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# Shaping Resilience in Urban Society through Digitalization and Green Technologies for a Sustainable Future

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Over the past two years, the COVID-19 pandemic has significantly affected all aspects of human life. The pandemic has become an issue of serious global concern in both developing and developed countries, with impacts including rapidly changing health and demographic conditions, threatened food security, declining quality of education at all levels, declining clean water access and availability, declining trade, economic, and industrial sectors, and a lack of efficient energy sources to secure communities.

These challenges necessitate swift responses to provide alternative solutions for global transformation toward sustainable development and improved living conditions at the local and global levels. The active role of universities in addressing these challenges is significant, as they allow researchers to propose advanced and applied technologies, as well as create efficient processes and innovative products. Triggering change, universities are leading institutions in transforming policy into concrete action. In addition, the collaborative study and research among universities and research centers, experts, industry, governmental and non-governmental organizations, and policymakers fosters and strengthens their collective ability to provide a higher quality of life and a more sustainable society around the world.

Research on how to raise sustainability awareness and enhance regional collaboration to create a more sustainable society is also an important issue. Societal transformation through the application of digital technology, nurturing economic development, controlling rapid urban population growth, and building more intelligent cities (e.g., intelligent

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transportation systems) while considering environmental aspects are essential for future sustainable urban development. This sustainability awareness is crucial in preventing environmental destruction, enhancing social participation, and improving the economic impacts of reusing certain technologies.

To address the above issues, the 17th International Conference on Quality in Research (QiR) was virtually held October 13–15, 2021, in conjunction with the 6th International Tropical Renewable Energy Conference (i-TREC) and the 2th CSID AUN-SCUD International Conference on Sustainable Infrastructure and Urban Development (CAIC-SIUD). The QiR and i-TREC conferences focus on resiliency and adaptability in a post-pandemic world, exploring technology for a greener environment. The theme of the AUN-SCUD conference was shaping resiliency and sustainable futures through digitalization, technologies, and added value in developing sustainable infrastructure and resilient smart cities. Furthermore, the conference highlighted the role of digital technology in transforming cities and fulfilling Sustainable Development Goal (SDG) 9: Industry, Innovation, and Infrastructure, as driven by the three-pronged principles of Industry 4.0, Nature 5.0, and Society 5.0. Of the papers presented there, the top 18 papers have been selected for publication in *IJTech* and are summarized as follows.

The first paper, written by P. Thaithatkul, O. Anuchitchanchai, P. Srisurin, P. Sanghatawatana, and S. Chalermpong, investigated the main factors influencing the loyalty and satisfaction of ride-hailing applications (RHA) users by the service quality model (SERVQUAL) and structural equation model (SEM). They suggested that to increase customer satisfaction, RHA providers should emphasize driver training since trained drivers could provide customers with better offline customer experiences. To achieve customer loyalty, RHA providers should also focus on the platform's structural assurance, in addition to offline customer service.

The second paper, written by H. Pyykkö, V. Hinkka, T. Uotila, and R. Palmgren, analyzed the effects of the upcoming increasingly restrictive regulations from various sources driven by climate change prevention and general public opinion supporting "green" values to the organizations within the European Port Cluster (EPC) study. The authors argued that the adoption of future-oriented regulations is a non-linear, potentially disruptive, and complex foresight process that requires each stakeholder to formulate their own strategic pathway toward a target-seeking scenario. Changing direction from the status quo toward sustainability also requires a strong commitment beyond mere regulatory compliance.

The third paper, written by Zulkarnain and Al Ghiffary, analyzed the effects of the expansion of odd–even driving restrictions on *Daerah Khusus Ibukota* (DKI) Jakarta's ambient air quality. Carried out by regression discontinuity design (RDD), the study found that the odd–even driving restrictions did not significantly reduce DKI Jakarta's air pollutants, and the authors argued that the government should improve the restriction mechanism or enact more impactful programs to solve the air quality problems in DKI Jakarta.

The fourth paper, written by M.A. Berawi, C.R. Putri, M. Sari, A.V Salim, G. Saroji, and P. Miraj, examined the financial feasibility of investment in industrial supporting infrastructure projects investment and develops financing and institutional schemes for the Public-Private Partnerships (PPP) implementation to enhance project attractiveness to the private sector. They found the optimal cost-sharing scenario of the PPP financing scheme for industrial-based infrastructure development in six economic corridors in Indonesia, generating an IRR of 15.62%. This demonstrated that the cost-sharing scheme provided a more optimal financing option with a higher IRR value and equitable allocation of the responsibilities and risks.

