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Book of Abstracts of the
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Edited by

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Green Transition: Advancing Academia's Role in Sustainable Innovation

University of Maribor

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Maja Godina Marin
Sara Zlodej
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LITERARY THEMED ONLINE GUIDED TOURS (LTOGT) AS A TOOL FOR A SUSTAINABLE DESTINATION'S TOURISM DEVELOPMENT

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Online guided tours (OGT) have emerged as a promising tool for promoting sustainable destination development. By leveraging technology and digital platforms, OGT offer a unique opportunity to showcase a destination's attractions, culture, and heritage to a global audience in an environmentally friendly manner. Literary-themed OGT are even more specific and can be an effective tool for a destination's sustainable development. They can raise awareness about the importance of responsible tourism behavior and encourage visitors to support sustainable initiatives in the destination. They tend to bring visitors to more off-the-beaten-path areas, known by locals mainly. Presenting cultural sites, traditions, and practices digitally, these tours raise awareness about the importance of heritage conservation and encourage responsible tourism practices. LTOGT make destination experiences more accessible to a wider audience, including individuals with physical disabilities or financial constraints. Inclusivity promotes social sustainability by ensuring that everyone has the opportunity to engage with and appreciate the destination. LTOGT create new economic opportunities for local communities by providing a platform

for their products, services, and cultural offerings to a global audience, which can contribute to the growth of sustainable tourism enterprises and support community development. LTOGT can eliminate the need for physical travel to a destination, thereby reducing carbon emissions associated with transportation. OGT can potentially be a valuable tool for destination sustainable development by promoting environmental conservation, social inclusivity, cultural preservation, economic growth, and responsible tourism practices.

Keywords: digital tourism, online tourism, guided tours, sustainable development, destination marketing

THE IMPACT OF FRAGILE/EXCLUSIVE MOBILITY SYSTEMS ON SOCIAL EXCLUSION PROCESSES: PEOPLE WITH DISABILITIES AND ELDERLY; KABUL CITY

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This study seeks to identify the key factors contributing to the fragility and lack of accessibility of public transportation and its impact on social exclusion processes in Kabul, Afghanistan, particularly from the perspectives of stakeholders and users with disabilities and the elderly. The research employs a mixed-methods approach, gathering quantitative data from 150 individuals with disabilities and the elderly across four districts of Kabul through questionnaires. It also utilizes focused group discussions involving six groups: representatives from the Elders Committee, Disability Rehabilitation Association, The Enlightenment Association, Civil Society, Public/Private Transport Providers, Transport Expert's Diaspora, and Security Sectors representatives. Through confirmatory factor analysis, the perceptions of individuals with disabilities and the elderly regarding public transportation were categorized into two main components: security and services. The security component encompassed concerns about terrorist attacks and social crimes, which instilled fear and discouraged their utilization of public transportation services. This fear of insecurity has led to social exclusion. The service component addressed issues related to accessibility, affordability, and social interactions. Respondents highlighted the difficulty of paying fares, lack of wheelchair space, inaccessible vehicles, and instances of social abuse. The analysis of discussion group findings revealed that

fragmented public transportation departments not only contributed to the fragility and inaccessibility of the current public transport system but also created a push-and-pull policy environment that hindered public sector investment, representation, and participation of people with disabilities and elderly in transport policy and planning decision-making. Moreover, this fragmented structure weakened the ability of civil society to advocate for the rights of people with disabilities and the elderly and made the system more vulnerable to terrorist attacks. In the short term, fostering collaboration among fragmented departments through a collaborative process that brings together independent actors to create an inclusive public transportation system that none of these departments alone can achieve. In the long term, proposing a new institutional framework (PTA) that merges and consolidates all the fragmented departments under a single umbrella to address the issues identified in our findings.

Keywords: people with disability and elderly, exclusive, inclusive transport, fragmented, security, perceptions, collaborations, institutional, Kabul, Afghanistan

POTENTIAL OF LUXURY TOURISM TO CONTRIBUTE TO SUSTAINABLE DEVELOPMENT IN SEYCHELLES

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This work reflects on the contribution exclusive tourism can make to sustainable development and examines the extent to which selected high-end hotels in Seychelles contribute to meeting sustainability ambitions encapsulated in the UN Sustainability Development Goals. The secondary objective is to identify challenges facing high-end tourism operators in embracing the sustainability agenda and optimising opportunities offered in its implementations. The research is based on the author's field research to Mahé based resorts; academic literature review, government reports and strategic plans, and clustering of internet-based data provided by booking.com, tripadvisor.com and the target hotels. In general, luxury and sustainability are simply not compatible. Despite ubiquitous marketing to the contrary, high-end tourism can make only a marginal contribution to sustainability. This contribution could be boosted by continuous analysis, monitoring and dialogue supported by awareness raising activities and assessment tools. It is also crucial that Seychelles closely coordinates such efforts with other luxury destinations.

