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"Reimagining The Future of Built Environment"

Organised by:
Centre of Building, Construction & Tropical Architecture (BuCTA)

CONFERENCE PROCEEDINGS OF ASEAN POSTGRADUATE CONFERENCE 2023

Reimagining The Future of Built Environment

Centre of Building, Construction & Tropical Architecture (BuCTA)

Faculty of Built Environment (FBE), Universiti Malaya, Kuala Lumpur

Conference Proceedings of Asean Postgraduate Conference 2023

Series Editors

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Conference Proceedings of Asean Postgraduate Conference (APGC) 2023 – encapsulates the wealth of knowledge, novel ideas, and innovative research presented during the conference. The primary aim of APGC 2023 was to serve as a platform for postgraduate scholars, researchers, and professionals in the field of Built Environment to converge, exchange insights, and delve into the latest advancements in the discipline. With the overarching theme, "Reimagining the Future of Built Environment," the conference sought to push the boundaries of conventional practices and explore progressive approaches to design, construction, and operation for sustainable and regenerative built environments.

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- Sustainable Construction and Artificial Landscape
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- Construction Project Management
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- Building Construction Materials and Technology
- Heritage Conservation
- Building Services and Maintenance
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- Emerging Technologies

Table of Contents

SS

Effectiveness of Interior Decorative Materials for Lecture Room Acoustical Design Strategies

Abdul Wafi Razali[1,2], Nazli Che Din[2], Musli Nizam Yahya[3], Raha Sulaiman[4], Asrul Mahjuddin Ressang Aminuddin, Asrul Sani Abdul Razak, Mohd Shahril Nizam Shaharom

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Abstract

The adverse conditions of classroom acoustics had a detrimental impact on students' ability to comprehend speech, leading to later consequences for their cognitive development and academic achievement. Hence, it is imperative to provide ideal listening settings in order to facilitate effective perception and recognition of speech by the listeners. This calls for extensive research to investigate potential acoustic interventions and treatments as a proactive measure to address the problem. This study aims to analyse the acoustic performance of two lecture rooms located at a Public University in East Malaysia. Additionally, it aims to propose acoustic design solutions using interior decorative materials as a remedy for future enhancements. This study employs a quantitative approach to conduct on-site acoustic measurements in order to assess the reverberation time and background noise level of the lecture rooms. The data obtained from measurements conducted on-site is utilised in the simulation process. The analysis of viable design treatment possibilities is further examined through simulation with ODEON software. The simulation procedure produced results pertaining to the impact of the treatment of the material surface on various acoustic parameters. The results indicate that implementing surface treatment using interior decorative materials has a substantial positive impact on the reverberation time and speech transmission index ratings. These measures are both practical and viable as a guideline for future improvements.

Keywords: Classroom acoustics, Interior decorative material, Background noise level, Reverberation time, Speech transmission index

Assessing Patient-Cantered Healthcare Through Maqasid Shariah Principles: A Public Document Analysis of Public Hospitals in Malaysia

Ahmad LuqmanulHakim Sunawari, Azira Khalil

Abstract

This research paper, titled "Assessing Patient-Centered Healthcare through Maqasid Syariah Principles: A Public Document Analysis of a Public Hospital in Malaysia" explores the application of patient-centred with the accordance of Maqasid Syariah principles in the context of healthcare services, with a focus on a public hospital in Malaysia. The study employs a public document analysis approach with to assess the extent to which the hospital's policies and practices align with the concept of patient-centred align with the principles of Maqasid Syariah, which encompass the preservation of essential elements of well-being and human dignity. The research aims to provide insights into the potential compatibility and challenges along with the status of it in implementing Maqasid Syariah principles within the healthcare system, especially in a diverse and multicultural society like Malaysia. By evaluating the public hospital's documents, such as policies, guidelines, and mission statements, the study seeks to identify areas where patient-centeredness, ethical healthcare practices, and equitable access to services can be enhanced or aligned with Islamic ethical values. The findings from this research can offer valuable recommendations for policymakers, healthcare administrators, and practitioners to improve the patient-centeredness and ethical dimensions of healthcare services in line with Maqasid Syariah principles. This research contributes to the growing body of literature exploring the intersection of Islamic ethics and healthcare, offering a unique perspective on enhancing the quality of healthcare services in a multicultural and multi-religious society while respecting the principles of Islamic jurisprudence.

Keywords: Patient-centred, Maqasid-syariah principles, Public documents, Public hospital

Research Trends and Issues of Vernacular Architecture Regeneration: A Literature Review

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Abstract

Vernacular architecture demonstrates the diversity of rural culture, traditional practices, building techniques, and architecture. Rapid urbanization and industrialization have led to the decline, disappearance, and hollowing out of the countryside. The destruction or abandonment of vernacular architecture, the disappearance of traditional lifestyles and cultures, the deterioration of ecological environments, and the waste of land resources have posed great challenges to the conservation and sustainable development of the countryside. Regeneration and sustainable development of vernacular architecture has become a very important field of research. Based on the study of the literature in recent years in the Web of Science, the necessity and urgency of the sustainable development of vernacular architecture is described. The research field of vernacular architecture regeneration is analyzed qualitatively, mainly involving architectural types, building materials, architectural styles, architectural forms, spatial models, and analysis of influencing factors. It contributes to the sustainable development of vernacular architecture in terms of culture, regional characteristics, social value, and natural environment, and provides valuable insights and important references.

