the coaching, training, and mentoring of over 400 startup proposals. From this effort, 50 ventures have emerged across sectors such as ICT, manufacturing, education, and agriculture. However, gaps remain in areas like renewable energy and ocean technology, which require further focus. They highlighted the rise of six specialised incubators as evidence of ecosystem diversification, and argued for broadening success metrics beyond startup counts to include job quality, patent outputs, faculty spin-offs and private follow-on investments to more accurately gauge systemic maturity.

The main highlights of the debate for this section are as follows:

MRIC/NSIS Impact:
Since its launch in December 2017, the NSIS has disbursed grants to some 400 projects which received training from NSIS Accredited incubators. A total of MUR 60M was disbursed from 2017 – 2025 to facilitate the training, mentoring and coaching of these innovative, commercially driven projects. A total of 50 startups were created and some 25 are still operational to date. While the 400 incubated projects spread over diverse domains, as shown in Fig. 1 below, it is worth noting the following trends: ICT (19%), manufacturing (14%), education (10%), agroindustry (13%). It is to note that some key areas such as renewable energy, water supply, waste management, transport, scientific and technical activities and ocean technology projects remain underrepresented.

Fig 1: Representation of the different fields of focus of the 400 incubated projects of the NSIS from 2017 to 2025.

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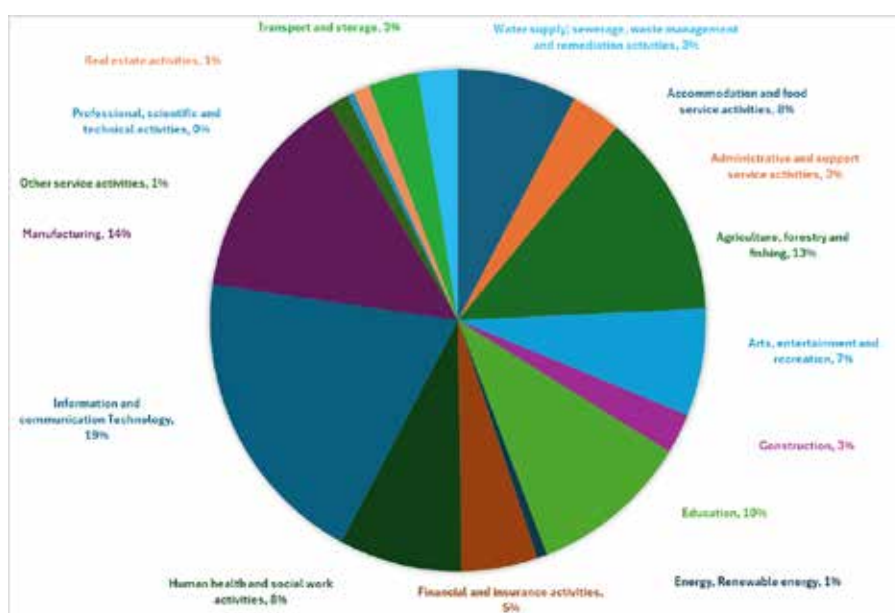
Incubator Growth:
Six sector-specific incubators have emerged, including La Plage Factory (Tech for Good ventures), Blossom Factory (women-led ventures), Turbine Incubator (Grass Root Innovation ventures), Linear Arc Solutions (Grass Root innovation and agribusiness ventures), Trampoline Ltee (Social Business ventures) and the Centre for Innovation, Professional Development, and Incubation (CIPDI) of Polytechnics Mauritius (Academia based incubator). This highlights diversification beyond core ICT and indicates opportunities for development of more sector specific opportunities.

Metrics Beyond Startups:
Panellists highlighted that it is important to refine performance indicators and consider indicators that transcend simple startup counts. Such an approach will provide a nuanced evaluation of systemic health and readiness for scaling. They advocated tracking additional KPIs such as job creation quality, patent filings, spin-off faculty engagements and private follow-on investments—to capture a clearer picture of Mauritius' ecosystem maturity. However, it was observed that the ecosystem is still very young and would need a couple of more years of development as well as a considerable shift towards entrepreneurial mindset (in the public, private, academic and societal sectors) to be able to consider the above metrics.