Keywords: small island developing states, sustainable development, luxury, tourism, high-end resorts, Seychelles

ADOPTING RESILIENT SUPPLY CHAIN PRACTICES TO STRENGTHEN PROJECT MANAGEMENT RISK MITIGATION STRATEGIES

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This systematic literature review (SLR) examines resilience-based topics within supply chain management (SCM) and project management (PM). SCM and PM share similarities in complex decision-making challenges due to the fluctuating and unpredictable nature of market demand, material and product prices, transportation schedules, delivery timelines, processing, and budget considerations. Even though SCM has five times more publications related to resilience compared to PM, the aim is to understand whether there are common resilience topics within SCM that could also be applied to PM. The review analyzes over one thousand eight hundred publications from the Web of Science Core Collection database, addressing four research questions. These questions mainly cover key characteristics of initial publications, such as the co-occurrence of keywords analyzed with the bibliographic software VOSviewer. Then, it delves into the final list of publications and their co-authored countries, main sources, publishers, publication years, and co-occurrence of all keywords. The review finally addresses the most common aspects of resilience in SCM that could be applied to the PM field. Despite the comprehensive research, the final list includes only 27 suitable publications from the field of PM that met the minimal criteria. This SLR maps current literature and provides a foundation for

future empirical research, emphasizing the growing importance of resilience in PM and SCM. The limitation of focusing the analysis solely on the Web of Science database, open-access, only articles, and such interdisciplinary fields of Business, Management, Operations Research, Management Science, and Social Sciences suggests a need for broader studies.

Keywords: bibliographic analysis, project management (PM), systematic literature review (SLR), supply chain management (SCM), resilience

SUSTAINABLE LEADERSHIP: EMPOWERING INNOVATION FOR A SUSTAINABLE FUTURE

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The dissertation examines the impact of sustainable leadership (SL) on various aspects of innovativeness in organizations, specifically innovation capability prioritizing both innovation and sustainability. It highlights concerns about the current business environment's inadequacy in addressing today's rapidly changing global landscape. Amid technological, geopolitical, and economic upheavals, reassessing existing knowledge and adopting new perspectives becomes imperative. This is particularly significant as industrialization has historically been the driving force behind economic development. Consequently, the United Nations (2023) advocates for a "new generation of sustainable industrial policies" founded on integrated national planning to enhance investment and establish a robust foundation for the future.

The concept of sustainable leadership as an independent construct emerged over two decades ago. Since its inception, scholars have identified that traditional economic models operate on reductive assumptions concerning the human perspective, often neglecting essential dimensions such as psychology, sociology, biology, and ecology. Researchers have posited that the integration of sustainable leadership principles into management frameworks is pivotal for the development of sustainable organizations. The realization of effective sustainable leadership necessitates profound shifts in beliefs, attitudes, and behaviors across multiple levels:

at the individual level, within organizational structures, and throughout broader societal contexts. Cultivating a culture of sustainable leadership has the potential to engender transformative changes, fostering an environment that nurtures and values innovative thinking.

Despite these advancements, the research underscores the dearth of studies on sustainable leadership, especially considering its critical role in promoting sustainable development. Although the industry significantly impacts social, environmental, and cultural aspects, sustainable leadership practices receive scant attention. Given that the implementation of sustainable leadership involves a complex interplay among national governments, sub-national authorities, and non-state actors such as businesses and civil society, it is surprising that relatively few studies have been dedicated to this subject. Furthermore, the study emphasizes the importance of disseminating knowledge and practices related to sustainable leadership, particularly due to the limited geographical scope of existing research. This suggests current leaders may lack the competencies to address the complexity of sustainable development, which demands innovative solutions for environmental sustainability, social equity, and long-term economic viability. Through a judicious amalgamation of methodologies like case studies and surveys, the research aims to comprehensively illuminate the intricate relationship between sustainable leadership and organizational innovativeness.