Keywords: *Vernacular Architecture; Micro-Regeneration; Village; Sustainable Development; Rural Revitalization*

Sustainable Urban Farming and Food Security through Landscaping

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Abstract

With the increasing urban population and disparities in food supply and demand, ensuring food provision for urban dwellers has become a major concern. This research focuses on the analysis and comparison of various reputable theories in the field of sustainable urban farming and presents innovative approaches for the development of sustainable agriculture in urban areas. In this regard, we examine theories put forth by innovators such as "Jan Asselin," "Dickson Despommier," and "Will Allen" to demonstrate how these theories can contribute to the development of food security in cities. The primary objective of this research is to enhance food security in cities by reducing dependence on external food resources and elevating local agricultural production. Especially during times when climate change and global fluctuations destabilize food supply, the development of sustainable urban agriculture is proposed as a global strategy for ensuring food security. We delve into scientific experiences and modern technologies that can be harnessed in the development of urban farming. This encompasses the utilization of artificial intelligence principles in agriculture, efficient water-based agriculture, recycling urban waste products, harnessing energy from renewable sources, and employing Information and Communication Technologies (ICT) to enhance resource management in urban environments. This research deals with the theoretical development of the urban agriculture framework to provide recommendations to improve the form of food security and urban farming through landscaping. In order to search for the theory of sustainable urban agriculture development, the qualitative research method including content analysis is the most appropriate approach to use in this research. At the end of the research, this study will reveal the component of good urban sustainable agriculture planning. This research develops the theoretical basis of the urban sustainable agriculture planning framework to provide recommendations to improve the urban sustainable agriculture planning form and urban food security. An element of sustainable agricultural planning and good urban food security is proposed by combining theories to improve the quality of life in the city.

Keywords: Sustainable agriculture, Food security, Urban environment, Urban farming, Modern technologies

Beyond Barriers: An Exploration of Accessibility Challenges and Emotional Experiences in Inclusive Heritage Visitation at Lalbagh Fort, Dhaka

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Abstract
Heritage sites, as revered repositories of cultural memory, form an integral facet of a nation's cultural and architectural fabric. In Bangladesh, where conventional conservation paradigms have been traditionally embedded, the connection between heritage conservation and outdoor accessibility, especially for physically challenged individuals, remains under-researched and overlooked. This study seeks to bridge the gap between existing research and the limitations of accessibility regulations in Bangladesh by investigating outdoor accessibility challenges faced by physically challenged persons at heritage sites, focusing on the historical Lalbagh fort. This qualitative case study methodology includes surveys with observations through access audit checklist and semi-structured questionnaires to investigate the physical barriers, communication systems, and representative and interpretive resources that could impede accessibility and impact the experience of heritage visitation. This study aims to investigate the challenges that prevent individuals with physical disabilities from having barrier-free access to the heritage site's resources and experiences. While doing this, this research also explores potential solutions to overcome these obstacles and promote inclusive heritage tourism practices. The findings of the study indicate that while there is a genuine intention to enhance accessibility, the barriers of core outdoor accessibility elements remain unattended. The study recommends a multifaceted strategy to improve accessibility, including modifications to the site's physical environment, enhancements to communication systems, and increased staff training and capacity-building. By addressing these barriers and promoting accessible tourism practices, places like Lalbagh Fort can become more inclusive, fostering future generations' cultural heritage preservation.

Keywords: Accessible heritage, Accessible tourism, Cultural tourism, Cultural heritage, People with disabilities.

Leveraging VR with TPACK Model: A Framework for Enhancing Indoor Environmental Quality Knowledge

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Abstract
In today's higher education, learning frequently entails an indirect approach that often relies on students' imaginative abilities rather than direct interaction with real-world objects or phenomena. Therefore, VR as a learning tool holds immense potential for revolutionizing today's teaching and learning activities in built environment domains such as architecture and construction. However, its application in the context of building science, particularly in Indoor Environmental Quality (IEQ), remains notably underexplored. Furthermore, existing VR interventions in education often lack a robust foundation based on established learning models, thus rendering them less effective. Recognizing the paramount importance of grounding educational technology within a solid learning model, this study aims to bridge this gap by developing a conceptual framework for VR-based learning of IEQ, firmly rooted in the Technological Pedagogical Content Knowledge (TPACK) model. This framework will not only serve to enhance students' learning experiences, but also deepen their comprehension of the multisensory phenomenon of IEQ. This conceptual framework will be built upon a thorough review of existing literature to integrate the fundamental aspects of Indoor Environmental Quality (IEQ) and Virtual Reality (VR) within the TPACK model for education. Ultimately, this conceptual framework could serve as a valuable resource for educators, students, and researchers alike, offering a structured and innovative approach to IEQ learning through VR. Its contributions include enriching the learning experience, preparing students for their professional roles, and advancing the field of VR-based education within the built environment domain.

