THE ROLE OF DIGITAL TECHNOLOGIES IN SHAPING SUSTAINABLE AND SMARTER CITIES

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Digitalization has proven to be important in shaping cities towards more effective and efficient in terms of planning, management, and development. Digitalization that is taking place extensively right now has revolutionized the business ecosystem and changed the value chain process in many industries. It offers various enthralling opportunities yielded by the applications of technologies and intelligent systems to provide smart solutions to urban challenges. The effect of digitalization encouraged innovation by taking into account a physical-digital collaboration among related parties within the urban context and beyond.

In a broader context, digital technologies have also played a significant role in accelerating access to more data and knowledge. It further fosters the accountability of institutions, stimulates the efficiency of science, and promotes more innovation opportunities in many sectors. Digital technologies supported by data are used in the development of smart cities to solve problems and make better decisions to achieve a higher urban quality of life. A smart city is an integrated system of six components, which consist of smart people, smart living, smart mobility, smart environment, smart economy, and smart governance; the smartness of which can be enhanced by the utilization of several crucial technologies including information and communication technology (ICT), Internet of Things (IoT), sensor technology, geospatial technology, Artificial Intelligence (AI), and Blockchain.

ICT is the leading technology in smart cities, which is used to implement smart initiatives by employing physical infrastructure and data processing instruments. IoT devices help cities to collect and analyze real-time data to identify problems and improve service provision. In the context of smart cities, sensor technology is a crucial means to measure various values of the systems such as energy usage, water quality, gas consumption, traffic congestion, pollution levels, and any other parameters. While AI technology is used to manage and control the automated city infrastructure, geospatial technology is applied across the subsystems of a smart city such as energy, transportation, public services, and governance, to improve the efficiency of infrastructure management. Moreover, a secure communication framework in the smart city can be provided by using Blockchain technology.

Digital technologies are believed to contribute to help humans and cities to achieve better quality life; however, the environmental costs can be ignored. Therefore, the creation of cyber-physical assets in collaboration with sustainability issues is highly encouraged to not only improve citizen’s quality of life but also transform the quality of the urban environment. We need to ensure that the utilization of digital technologies will bring long-term well-being for the economic, social, environment.

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We argue that the practice of ongoing digital transformation that we are experiencing today should incorporate the consideration toward environmental sustainability so that they will do us a favor to thrive for a better life in the long run.

**Fostering Research that Stimulates Technology Innovation**

Technology innovations are continuously being stimulated through the conduction of research in engineering fields in order to create added value solutions that can help accelerate sustainable development. In this edition of the CSID Journal of Infrastructure Development, nine papers dedicated to studies in innovation and sustainability fields are presented.

The first paper, written by H. Elle, R. Jimoh, L. Oyewobi, A. Bilau, and K. Ibrahim, evaluates the use of post-occupancy evaluation to measure satisfaction and comfort of users in the administrative office building in Nigeria. The findings show that there are some sustainable features to improve building performance and in longer-term maintain occupant productivity and comfort in the buildings.

The second paper, written by Zulkarnain, Komarudin, F. Arofah, and I. Rahman, attempts to develop an intelligent logistics and distribution system of retail outlets by considering the concept of the Traveling Salesman Problem (TSP) and the Vehicle Routing Problem (VRP). The results of their research indicate total route distance with reasonably efficient computation time that can be produced by involving near-optimum solutions and workload balance constraints amongst the salesmen.

The third paper, written by M. Gelfi and H. Achiari, discusses the framework of deep uncertainty in port by taking into account Scenario Based-Adaptive Port Planning (SB-APP). The result recommends a preliminary terminal layout and offers input for decision making to tackle uncertainties in the future.

The fourth paper, written by O.J Faremi, O.O Ajayi, and O.E Faremi, exposes the factors influencing the use of substandard construction materials for the construction of residential buildings in Lagos State. Their findings show that these factors are consist of corruption, the use of quacks, contractor's greed and selfish interests, and the client's financial constraints. In the future, engaging professionals and refraining the project from patronizing quacks need to be considered by building clients.

The fifth paper, written by Belgis, provides a review of chitosan as potential material for wastewater purification. The author highly encouraged to consider the use of chitosan to absorb heavy metal and some dangerous materials in many industries. As Indonesia has a significant amount of raw material, a collaboration between industries and academics is suggested to produce household material.

The sixth paper, written by OO Ajayi, O.J Faremi, S.D Roger and A. Uwaje, discusses the factors mitigating the actualization of affordable housing for low-income masses in Lagos Metropolis. Their findings indicated factors weighing down the provision of affordable housing and factors precluding accessible housing for low-income masses. The result also suggests the level of agreement on factors impeding the provision of affordable housing from national construction professionals.

The seventh paper, written by D.A Purnomo, Yulianta, D.P Utomo, and Sucipto, investigates the selection of the Public-Private Partnership (PPP) scheme and their implications on the Jakarta-Surabaya railway project. The result of this paper shows the prioritization of PPP feasibility study of the railway project by taking into account value for money analysis, which includes concession period, investment proportion, and discount factor. Future research direction regarding PPP and railway project is proposed.
The eight paper, written by T. Patriot, A. Kusuma, and Nahry, analyzes the implementation of vehicle speed restriction through signs and radar speed cameras in the control zone. The result showed that there is a speed deceleration of the vehicle through signs and speed cameras in the control zone of 9% at an average of 7 Km/Hr.

The ninth paper, written by F. Muslim, reviews microstructural characteristics of the interfaces in reinforced concrete and its effect on the mechanical properties. The findings show interfacial characteristics between aggregate particles and cement paste, steel and concrete, and new and old concrete. In general, it can be concluded that these interfaces exhibit similar microstructural characteristics and are considered as weak zones in concrete in terms of bond strength.

We hope that this edition may convey new insight and knowledge that bring benefits to our readers. We welcome any comments or inquiries that you may have concerning the direction and the content of this journal. We also invite you to join our venture by sending your work for future consideration.

Warmest regards from Editorial Office,

Dr. Mohammed Ali Berawi  
Editor-in-chief  
Perdana Miraj  
Managing Editor  
Mustika Sari  
Managing Editor