Leadership plays a pivotal role in the implementation of sustainable development. Given that this process relies on the leader's attributes—such as beliefs, values, ethics, character, knowledge, and skills—the study's findings highlight the imperative for a fundamental shift in mindset and behavior to successfully attain Sustainable Development Goals. Additionally, collaborative efforts across disciplines, including business, management, and education, are crucial to fostering a global shift in mindset and behavior towards these goals. Looking ahead, the research envisions a transformative change in the perception and implementation of sustainable leadership through interdisciplinary collaboration and the integration of sustainable development principles into formal education systems. By embedding a sustainable mindset and practices into curricula, we can nurture future generations capable of creating a better and more equitable world.

Keywords: sustainable leadership, sustainable development, innovation, innovation capability, business and management

TRANSITIONING FROM PROCESSED FOODS BACK TO HEALTHY EATING: HOW SLOVENE MOTHERS USE ANCESTRAL KNOWLEDGE TO FEED THEIR CHILDREN IN CONSUMER SOCIETY

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Healthy eating has a large impact on family health. Therefore, one of the global aims of green transition and sustainable living should incorporate food and health knowledge. In Slovenia, a post-socialist country and member of the European Union, gardening, home-cooking, home-preservation methods, and buying seasonal foods at farmers' markets remain important even among younger families in urban areas. We present the findings of a ten-year qualitative anthropological study on healthy eating practices used by Slovene mothers when feeding their five-year-old or younger children. Our observations, limited to a small sample, have revealed where healthy eating knowledge originates, how it is valued and how it is used by younger generations of mothers. Despite living in urban areas, having a university education, being employed, and leading a modernized lifestyle, these mothers avoid feeding their children processed foods. Inquiring about the transfer of knowledge behind such practices, in-depth interviews show that the mothers revive values and traditions not from their mothers, but from their grandmothers and great-grandmothers. The respondents selectively adopted healthy eating values only from

those of their ancestors who had refused to fully transition toward consumerism and modernized diets. Describing a path from unhealthy teenage and student diets back to healthy eating when giving birth to their children, the mothers claim the importance of raising personal knowledge to a 'more conscious level'. Interestingly, traditional knowledge and healthy eating values among mothers in this study remain strong throughout the years despite a growing availability of processed foods in the Slovene food chain.

Keywords: healthy eating, child-feeding, ancestral knowledge, post-socialism, Slovenia, food transition, indigenous knowledge, consumerism

DUAL-USE GOODS IN THE CONTEXT OF LIFE SCIENCES RESEARCH

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As a part of my dissertation, I will be studying the regulation of life science research and limitations to the dissemination of researcher's findings. Dual-use goods, as a legal term, are items, technologies, and materials that have both civilian and military applications. The term encompasses not only material goods but also technology and know-how. Certain findings of life science researchers, due to their possible grave negative consequences, definitely fall in the category of dual-use goods and are, therefore, subject to export control. My research will analyse the different approaches to the regulation and control of scientific research and dissemination of findings and the human right to freedom of speech and access to information (both under the Universal Declaration of Human Rights, Art 19).

Allowing unhindered access to findings may result in the proliferation of know-how that could be implemented into the production of Weapons of mass destruction (WMDs) or other biological or chemical weapons. The role of academia is to firstly consider the ethical limitations of the research and, secondly, regulations put in place by the institution facilitating the research, national legislation on the matter and relevant international treaties. Some findings are best kept undisclosed, even if that means slower development of a scientific field. In the current world, the demand for malevolent technology is high, and it is every individual's duty to prevent

proliferation. If humanity is to survive on planet Earth, we are to protect ourselves from the very weapons we create.

Keywords: dual-use goods, life science research, export control. Freedom of speech, weapons of mass destruction (WMDs)

ADDED VALUE OF SMARTPHONES AND TABLETS IN LABORATORY AND FIELDWORK IN BIOLOGY AT THE LOWER SECONDARY SCHOOL LEVEL

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This research examines the added value of smartphones and tablets in lower secondary school biology education, focusing on laboratory and fieldwork settings. The project aims to develop a predictive model to facilitate the incorporation of these technologies into teaching strategies.

The study is divided into two principal components. The first component of the study involves the identification of obstacles and perceived benefits associated with m-ICT through the administration of surveys to students, teachers, and parents. The surveys have been adapted from tools used in similar studies, ensuring relevance and applicability. The second component of the study seeks to innovate biology laboratory exercises by integrating m-ICT.