Keywords: Indoor Environmental Quality, Immersive Learning, Virtual Reality, TPACK, Conceptual Framework

Impact of Legibility of Regenerated Urban Alleys on Users' Engagement

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Abstract
The regeneration of urban alleys in Kuala Lumpur has been executed with the objective of attracting tourists. However, the deficiency of empirical analysis on the legibility of space poses a significant drawback. In urban design, the success of public spaces hinges on their legibility, which concerns the perceptible image and lucidity of the urban landscape that direct people's movements and patterns of behaviour in public spaces. The aim of the study is to examine the impact of the legibility of regenerated alleys on users' engagement with public spaces. Correlation analysis was performed based on on-site questionnaire surveys conducted with a targeted sampling of 695 users who had visited regenerated alleyways within the commercial district of Kuala Lumpur. Physical and behavioural observations of the alleyways were done to understand the issues, the space function, and the pattern of activities. The study reveals a significant correlation between the legibility of urban alleys and users' engagement in the selected commercial districts. The insufficiency of physical elements within the regenerated alleys and the potential confusion arising from users' diverse cultures significantly impact their interaction. These results contribute to the design and development of legible environments in regenerated alleys, which, in turn, positively impact users.

Keywords: Regenerated urban alley, Legibility, Place engagement, commercial district guidelines

A Three-Dimensional Policy Instrument Framework for The Construction Circular Economy - A Systematic Literature Review

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Abstract
The construction circular economy concept has gained popularity recently due to its significance in releasing construction waste problems. As a result, many countries actively promote circular economy implementation in the construction industry, and policy instruments play a vital role in facilitating its implementation. However, much of the recent analysis on circular economy policy instruments has focused on the effects of specific policy instruments without a comprehensive decision-making framework for different stakeholders and 3R principals(reduce, reuse, recycle). Thus, this research solved three questions: (1) What is the state-of-the-art of CE-related policy instruments study?; (2) What are the optimal policy instruments for motivating various stakeholders in circular economy implementation? (3) What are the optimal policy instruments for motivating different 3R strategies? The research conducted a systematic literature review to solve these questions by building a three-dimensional construction circular economy framework that links policy instruments with the 3R principle and relevant stakeholders. The framework provided the government with novel angles to manage construction waste and promote the circular economy in the construction sector.

Keywords: Construction industry, Circular economy, Policy instruments, Built environment, construction and demolition waste management

Empower Homeownership with an Alternate Financing Model

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Abstract
The pursuit of homeownership faces hurdles from financial constraints and regulations. Housing finance is crucial in bridging this gap, demanding innovative models for affordable homeownership. This study focuses on Malaysia's housing finance landscape, where escalating expenses and increasing debt highlight the need for fresh approaches. Significantly, Malaysia encountered the most substantial household debt within its region, accompanied by banks' hesitancy to offer financing due to repayment uncertainties. The proposed housing finance model coordinates lower monthly payments with reduced household debt. It employs critical variables like the rate of house price appreciation, interest rates, initial guarantee fees, and loan-to-value (LTV) ratios to formulate a new financial model aligned with Malaysia's landscape. Balancing payment amounts, loan interest rates, and price acceptance levels is important to ensure the well-being of both creditors and debtors. This proposed model caters to low-income families without homes by introducing a structured repayment plan, offering a sustainable pathway to homeownership. Incorporating future value adaptation from the reverse mortgage concept adds adaptability, ensuring sustainability over the long term. This strategy follows the principles of reverse mortgages, effectively navigating economic shifts and ensuring stable, sustainable housing finance solutions. The findings contribute to addressing housing affordability gaps, offering hope for aspiring homeowners, and reshaping housing finance in Malaysia.

Keywords: Homeownership; mortgage loan; home financing; financing model; future value

Construction Project Failure: Investigating Causes of Ineffective Building Information Modelling Execution Plan

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Abstract

The successful implementation of Building Information Modelling (BIM) is contingent upon effectively executing BIM Execution Plans (BEPs). However, the development of an effective BEP is impeded by a lack of sufficient information. Therefore, mitigation strategies should be implemented to ensure the development of effective BEPs. This study aims to investigate the causes that contribute to the development of ineffective BEPs that ultimately result in construction project failures. Interview data with twenty BIM professionals were collected on causes contributing to the development of ineffective BEPs. The collected data was analyzed using thematic analysis. Additionally, the grounded theory techniques and coding approach were used in developing the axial coding and grounded model. The findings include a list of causes of failures identified and can be used in developing failure intervention strategies. The finding suggests that incompetency, lack of knowledge in BIM, individual attitude, poor data management, and insufficient technology used are the causes that contribute to ineffective BEPs. The causes can be categorized into three categories: people, processes, and technology. The outcomes of this study offer substantial insights into the Architecture, Engineering, and Construction (AEC) industry in developing effective BEPs, thereby ensuring the successful delivery of BIM-based construction projects.

