Emerging issues in the built environment sustainability agenda

Built environment and related activities have traditionally been notorious for depleting natural resources and adversely affecting the environment, economy and society, thereby also compromising future generations. Thus, integrating and mainstreaming sustainability considerations into built environment-related activities is encouraged by recent sustainability agendas. In this context, this special issue consists of eight papers that probe and shed light on various emerging issues in the built environment sustainability agenda.

This special issue commences with a paper by Xiaojing Zhao and Wei Pan who consider co-productive interrelations among business model (BM) and zero carbon building (ZCB). Drawing on a critical review of definitions, components and theoretical bases of BM and ZCB, the authors propose a conceptual framework that maps out multifaceted interrelations among ZCB and BM at both project and organisational levels. Co-productive interrelations among BM and ZCB are identified in four aspects, namely, value offering, project delivery process, stakeholder network and revenue generation logic. Interrelations among BM and ZCB are of immense benefit to decision makers of construction organisations to enhance their business strategies for successful ZCB deliveries and help to de-risk business innovations and ZCB take-up for their maximised synergies.

The second paper by Gulbin Ozcan Deniz proposes an analytic network process (ANP) model to examine the operational performance of LEED-certified buildings. In this study, a performance assessment model is proposed based on the literature review and experiences of professionals in the construction industry to analyse the relative impacts of life cycle external parameters on various operating performance parameters. Proposed ANP model reveals the relationships between external parameters and operational benefit indicators from various perspectives. The author indicates that external parameters such as lack of enhanced commissioning, lack of LCA/LCC analysis, lack of energy modelling and lack of knowledge in green technology are the most prominent factors affecting the operational performance.

Nayani Hettige, B.A.K.S. Perera and Harshani Mallawaarachchi contribute the next paper on adopting green leasing from a Sri Lankan perspective. Given the benefits in the commercial leasing market due to green leasing, considerable efforts are being deployed in pursuing green building concepts to optimize sustainable operation and performances of buildings. Green leasing is still not practiced widely particularly in developing countries. The authors therefore, identify the enablers and barriers to adoption of green leasing in Sri Lanka in terms of process, institutional, economical, government and legal and social factors. The authors conclude that unawareness of green leasing, poor institutional and government commitment and incentives and fewer financial initiatives for sustainability approaches are major barriers to adopting green leasing in Sri Lanka.

The fourth paper by Jehan Zeb probes eco asset management. Eco assets are equally important as engineered assets. Their integration with built environment would result in developing more sustainable infrastructure systems. For effective eco assets management, the author has developed an ontology of eco or natural assets to represent eco asset knowledge at two levels: eco asset metal model and eco asset ontology. The meta model represents the abstract concepts of asset management to show how eco assets can be integrated within built environment to accomplish a holistic and integrated eco asset management while detailed eco asset ontology explicitly defines eco assets in asset management. The authors’ eco asset ontology model is a significant contribution to the body of knowledge in the domain of asset management. From a practical perspective,
the proposed eco asset ontology enhances the understanding of eco assets for industry experts and ensures the consistent implementation in applications. A useful next step in this work is to implement the proposed eco asset ontology in two asset management applications: ArcGIS and CityWide system to test and validate the approaches further.

Efficient use of water in construction projects is another concern in built environment. As construction is a water-intensive industry, water shortages could severely affect the performance of the industry. The next paper by K.G.A.S. Waidyasekara, Lalith de Silva and Raufdeen Rameezdeen presents an extended water hierarchy to ensure sustainable water usage in construction projects in Sri Lanka. The authors have incorporated three new R principles, namely, regulation, responsibility and reward into existing water hierarchy with 6Rs (review, replace, reduce, reuse, recycle and remove). It is expected that implementation of extended water hierarchy, 3R.6R would ensure sustainable water usage in a construction project.

The next paper by Khalid Al-Gahtani, Ibrahim Alsulaihi, Mohamed Ali and Mohamed Marzouk addresses the production of green concrete using recycled waste aggregate and by-products. Sustainability is concerned with balanced and efficient consumption of resources to achieve social and economic needs of a society without much harm to the environment. On that note, green concrete is an environmentally promising type of concrete in which portion of non-renewable ingredients is replaced by recycled eco-friendly wastes and by-products. The authors have tested suitability and benefits of using demolition and industrial waste as replacements for aggregate and cement in traditional concrete mixes. The authors conclude that replacing cement with pozzolanic industrial waste and by-products would enhance the mechanical characteristics of green concrete. The authors also provide information on other possible replacements along with the future directions of research.

In the next paper, Piumi Walimuni, Aparna Samaraweera and Lalith De Silva explain that construction activities are responsible for significant environmental hazards which need to be controlled. They claim that having an effective payment mechanism(s) would encourage contractors to better control environmental hazards in road construction projects. From the Sri Lankan perspective, the authors found that environmental hazards in road construction projects include loss of trees, interference with services, dust, noise, vibration, water pollution from waste, interferences with natural drainage paths, reduction in water quality, oil spillage and reduction of rare species by trapping and temperature differences. These are better controlled by adopting appropriate payment mechanism(s): a unit price; a provisional sum; lump sum and payment is made along with appropriate main work items in a contract. The effectiveness of these four methods for better control of environmental hazards varies with hazard controlling mechanisms being practised in road construction projects.

This special issue concludes with a paper by Mohan Kumaraswamy, Kelwin Wong and Jacky Chung. The authors focus on megaproject strategies to achieve sustainable best value for stakeholders. With increasing numbers, scale and complexity of megaprojects, the authors postulate that it is critical to identify at the outset the overall “best value” for both short-term and long-term stakeholders including society at large and consistently pursue long-term “best value” by formulating and sustaining suitable overall goal-directed strategies throughout the megaproject. However, current practices fail to align with this. Based on review of relevant literature on stakeholder management in megaprojects together with three research projects conducted in Hong Kong, the authors indicate that inadequate stakeholder engagement has led to many process disruptions and adverse outcomes in recent megaprojects. The authors therefore recommend that aligning megaproject stakeholder objectives with regional or even national needs and targeting co-creation of common values through early stakeholder involvement in planning and design of built infrastructure megaprojects enable achieving of better and more sustainable megaproject outcomes.
It is hoped that scholarly contributions presented in this special issue would enhance the knowledge base in the subject area which would help future researchers and industry practitioners towards effective practices. The guest editors, therefore, would like to thank all the authors who made scholarly contributions to this special issue and reviewers who contributed enormously to improve the work of this special issue by providing constructive comments on submissions. Also, the guest editors express their heartiest gratitude to Editor-in-Chief and Assistant Editor, Professor Mohan Kumaraswamy and Dr Jacky Chung, respectively, for their valued advice, as well as providing an excellent opportunity to deliver this special issue within such an esteemed journal. Finally, the guest editors also would like to acknowledge the Emerald Publishing team for their effective logistical assistance.

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