The effectiveness of these modern methods will be measured against traditional teaching practices by assessing participant satisfaction and learning outcomes.

The central hypothesis of this research is that m-ICT can significantly enrich biology education by enhancing hands-on experiences in laboratory and field settings.

To assess the impact of m-ICT on educational outcomes, the study employs various multivariate statistical methods. The study aims to address a critical research gap and provide insights into the current adoption of mobile technologies in Slovenian schools, with potential implications for international educational practices. The study aims to provide a comprehensive perspective on the role of m-ICT in education by evaluating both the advantages and possible drawbacks of this technology. It seeks to support the development of effective, modernized teaching approaches that leverage the capabilities of available technologies.

Keywords: Biology education, educational innovation, m-ICT, mobile learning, smartphone, tablets

WHICH INNOVATIONS WILL PREVAIL IN OPTIMIZING HUMAN RESOURCE USAGE IN SUSTAINABLE GREEN TRANSITION

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Transitioning to a green and sustainable economy is infeasible without innovative solutions to several technological, economic, and societal challenges. Significant interdisciplinary innovative effort in circumstances of constrained resources requires foresight in understanding which of the innovations will survive the test of time and which will fail. In our paper, we combine insights from decision theory, evolutionary game theory, and psychology into a framework of maturity models to offer some insights into the question of innovation perspective.

Maturity models, exemplified by the Technology Readiness Level (TRL), scale developed by NASA and adapted by the European Commission for Horizon Europe projects, can be used to trace the lifecycle of innovation from theory to practical implementation. Snowden's Cynefin decision-making framework offers another lens, following the innovation from a chaos realm to straightforwardness. Emotions of the innovators within this process parallel these stages: from apathy in chaos through anxiety in complexity to flow in the complicated realm closing in relaxation of the simple realm. We unify these diverse insights using a universal agent model combining models of Markov decision process and Hoffman's interface theory of perception. We apply the model to several green-transition-supporting

innovations from physics, biodiversity preservation, construction engineering, and medicine: building green roofs, where biodiversity is preserved through the conservation of native plant species; converting greenhouse gasses into fuel for heating or electricity, manufacturing rechargeable batteries that store excess energy; the use of materials obtained through low-emission processes, such as bamboo, wood wool or natural rubber.

Keywords: green innovations, maturity models, sustainable economy, climate neutrality, digital transformation

DEVELOPMENT OF AQUEOUS ECO-EXTRACTION METHODS OF POLAR AND NON-POLAR PIGMENTS

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The development of effective eco-extraction methods is a challenge both for the research and the industry that contributes to the sustainable development goals adopted by the United Nations in 2015. One of the approaches to eco-extraction is using water as a solvent. Water is sometimes considered as the greenest solvent as it is safe, accessible and has a low environmental impact. Due to solubility issues, water is generally limited to extracting polar molecules. However, innovative extraction methods and the addition of a co-solvent can expand the polarity range of extracted compounds.

Two dye plants containing pigments with different polarities were studied. Anthraquinones from Dyer's Madder (Rubia tinctorum L.) are hydrosoluble in their glycosylated form but much less polar than aglycones. A pressurised microwave-assisted extraction was developed by response surface methodology. The pressure and temperature obtained through this method put water in a subcritical state, allowing the extraction of all anthraquinones. The simultaneous ultrasound-assisted extraction of polar antioxidants and the oil-soluble pigment from achiote (*Bixa orellana* L.) was developed using a biphasic mixture of vegetable oil and water. Five vegetable oils (sunflower, coconut, grapeseed, jojoba and olive) were investigated to

determine their impact on the colour, antioxidant activity and composition of the extract. The composition of the extracts from both plants was characterised by UHPLC-HRMS/MS.

Keywords: Water, eco-extraction, dye plants, microwave-assisted extraction, vegetable oil