Keywords: Building Information Modelling, BIM Execution Plan, BEP failure, construction project, thematic analysis

Addressing Competency of Practitioners within BIM e-Submission in Malaysian Local Authorities: A Concept Paper

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Abstract
In the evolving landscape of BIM adoption in Malaysia's construction sector, this phenomenon has resulted in a shift from the current building plan approval process under the OSC 3.0 Plus Online system to new roles and responsibilities that will heavily rely on BIM technology-based skill sets,sparked by the introduction of National BIM e-Submission (NBeS) in the Malaysian local authorities (PBT). This study delves into the transition and seeks to address competencies required by the specific demands of BIM e-Submission-related roles and responsibilities encountered by practitioners to ensure the success of Malaysia's BIM e-Submission in Malaysian PBT. Improper allocation of functional competencies can lead to implementation failures, emphasizing the need for this research. It reviewed the current literature and recommended the adoption of multi-method qualitative research for the primary data collection. The proposed exploratory study aims to analyze the competency issues and find solutions for improving the existing and future BIM e-Submission implementation in the country. This paper aims to propose a conceptual framework for individual competency within BIM e-Submission practitioners in Malaysian PBT. Findings from the literature emphasize the significance of having effective competency development practices that will empower BIM e-Submission practitioners with sources of information as aid during the training process. It is envisaged that the study would contribute to a new understanding of BIM e-Submission in Malaysia, raise awareness of roles, responsibilities, and competencies among stakeholders, and improve the use of BIM e-Submission as a catalyst for digital construction.

Keywords: Building Information Modelling (BIM), BIM electronic submission, BIM roles and responsibilities, individual BIM competencies

Trends on The Overhang Residential and Serviced Apartment Properties in Malaysia

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Abstract
Property overhang happened all over the world including Malaysia. The overhang residential and serviced apartment properties that occur in Malaysia should not be taken lightly. Hence, this paper aims to highlight the trends in the overhang residential and serviced apartment properties in Malaysia. Desk research was conducted based on data on residential and serviced apartment properties (all states) from the National Property Information Centre (NAPIC) from the year 2013 to 2022. The paper reveals that the top three (3) overhang residential and serviced apartment properties are in Johor (19,390 units), Federal Territory Kuala Lumpur (9,441 units), and Selangor (6,624 units). Condominiums/Apartments and serviced apartments are the highest type of overhang properties with a price range of RM500,001 – RM1,000,000. This paper does not involve any empirical analysis. It only provides insight into trends and performance of overhang residential and serviced apartment properties in Malaysia. This will be a guiding step for further investigation. Thus, this paper provides insight into the market performance of overhang residential and serviced apartment properties in Malaysia. This data will be used to examine the factors that influence the overhang of these properties.

Keywords: Trends, Property overhang, Residential, Serviced apartment

A Conceptual Paper on Stigmatised Dimension Towards Residential Overhang

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Abstract

Property stigma refers to some characteristics, features, social values, or an event relating to land and buildings that can create a negative perception of a building, land, project, or neighborhood area. It was identified as a significant factor contributing to the number of overhang residential units in Malaysia. This paper aims to develop a Conceptual Framework of a stigmatized dimension model for residential overhang properties that can assist the decision-making of the property market players (developers, planners, and property consultants). This study utilizes a desktop analysis that reviews previous scholars' conceptual frameworks. The conceptual paper develops four (4) stigma-related variables: Environmental stigma, phenomena stigma, neighborhood and structural stigma. However, It is not an empirical investigation of property overhang because this paper needs to review in detail all the factors that influence the property overhang. The proposed conceptual framework will provide valuable insights into the stigmatized dimension of property overhang from the buyer's perspective. This paper provides an essential conceptual framework that will assist the property market players enhance their housing development and sales strategy, thereby increasing the bottom line. Subsequently, this will perfect the property market efficiency and meet the demand and supply requirements.

Keywords: Property Stigma, Property Overhang, Purchaser

Strategies to Enhance Construction Readiness of BIM-based Building Projects

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Abstract

Construction delays can have significant consequences that impact not only the individual project at hand but also a nation's broader economic and social conditions. Hence, construction projects must be completed on time and on budget. However, project teams often rush into construction without assessing the readiness, leading to premature starts in construction. An early start of construction often leads to project interruptions, resulting in delays that can have various negative impacts on all project stakeholders. Assessing projects' readiness before starting the construction phase can prevent premature start and mitigate delays. Therefore, this study aims to identify strategies for enhancing construction readiness, specifically for building information modeling (BIM) based building projects. To achieve this objective, semi-structured interviews were conducted with twenty industry practitioners with BIM experience. The data was analyzed using thematic analysis to determine strategies that could enhance the construction readiness of BIM-based building projects. The results of the study revealed that strategies to enhance the construction readiness of BIM-based projects can be categorized into four themes: project planning, documentation, stakeholders' management, and model development. This study will contribute to the body of knowledge by identifying a list of strategies to enhance the construction readiness of BIM-based building projects. Industry practitioners can use the established list of strategies to enhance the construction readiness of BIM-based building projects to prevent delays.