(b) Fostering a Culture of Innovation
The panellists illustrated how deepening connections between academia and industry fuels a vibrant innovation culture. The case of Polytechnics Mauritius' CIPDI was highlighted, where students tackle real-world challenges under the mentorship of seasoned practitioners based in Industry. Furthermore, Panellists were also apprised of the University of Mauritius' Agritech laboratories that blend hands-on field trials with strategic market analysis. The Panellists recommended (i) instilling entrepreneurial mindsets early in the younger generation — through secondary-school hackathons, (ii) compelling storytelling of both local successes and setbacks of entrepreneurs and startuppers, (iii) mandatory university courses in entrepreneurship, and (iv) showcasing visible role models, including diaspora innovators supported a scheme like 'Return to Innovate' program. All these initiatives aim to inspire and guide emerging founders/startuppers which the MRIC could consider supporting. Through this debate, the panellists illustrated how an ecosystem's psychological and cultural fabric could be as decisive as its formal structures in fostering sustained creativity and risk-taking.

The main highlights of the debate for this section are as follows:

Academic-Industry Linkages:
Polytechnics Mauritius' CIPDI integrates project-based modules with industry mentors, while University of Mauritius' agritech labs combine field trials with market scouting. Dayforce's Metaverse R&D lab (established at the University of Mauritius and at the University of Technology Mauritius) exemplifies corporate commitment to high-risk, exploratory research.

Mindset Shifts:
Consensus that entrepreneurial mindsets must be cultivated early—through hackathons in secondary schools, storytelling of local success/failure journeys and inclusion of mandatory entrepreneurship courses at the tertiary level. It is recommended that Government should take the lead in such action.

Role of Role Models:
Success stories—particularly from diaspora entrepreneurs like those engaged via a scheme that could be developed by the MRIC encouraging Mauritian Diaspora to 'Return to Innovate'. This drive could serve as powerful motivator for local talent.

(c) Addressing the Funding 'Valley of Death'
The conversation turned to the critical juncture between prototype development and market launch, where many Mauritian startups falter due to limited post-MVP financing. Panellists observed that local angel networks tend toward conservatism and VCs are attracted to larger markets, leaving a financing gap that thwarts early-stage ventures. Drawing on successful international examples, the panel outlined practical ideas that fit Mauritius' specific financial context. They recommended to define innovative and practical funding solutions that fit Mauritius' specific financial context to help startups move from prototype to market. They also proposed a tiered matching grant model—drawing inspiration from BIRAC's Biotechnology Ignition Grant—where government funding is unlocked alongside angel contributions in milestone-linked tranches. Moreover, speakers highlighted an untapped opportunity in Mauritius' financial sector. They advocated for targeted tax incentives to encourage fund managers to invest locally. Additionally, they recommended regulatory mandates that require new funds to allocate a specified percentage of their assets to accredited startups. Such measures would channel captive capital into high-potential ventures. present a spectrum of innovative funding solutions to help startups move from prototype to market.

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The sections below highlight the main discussion points:

Prototype-to-MVP Rift:
Startups often struggle to secure funding beyond proof-of-concept stage (MVP), with local angel networks risk-averse and VCs focused on larger markets.

De-risking Mechanisms:
Panellists proposed a matching grant facility—like India's BIRAC Biotechnology Ignition Grant model—that pairs government funds with angel contributions, disbursed in tranches linked to milestone achievements.

Leveraging Mauritius' Financial Sector:
The Global Business Sector of Mauritius locally handles a significant amount of funds annually (approx. 750Bn USD). There is a thus strategic opportunity to channel captive capital into innovation. Suggestions included tax incentives for fund managers and a regulatory requirement for newly registered funds to allocate a portion to accredited startups.

(d) Inclusivity, Clustering and Sector Prioritization

Panellists explored how building a truly inclusive innovation ecosystem requires intentional design to support underrepresented groups and strategically focus national efforts. Drawing on the example of Blossom Factory, which has achieved 40% female founder participation, the discussion emphasized the importance of tailored support structures for women and youth-led enterprises. Participants advocated for a national cluster strategy, urging the government to formally designate priority sectors such as food security, climate resilience, ocean economy and health biotechnology. These clusters, supported by public-private living labs and research roadmaps, would allow Mauritius to pool resources, foster specialization, and drive targeted innovation. Importantly, panellists stressed the need for participatory development models, where communities—especially in rural and coastal areas—are actively engaged in the co-design of solutions, ensuring that innovation is both inclusive and contextually grounded.