AUTOMATED SOFTWARE COMMIT CATEGORIZATION THROUGH CONTEXT-AWARE CODE CHANGE EMBEDDINGS

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Software commit categorization refers to the process of identifying and classifying changes made to software during its development and maintenance phases of the software lifecycle, with the primary aim of demystifying the intents behind these changes. This involves analyzing each commit – a set of related changes made to the software's codebase captured within a version control system at a specific point in the software's evolution – and assigning it to a particular category. While this can be performed manually, automated data-driven approaches offer significant advantages in terms of consistency and scalability, as well as time efficiency, labor intensity, and cost-effectiveness. These approaches reduce manual effort and the need for physical resources while enabling productivity gains, more efficient resource usage, and more optimized software development and maintenance. Hence, automation in software engineering, particularly in commit classification, promotes more sustainable software practices, targeting the economic, technical, environmental, individual, and social dimensions of sustainable software engineering. To reach their full potential, automated commit classification approaches must be accurate and efficient in the heterogeneous landscape of software changes and projects. To address these challenges, our research focuses on representing code changes using context-aware change vector embeddings based on pre-trained transformer-based models for

source code. Additionally, we explore the integration of data from different modalities to comprehensively represent code changes with respect to their change intents. Our research findings highlight improvements in automated commit intent classification performance, demonstrating the value of this approach in enhancing software development and maintenance practices.

Keywords: automated software engineering, code changes, software change intents, supervised machine learning, commit classification, code representation learning, semantic code embeddings

DEVELOPING NOVEL AND OPTIMISED PROTOCOLS USING PTEC FROM HUMAN KIDNEY BIOPSY FOR NEPHROTOXICITY MODELLING

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Human kidneys play a role in several functions, including reabsorption and secretion of compounds, exposing them to substances that could cause harm. Currently, preclinical studies for novel drug development and nephrotoxicity focus on *in vitro* and *in vivo* animal studies, which are not precise and pose numerous ethical considerations. To address this issue, available isolation protocols need to be improved. Our work aimed to develop a protocol for isolating proximal tubular epithelial cells (PTEC) from human kidney biopsy to serve as a model for nephrotoxicity studies.

We isolated and cultivated primary PTEC obtained during regular diagnostic kidney biopsy procedures. We used two protocols for tissue micro-dissection, enzymatic dissociation and selective culturing. For phenotypic characterisation, several markers characteristic of PTEC were chosen for immunocytochemical staining.

Following these protocols resulted in isolating cells that exhibited a cobblestone appearance, which is indicative of PTEC. They reached confluence after eight and ten days and showed dome (hemicysts) formation after 13 days, also indicative of

PTEC. The monolayer showed high integrity. The isolated cells were positive for 10 PTEC markers using a fluorescence microscope, and the polarisation of these markers was shown with a confocal microscope. First experiments using cyclosporine and omeprazole for nephrotoxicity studies are undergoing.

We have developed novel and optimised protocols for isolating and cultivating primary human PTEC, named MFUM-RPTEC-1 and MFUM-RPTEC-2, and performed the most extensive systematic characterisation following kidney biopsy reported to date. We have begun our first studies for modelling nephrotoxicity.

Keywords: proximal tubular epithelial cells, in vitro models, human, biopsy, nephrotoxicity

REDUCING THE EFFECTS OF COPPER IN VITICULTURE THROUGH THE USE OF PYROLYSED BIOCARBON CO-PRODUCTS IN SUPPORT OF THE CIRCULAR BIOECONOMY

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The use of Bordeaux mixture and organic phytosanitary products in viticulture to fight vine diseases has led to the accumulation of large quantities of pollutants in viticultural soils. These treatments, mainly based on copper, are used in organic, integrated and conventional agriculture. Although the quantities applied have decreased, the concentrations of copper and phytosanitary residues found in these soils remain high. This pollution is dispersed into the environment when it is washed away by rain. It is therefore necessary to propose alternatives to the use of copper and phytosanitary products which represent a danger for the vineyard, for the living organisms in the soil and our water resources. Reducing the effects of phytosanitary products on the environment is an important issue for our society. This thesis aims to valorize and use the bio-sourced co-products of viticulture (vine shoots, pomace and grape seeds), transformed by pyrolysis into (i) carbonaceous amendments which will be used to stabilize the copper present in the viticultural soils and thus make it possible to increase the biological and physicochemical quality of the soils and (ii) bio-oil co-products of the pyrolysis which are tested for their antifungal activities against mildew. This will allow to decrease the use of copper in viticulture and will

contribute to the implementation of sustainable agricultural practices based on a circular economy. Ultimately, it will preserve the quality of our water resources in a global perspective of climate change.

Keywords: copper, vineyards, biochar, circular economy, phytomanagement

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With this publication, we aim to inform doctoral students, university professors, and the interested public about current topics being researched by doctoral students in the field of the green transition and the role of the academic environment in developing sustainable solutions. The summaries of the publications provide insight into the research problems doctoral students are addressing in this area and the solutions they propose.

Keywords
green transition, sustainability, development, innovation, doctoral students

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