Keywords: Building information modeling, BIM, construction readiness, strategies, thematic analysis.

Children's Independent Mobility to School in Malaysia: An Overview for Future Framework

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Abstract

Independent mobility is a concept that is being endorsed globally in urban planning towards creating a child-friendly city. The concept of children's independent mobility encourages children to participate in physical activity through active transportation. Children's Independent Mobility (CIM) is defined as the freedom for children to move around their surrounding neighbourhood without supervised by an adult supervision. Currently, there are some concerns about the decline in children's levels of physical activity. Increased reliance on automobiles for children's daily transportation can have negative effects on the environment, as well as increase the level of childhood obesity, and reduce their sense of independence. Research suggests that independent mobility to school is an essential component of a balanced childhood, and it has positive impacts on various aspects of children's lives, such as physical health, social skills, and cognitive development. However, there are very few practical studies that address the association between children's independent mobility to school specifically. An investigation of CIM in the specific context of children mobility to school is important because commuting between home and school is a major issue in active school travel. This paper establishes a comprehensive overview on the promotion of CIM to school in Malaysia context. Based on the literature reviews, this paper will outline some recommendations that can be used by the relevant authorities in implementing pedestrians' policies and guidelines for school children based on the school accessibility and connectivity to promote CIM. Further studies should provide more comparable and detailed measures to understand the determinants and mechanisms of CIM.

Keywords: Children's independent mobility, Active transportation, School, Accessibility.

Managerial Competencies as a Crucial Barometer for Construction Project Managers

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Abstract

The Construction Industry as a whole faces a significant gap in the competencies of Construction Project Managers (CPM) towards project's performance which resulted in time and cost overruns. It can be noted that managerial competencies is becoming increasingly significant for the identification of a competent project manager as it contributes towards the achievement of the 2030 United Nations' agenda on Sustainable Development Goals (SDGs) 9, Industry, Innovation and Infrastructures. This research aims to determine the managerial competencies as a crucial barometer for CPM. Specifically, it will explore the enhancement of managerial competencies led to create a positive impact and the sustainability project completion with a high success rate. Main research instruments using the Jauhari Window and the McKinsey 7S models. As a result from Cronbach's alpha reliability, Kruskal Wallis H and other decreptive statstictic tests, this research significantly establishes the core competencies which are the knowledge, skills and attitude as a crucial barometer for CPM to build the resilient infrastructure, promote effective sustainable industrialization and foster efficient technology innovation. It is imperative appraise that managerial competencies as a crucial barometer for CPM as established in Construction Industry Competency Standard (CICS) by Construction Industry Development Board (CIDB) Malaysia which aligned to enhancing the establishment of managerial competencies that be made a standard benchmarking for CPM to possess effective culture and the machine learning (ML) as an efficient technology innovation.

Keywords: Managerial Competencies, Sustainable Development Goals (SDGs), Construction Project Managers (CPM), Effective Sustainable Industrialization, Efficient Technology Innovation, Machine Learning (ML), Competencies Benchmarking

Analysing The Issues Of E-Tendering Implementation in Public Private Partnership Practice: A Preliminary Study in Malaysia

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Abstract

Public Private Partnership (PPP) have become a popular choice for policymakers in implementing important public projects especially when it comes to the shortage of government funding resources and where it is necessary to counter public project inefficiency. However, the PPP tendering period, spanning from contract advertisement to contract award, tends to be lengthy due to reliance on paper-based tendering, with e-tendering not being fully utilized. Therefore, this study aims to enhance the understanding of issues related to e-tendering within the context of PPP practice in Malaysia. Semi-structure interviews were conducted with five selected participants from various grade in the public sector, each possessing a minimum of three years' experience in PPP projects. The study reveals total agreement among participants with the literature's findings, highlighting that e-tendering is not fully utilise in PPP processes and that the tendering procedures are conducted manually. The outcomes of this study suggest the need for further exploration into the factors that PPP practitioners require prior to the implementation of an e-tendering system in PPP procurement processes.