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Some of the key insights of the discussions are summarised below:

Supporting Women and Youth:
Blossom Factory's gender-responsive incubation has achieved a 40% female founder participation. Replicating such models in other sectors could close participation gaps.

National Cluster Strategy:
Advocated formal designation of 3–4 priority clusters—such as food security, climate adaptation, ocean economy and health biotech—with dedicated living labs and public-private R&D roadmaps to concentrate resources and talent.

Community Engagement:
Emphasized involving local communities—especially in rural and coastal areas—in co-design processes to ensure inclusive benefits and knowledge transfer.

(e) International Collaboration and Talent Mobility
Expanding the innovation frontier in Mauritius will require greater global connectivity—both in terms of ideas and talent. The panel highlighted India's BIRAC embedded incubator model as a blueprint for accelerating cross-disciplinary innovation by placing incubators within academic institutions. Adopting a similar approach in Mauritius would bring researchers, students and entrepreneurs together under one roof, creating fertile ground for experimentation and technology transfer. In parallel, the panel proposed an Innovation Residency Programme to attract global talent, offering 2–3-year visas, startup grants and co-working access to diaspora and foreign founders willing to launch ventures locally. Finally, to enhance visibility and foster international partnerships, panellists called for the creation of a flagship annual event, which could be called the "Mauritius Innovation Summit" which would serve as a platform to showcase local research, facilitate investor engagement and promote the country as a regional innovation hub. Overall, the Panellists highlighted how strategic partnerships, talent repatriation programs and high-profile events can amplify local capabilities and integrate the island into international value chains thus bringing us within the global innovation landscape.

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Some highlights of discussions include:

Adapting BIRAC's Embedded Incubator Model:
India's success in situating incubators within research institutions fosters cross-disciplinary synergies and easier technology transfer. A pilot within MRIC's partner labs was recommended.

Diaspora Engagement:
Proposals for 'innovation residencies' offering 2 to 3-year visas, seed grants and access to co-working spaces to attract experienced foreign and Mauritian diaspora entrepreneurs.

Flagship Global Events:
Launch an annual 'Mauritius Innovation Summit' to showcase local research, facilitate investor pitches and forge international partnerships.

Consolidated Recommendations
Synthesizing the insights from all five thematic areas, the panel proposed a comprehensive suite of recommendations designed to address systemic gaps and accelerate Mauritius' innovation journey. The cornerstone of these proposals is the creation of a post-MVP matching fund, designed to bridge the funding chasm between prototyping and market entry. This would be complemented by policy tools to mobilize domestic and offshore capital—through targeted incentives and regulatory mandates—ensuring that local startups gain access to growth capital. Recognizing the untapped potential within academic institutions, the panel recommended launching a spin-off accelerator, equipping faculty and students with the tools and resources needed to commercialize research. Simultaneously, a national cluster strategy could be set up to focus efforts and investment on key growth sectors, supported by multi-stakeholder living labs. The panel also placed significant emphasis on mindset change: a national entrepreneurial campaign and integration of entrepreneurship education across all levels were suggested to embed innovation into the cultural fabric. Finally, internationalization efforts—including a global residency programme and annual innovation summit—would help elevate Mauritius' global visibility and attract world-class talent and partnerships.

The detailed recommendations are highlighted below:

Post-MVP Matching Fund:
Establish a tranche-based co-investment facility linking government grants with angel and VC contributions. This fund would provide staged disbursements tied to clearly defined milestones—prototype validation, pilot commercialization and market scaling—to ensure accountability and de-risk investment. A governance board comprising MRIC, private investors and academic representatives could be set up to oversee fund allocation and impact monitoring.

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Offshore Capital Mobilization:

Enact policy requiring a minimum allocation from foreign-domiciled funds to local startups/incubators, complemented by fiscal incentives. Tax credits, concessional licensing and reporting waivers can be offered to fund managers meeting or exceeding their local investment quotas. Additionally, create a publicly accessible registry to track fund performance and promote transparency.

Academic Spin-off Accelerator:

Pilot a dedicated spin-off incubator within MRIC's partner universities, offering IP management, mentorship and faculty release time. This accelerator would include a structured curriculum covering business model development, regulatory compliance and investor readiness. Seed grants and access to shared laboratory facilities will further empower faculty and student entrepreneurs to translate research into viable ventures.