Keyword: Public Private Partnership, e-tendering, preliminary study

Gap Analysis on The Urban Agriculture Towards A Sustainable City

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Abstract

The lack of comprehensive, cooperative, participatory, and strategic efforts to implement urban agriculture (UA) has exacerbated urban pressures in cities. The adoption of UA has resulted in significant positive outcomes for the country, notably in enhancing urban green spaces, improving the environment and quality of life, ensuring food security, and building sustainable cities. Nevertheless, there is a noticeable lack of strategic efforts, encompassing top-down and bottom-up approaches to UA. Globally, policymakers, practitioners, and academics advocate for the alignment and cooperation of UA. UA play a crucial role in pursuing sustainable urban environments through due to their numerous benefits offered in addressing urban challenges. Despite to this, UA facing challenges in another ways to practice such as difficulty integrate into policy, land matters, isolated UA initiatives, huge cost, human related, climate change and risk in pest and disease. Therefore, this paper aims to examine the gap in the UA practice towards sustainable city. The researcher will use this information to start next investigation on the strategic partnership on UA practice between communities and local authorities.

Keywords: Gap analysis; Urban Agriculture; Sustainable City

Adaptation of Machine Learning in Information and Communication Technology (ICT) Project Planning: A Bibliometric Analysis using Bibliometric R-Tool

Patrick Pragasam Kulandaisamy[1], Zulkiflee Abdul-Samad[2] and Hafez Salleh[2]

Abstract

Machine Learning (ML) is a subset of Artificial Intelligence and is an emerging technology that is widely developed and used in the industry, especially in the field of science and technology. Lately, the usage of ML technology has been evolving in the field of project management, specifically in the project planning phase. This study investigates the adaptation and utilization of ML technology to the project planning phase of Information and Communication Technology (ICT) projects globally. There is limited research to summarize the published literature, hence a bibliometric analysis of the literature is required to capture a more comprehensive, diverse, and detailed information from a holistic perspective on the adaptation of Machine learning in ICT project planning. To develop the analysis and visualization, articles published between 2013 to 2023 from the Web of Science (WOS) database were screened by applying the PRISMA protocol. The articles' meta-data was analyzed using the 'Bibliometric 4.2.2' package R-studio. The results of this analysis aim to identify the development status, emerging trends, and themes of the adaptation of ML technology in the project planning phase of an ICT project. These findings shall propose the future directions and critical areas of ML in the project planning phase.

Keywords: Machine Learning, Artificial Intelligence, ICT Project, Project Planning, Bibliometric Analysis

The Impact of BIM Technology on the Performance of Prefabricated Building Project Management in China

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Abstract
Objective: This study aims to explore the efficacy of Building Information Modeling (BIM) technology in mitigating the high costs and safety hazards associated with the development of prefabricated buildings. The objective is to understand how BIM can be leveraged to optimize these aspects and enhance overall project management performance.
Methods: Employing a Structural Equation Model (SEM), this research integrates BIM technology as the independent variable, with the performance of prefabricated construction project management as the dependent variable, and collaborative management as the intermediary. The model is grounded in a comprehensive literature review, Technology-Organization-Environment (TOE) theory, and synergy theory. Data were collected via a questionnaire and analyzed using Smart PLS to determine the relationships between these variables.
Results: The findings indicate a significant positive impact of BIM technology on the performance of prefabricated building project management. The study also reveals the pivotal mediating role of collaborative management, suggesting that effective collaborative practices can significantly enhance the benefits of BIM technology in these projects.
Conclusions: This research elucidates the pathway through which BIM technology can improve the performance of prefabricated building project management. It contributes to refining the evaluation index system for prefabricated buildings, offering valuable insights for enhancing efficiency and safety in the field. The results advocate for broader adoption of BIM technology, underlining the importance of collaborative management in harnessing its full potential.

Keywords: Building Information Modeling, Prefabricated Buildings, Project Management, Structural Equation Modeling, Collaborative Management.

Fundamentals of Developing Conceptual Cost Estimation Models Using Machine Learning Techniques: Selection and Measurement of Building Attributes

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Abstract
Ensuring the identification of building attributes is the primary task in developing a machine learning cost estimation model. However, the existing research on building attributes has the following shortcomings: it struggles to categorize building characteristics according to various cost types, and the suggested sets of attributes do not clearly establish measurement standards for these qualities. To address these issues, this study aims to select a set of building attributes suitable for conceptual cost estimation and establish measurement standards. Through a two-round process of focused group discussions, this research ultimately identified 13 building attributes that can be collected before the completion of building design. These attributes serve as a basis for assessing historical buildings during the model development phase and for evaluating new projects during the model application phase. This study provides a foundational framework for developing conceptual cost estimation models, ultimately enhancing the accuracy of machine learning cost estimation models.

Keywords: conceptual cost estimation, machine learning, building attributes

Environmental Maintenance Appraisal on Lime-Based Mortar Repair for Heritage Buildings Conservation

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Abstract
Gradually, sustainable maintenance in the heritage buildings conservation moving forward to achieve The Sustainable Development Goals (SDGs), 2030 Agenda. The aim of this paper is to determine sustainable lime-based mortar repair in heritage buildings conservation based on calculation procedures of Green Maintenance model within cradle-to-site boundaries of LCA. The calculation appraises Environmental Maintenance Impact (EMI) of selected cased studies. This underpins informed decision-making in low carbon repair options in heritage buildings conservation. EMI appraisal of Green Maintenance Model in this paper is not confined to heritage buildings and can be applied to any building of different technologies and materiality. Moreover, EMI appraisal in this paper may enhance understanding of the relationship between lime-based mortar repair and their environmental performance. Significantly, this paper establishes interdisciplinary conservation strategies for heritage building located at UNESCO World Heritage Site (WHS).