Formalize Cluster Strategy:

Government to identify priority sectors, set R&D targets and fund living lab consortia involving academia, industry and communities. Each cluster would be supported by a thematic steering committee, annual performance reviews and cross-sectoral networking events. Resources—including specialized equipment, data platforms and expert consulting—could be co-managed by public and private partners to optimize efficiency.

Entrepreneurial Education Campaign:

Develop a national media series highlighting local innovators and failures, coupled with mandatory entrepreneurship modules at tertiary institutions. Content would span documentaries, interactive workshops and digital toolkits, showcasing real-world case studies and mentorship opportunities. Collaboration with secondary schools could also introduce entrepreneurship bootcamps and competitions to spark early interest.

Global Residency Programme:

Introduce streamlined visa pathways and start-up grants for foreign and diaspora innovators to establish operations in Mauritius. Offer flexible residency options—including short-term incubator stays and long-term founder visas—backed by access to co-working spaces and local investor networks. Annual performance evaluations could guide renewal decisions and ensure resident entrepreneurs meet agreed-upon milestones.

Annual Innovation Summit:

Host a combined investor conference and research expo to elevate Mauritius' innovation profile and attract global partnerships. The summit would feature sectoral showcases, pitch competitions with cash prizes and thematic workshops led by international experts. Post-event follow-up mechanisms—such as deal rooms and matchmaking platforms—could sustain momentum and facilitate actionable partnerships.

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Conclusion and Way forward

The panel discussion on Day 5 of National Research Week 2025 illuminated both the significant strides Mauritius has made in cultivating an innovation ecosystem and the urgent structural gaps that must be addressed to sustain and scale its impact. From inclusive incubator models and academic-industry partnerships to targeted financial mechanisms and international collaboration, the insights shared underscored a common imperative: innovation in Mauritius must be deliberate, inclusive, and globally engaged.

The Panellists' recommendations set out the broadlines for a clear and actionable roadmap. They not only tackle immediate challenges—like the funding 'valley of death'—but also lay the groundwork for long-term growth. Key priorities include fostering academic spin-offs, developing sector-specific innovation clusters, and creating pathways to attract and retain talent. Moving forward, the Panellists highlighted that it is essential that these proposals are not only acknowledged but implemented through coordinated action across government, academia, private sector, and civil society. Establishing a Ministerial Taskforce to oversee the post-panel implementation, backed by clear timelines and outcome metrics, will be crucial to ensure momentum is maintained.

By mobilizing capital, embedding innovation into education and governance, and opening its doors to global expertise, Mauritius can transform its island constraints into a springboard for creativity and resilience. The panel has charted a clear direction—what remains is collective will and consistent execution.

National Research Week 2025

Uniting Research, Industry and Innovation

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ROUND TABLE DISCUSSION

Future-Proofing Academic Research for Industry 5.0

SUB-THEME
Exploring the evolution of academia-industry partnerships with insights from sector leaders on market demands and industry trends

Session 3 by
Business Mauritius

VENUE
Paul Octave Wiehe auditorium,
University of Mauritius

Ministry of Tertiary Education, Science and Research

Introduction by:

Ms Zaahira Ebramjee, Head of National Economic Collaboration, Business Mauritius

Panellists:

1. Dr. Drishtysingh Ramdenee - Secretary General of the Mauritius Chamber of Commerce and Industry
2. Mr. Mehul Bhatt - Chief Strategy and Sustainability Executive, Rogers Group
3. Mr. Ruben Munien – Regional Head (Mauritius and Madagascar) Human Resources, CIEL Textile
4. Professor Mari Jansen van Rensburg - Pro Vice-Chancellor and Campus Director of Middlesex University
5. Mr. Ram Jutliah – Manager Industry, Economic Development Board
6. Mr. Tan Chee-Peng - CEO at Business Technovise International Pte Ltd, based in Singapore (via Zoom)

Moderator:

Dr. Manish Diwan, Head – Biofoundry, NCR, Biotech Cluster & IVCOL at BIRAC, Mission Director – Make in Indian Biotech sector, Department of Biotechnology, Government of India.