Keywords: Environmental Maintenance Impact (EMI), lime-based mortar repair, heritage buildings, Life cycle assessment (LCA), Green Maintenance, Sustainable Development Goals (SDGs)

A Review of Building Defects, Maintenance and Condition Assessment Method for Public School Buildings in Malaysia

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Abstract
The building's failure to deliver services as expected is defined as defects and damage. Various effects and negative impacts to occupants of the building which are caused by lack of maintenance, poor workmanship, building materials and the age of the buildings especially for school buildings. Building defects are becoming an ordinary phenomenon in building occupancy, which has an adverse effect on the building environments, health and safety concerns, and the teaching and learning processes. Thus, the main purpose of this paper is to identify the overview of building defects, maintenance and the study of condition assessment method which act as a tool for building inspection in public school buildings in Malaysia. The findings had shown that some of the major defects in the school buildings are peeling paint, moisture/dampness and building cracks. BCA from PWD standard and Condition Survey Protocol (CSP) 1 Matrix are among the common methods for assessing the building condition for public school buildings in Malaysia. By using the building rating system from BARIS and CSP 1 Matrix, the inspector or assessor can determine the building's current condition and planned maintenance activities according to approved standards. The standards for BARIS from PWD consist of building physical condition level which linked to maintenance action priority. The analysis of defect findings will then be linked to the defect parameter for building condition and maintenance priority action level in matrix analysis. Building rating obtained through a five-point color-coded system. Score 1 to 5 with very good condition and action matrix to be taken is preventive maintenance, 6 to 10, good condition with condition-based maintenance, fair condition with score from 11 to 15 required for repairs work. Rehabilitation work needs for poor condition with range scores from 16 to 20. Score from 21 to 25 is very poor condition and needs for replacement work. Meanwhile, the standards for CSP 1 Matrix consist of condition assessment protocol 1 and priority assessment which then combined in CSP 1 matrix. A colour (green, yellow, or red) is then applied to indicate the score in each of the 3 parameters: Plan Maintenance (1 to 4), Condition Monitoring (5 to 12) and Serious Attention (13 to 20) in the descriptive value according to score table. After scoring every defect, calculation will be made for overall building rating, which summarises the building’s condition. The score of each defect is added up and divided by the total number of defects to get the overall building rating. The building is then rated Good, Fair or Dilapidated, according to the score (out of 20). Based on the monitoring and assessment conducted by BCA, the surveyor can detect any deterioration that the building encounters. The educational process and learning activities could be disrupted by the lack of good building conditions. Therefore, addressing the buildings defects and using effective assessment method for building condition is crucial to maintaining a safe, healthy, and conducive learning environment for public school buildings in Malaysia.

Keywords: Building Defects, School Building, Condition Assessment, Review Article

Mapping Ecosystem Services' Assessments: Current Practice And Future Prospects In Malaysia

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ABSTRACT
Malaysia is one of the countries with rich biodiversity and it is one of the richest countries in the world in terms of biodiversity per unit area. Currently, the ecosystem services (ES) are found to be degraded in Malaysia and are expected to decline further over the coming century because of the management approaches, the priorities in planning and the decision- making, and the fiscal and budgetary structure which varies between ministries and agencies, due to the changing political scenarios. The present study focuses on ES assessments in Malaysia, we systematically review literature to summarise achievements to date, identify key research gaps, and reveal pathways for policy uptake. The assessment methods are diverse, varying from proxy-based mapping, modelling, economic valuation, and assessments of human perception to combinations among these assessment approaches. Based on the findings, the current practices and developments in the mapping of ES assessment was identified. The mapping of ES assessments, which is beneficial for designing efficient policies and institutions for maintaining ES, provides guidelines and recommendations for future applications and research. Thus, we suggest that further research could focus on monetary valuation. Valuation results will provide useful information about changes to welfare. Benefits Transfer can be a practical, swift and cheap way to get an estimate of the value of ecosystems service, particularly when the aim is to assess a large number of diverse ecosystems.