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Introduction

The panel discussion was framed within the context of the current economic headwinds of Mauritius, namely falling export competitiveness, rising labour costs, and the announced hike in US tariffs on exports. There is urgent need for a shift towards investment-driven, productivity-based growth, as outlined in the Government Programme 2025–2029, and emphasis was drawn to the fact that academic research must become more agile, applied, and aligned with real industry needs. Stakeholders were called to bring the brilliance of our laboratories into the heat of our factories, the urgency of our markets, and the ambition of our boardrooms. Aligned with the earlier panel discussion, this session was set to further stress on the need to transform Mauritius' research ecosystem into a business-aware and innovation-driven engine that can contribute to national priorities. Without strong bridges between academia and industry, even the best ideas remain untapped. This concluding panel discussion therefore brought together key industry experts ranging from the textile industry, the biomedical sector, private tertiary education, to commerce and industry representatives from private and public sectors, all in agreement that bold academic research, industry needs, and government policy must converge to drive competitiveness, industrial transformation, and societal value.

Panel Discussion

The discussion explored how Mauritius can future-proof its research and innovation ecosystem to support the transition towards Industry 5.0; a model of human-centric, sustainable, and digitally enabled growth.

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Panelists shared insights drawn from real-world partnerships and emphasised the need to build an agile, innovation-driven research ecosystem that is responsive to real business challenges, market demands and technological shifts while aligning with national economic priorities. In particular, the recent proposed US tariff on Mauritian exports highlighted the country's vulnerability to external shocks and the urgent need for product and market diversification. The role of research in enabling this adaptation and resilience was strongly underscored.

Participants highlighted successful examples of academia-industry collaboration in advanced sectors such as biotechnology and gene therapy, noting the complementary strengths of academia (scientific depth) and industry (scalability and operational agility). In particular, Bioculture's investment in Franklin Biolabs, a spin-off of the University of Pennsylvania. He shared how this strategic venture aims to build a next-generation Contract Research Organisation (CRO) focused on gene therapy and rare diseases.

However, it was acknowledged that effective partnerships require clear governance, mutual respect, and regulatory and policy alignment to de-risk early stage ventures and build investor confidence. It is imperative for regulatory and policy frameworks that evolve alongside innovation.

It was stressed that Mauritius must prioritise applied, commercially viable research that contributes to export competitiveness and industrial transformation. For example, while Mauritius holds niche expertise in the textile sector, rising global competition and labour shortages demand greater productivity and lean innovation.

For such traditional sectors as textile manufacturing, there was a noted gap between academic outputs and business needs. Limited graduates meeting current operational demands has prompted them to implement on-the-job graduate training programs lasting up to two years. While academia often prioritizes theoretical depth and long research cycles, the fast-paced realities of the textile industry demand speed, applicability, and continuous adaptation. Academic institutions were called to adopt faster, more practical innovation cycles, co-designed with industry, to address energy efficiency, waste reduction, and automation.

It was also noted that private universities and private research institutions have a critical role to play in the national innovation ecosystem, bringing agility, international networks, and market orientation. The panel strongly advocated for a collaborative research culture that bridges public and private academic actors with industry.

This session also benefitted from an international industry perspective focused on the evolving demands of the digital economy. The importance of human-centric leadership and responsible technology adoption in driving Industry 5.0 was emphasised by Dr. Tan Chee Peng, with a call for Mauritius to develop Leadership 6.0 capacities, combining strategic thinking, collaborative ways of working, and ethical use of AI and digital tools. His remarks highlighted how these capabilities are increasingly critical in responding to global market shifts and the disruptive potential of digital transformation.

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Participation of Polytechnics Mauritius in Day 5 of the National Research Week 2025

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Polytechnics Mauritius, through the Centre for Innovation, Professional Development, and Incubation (CIPDI), actively contributed in the National Research Week 2025. The institution highlighted its commitment to applied research and entrepreneurship through the presentation of "Dodo Explorer (Mauritius)"—a project developed under the CIPDI incubator and funded by the MRIC. The participation of Mr. Roshan Seebaluck in the panel discussion on building a collaborative innovation ecosystem further underscored the role of Polytechnics Mauritius in fostering industry-relevant training, applied innovation, and sustainable start-up support. This aligns with the day's objective of leveraging research to create real-world impact, particularly in preparation for Industry 5.0.

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