Keywords
Ecosystem Service Methodology, Ecosystem Service Assessment, Ecosystem Service Valuation, Decision Making, Mapping, Malaysia

Revitalizing Old Residential Areas through Innovative Landscape Space Design: An Urban Acupuncture Approach

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Abstract
China is undergoing a critical phase of urban renewal due to limited available urban land, resulting in imbalances in land supply and demand and the emergence of negative urban spaces. This situation significantly impacts urban vitality, quality, and citizen satisfaction. Concurrently, the task of renovating aging residential areas is growing, while urban infrastructure continues to deteriorate, necessitating comprehensive updates. The urban acupuncture concept, introduced by Morales in 1982, offers a progressive design paradigm rooted in traditional Chinese acupuncture principles. It addresses various emerging urban challenges by employing acupuncture's principles to rejuvenate the city. Utilizing smaller-scale, precise design strategies, this approach harmonizes urban functions, ameliorates blocked spaces, and revitalizes critical focal points. This research centers on applying urban acupuncture in renovating aging residential areas. It identifies challenges tied to urbanization and strives to rectify current landscape space issues while alleviating pressures on aging residential areas. The ultimate objective is to foster innovation that inspires the development of a dynamic, environmentally sustainable urban landscape. Illustrated through a case study of the Nanchang Cigarette Factory residential area, this article examines the area's current state. It systematically synthesizes the application of urban acupuncture principles in landscape space renovation and design, proposing strategies to enhance the quality of aging residential areas. This research confronts the intricate challenges of urban renewal in China, employing the urban acupuncture theory to reinvigorate aging residential areas into vibrant, sustainable spaces, and the transformation process for district landscape spaces promotes urban sustainability and protection.

Keywords: Urban acupuncture, Old residential area, Space creation, Urban Vitality

Analysis of Passengers' Willingness to Use Airport Smart Facilities Based on the Technology Acceptance Model

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Abstract
With the continuous advancement of technology, intelligent facilities at airports are gradually becoming a crucial means to enhance passenger experience and operational efficiency. This study focuses on the willingness of airline passengers to use intelligent facilities within airports. The research employs the Technology Acceptance Model as its theoretical foundation and collects substantial empirical data through a questionnaire survey. Following data collection, in-depth analyses of the sample data were conducted using the statistical analysis software SPSS and structural equation modeling software AMOS. The research findings demonstrate a significant impact of perceived usefulness and perceived ease of use on passengers' intention to use airport intelligent facilities, aligning with the assumptions of the Technology Acceptance Model. In terms of practical significance, this study provides essential decision-making insights for airport management and intelligent facility development.

Keywords: Technology Acceptance Model; Intelligent Facilities; Smart Airport; Structural Equation Model

Sustainable Green Building Initiatives in Malaysia: Issues in Implementation

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Abstract

In recent years, green building practices have gained tremendous global prominence due to their capacity to safeguard the environment and foster sustainable development. As Malaysia rapidly evolves as a nation, it has enthusiastically embraced the green building movement. This research aims to address the issues of green building to ensure the success and sustainability of the project. It emphasises the importance of completing training programs for building operators and facility managers to enhance their knowledge and skills in sustainable maintenance methods. The survey identifies and ranks the pressing challenges faced by green building projects in Malaysia. This study determines the primary issues that green building projects in Malaysia face, especially when it comes to operation and maintenance. Numerous factors contribute to the emergence of these challenges. These include insufficient training and educational resources for building occupants and facility managers, inadequate governmental incentives for promoting sustainable maintenance practices, and the initial high costs associated with procuring and installing green building materials and technologies. The study is based on a survey of 72 participants from diverse multidisciplinary backgrounds, including design, construction, operation, and maintenance professionals. Results indicate that operation and maintenance are urgent issues to be dealt with in Malaysian green building projects. The research underscores the significance of devising and implementing policies that provide financial incentives and regulatory support for the maintenance of green buildings. By recognising these issues and collectively addressing them, they can foster the growth and success of green building initiatives within the Malaysian construction industry, leading to a more sustainable built environment throughout the country.

Keywords: Green Building, Green Building Issue, Operation and Maintenance

Development of Procedural Framework for 6R Implementation in Construction Waste Management

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Abstract

Sustainable construction has become a top priority in most developing countries including Malaysia. With the rapid development progress in Malaysia, construction waste continues to rise and putting pressure on the social, economy, and environmental sustainability of the nation. Effective construction waste management (CWM) is crucial for achieving the sustainability goals. A well-designed waste management strategy is essential to minimise the environmental impact of waste generation for a more resilient built environment. Past researchers have identified a lack of systematic procedures for CWM and implementation by contractors. This research aims to address this gap by developing a procedural framework for implementing the 6R approach - refuse, reduce, reuse, recycle, recovery, and reflect in the local construction waste management. An extensive literature review on the CWM practices was conducted followed by a preliminary focused-group interview with the Solid Waste Management and Public Cleansing Corporation (SWCorp). A draft procedural framework focusing on 6R waste management was developed following the pilot group studies. To improve the developed framework, semi-structured interviews with the main contractors were conducted for their insights on the current practices and challenges faced in construction waste management, and the feasibility of the proposed procedural framework. The interview findings showed great support to the developed procedural framework with little recommendations incorporated. A final procedural framework was then concluded for implementation. This study presents a significant opportunity for the main contractor in practising sustainable construction waste management (SCWM) through the recommended procedural model.

Keywords: Construction Waste Management, Main Contractors, Procedural Framework, Reduce, Reuse, 6R Implementation

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