The fifth paper was written by D.T. Doan, H. Wall, A.G. Hoseini, A. Ghaffarianhoseini, and N. Naismith, examined the current strengths and limitations of New Zealand's (NZ) new green construction industry. They identified twelve key limitations mitigating green building in NZ new construction, wherein four were new ideas presented in the interviews with influential personnel involved in the construction industry and those who have critical Green Star NZ experience, including supply chain inefficiencies, tools not tailored to NZ, unproven commercial feasibility, and lack of short-term benefits.

In the sixth paper, authors by J.F. Fatriansyah, F.A. Abdillah, and F.R. Alfarizi, designed the National Institute of Science and Technology (ISTN) green campus master plan to create an environmentally friendly and sustainable campus by referring to the UI GreenMetric categories. They produced an optimum design, which provided the campus area with an approximate 70% increase in total UI GreenMetric score and made the campus more environmentally friendly and sustainable than before the design was implemented.

The seventh paper, written by E. Bahsan, B. Andreatama, W.A. Prakoso, B.S. Soepandji, R.R. Dwinanti, and R. Marthanty, simulated simple soil model deformation behavior using smoothed particle hydrodynamics. The main objective was to model the behavior of granular materials (i.e., sands) while interacting with water during liquefaction. They found that the proposed algorithm could simulate the behavior of granular material like particles after failure.

The eighth paper was written by G.P.L. Abella, F.P. Lansigan, and J.M. Tubay, demonstrated the development of a framework to formulate a land-use plan by integrating current and future climate scenarios. Based on a systemic approach, the authors proposed a methodology for optimizing land use to achieve more effective crop production.

The ninth paper was written by R.P. Drianda, M. Kesuma, and N.A.R. Lestari, examined the potential of the virtual platform to promote local cultural tourism to a global audience as an innovative solution during the pandemic, although they acknowledged that the experience of a virtual tour could never replace the direct experience. The study provided some lessons learned in designing a virtual platform to optimize the marketing of local tourism destinations.

The tenth paper, written by Jonny, Kriswanto, and M. Toshio, developed a model of Internet of Things and Big Data Implementation to enhance business performance. The authors argued that the method developed for evaluating the digital potential of a backbone innovatively active industrial cluster, successfully works on the example cluster. The model covered marketing strategies, business management innovation, business process improvement, and business performance. The results showed that all but marketing strategies significantly correlated to business performance.

The eleventh paper, written by Farizal, M. Dachyar, and Y. Prasetya, developed a mathematical model to obtain an optimal gas pipeline route, taking into consideration not only investment costs but also death-risk costs, gas supply availability, and cultural heritage in a single integrated model. The model developed simultaneously considered industrial and household consumers. Using Semarang City in Central Java as the study case, the model could be duplicated to determine the gas pipeline routing for other cities given that the data needed was available.

The twelfth paper was written by P. Leviäkangas and V. Ahonen, analyzed the shifts of smart or intelligent transport in both research and policymaking using scientific literature, European policy documents, and national policymaking. They found three shifts: (1) around 2005–2010, traffic safety was surpassed by intelligent transport/mobility when its systems made their first grand entry; (2) around 2010, there was a change from intelligent transport/mobility to sustainable transport/mobility; and (3) beginning around 2015,

sustainability came to include more dimensions and is probably undergoing ongoing development.

The thirteenth paper, written by A. Dhini and M. Fauzan, developed a model to predict customer churn using recent developments in machine learning approaches. The customer data of the biggest fixed broadband companies in Indonesia was selected as a case study. The results showed that the ensemble learning model outperformed other classical techniques, and the best algorithm for predicting customer churn was the extreme gradient boosting tree (XGBOOST). Hence, they concluded, companies can specify a better strategy to conduct customer retention toward a specific customer cluster.

The fourteenth paper was written by M.A. Berawi, M. Sari, F.A.F. Addiani, and N. Madyaningrum, developed a model of a blockchain-based cloud storage system by identifying the dominant risk factors from its implementation in government agencies, which potentially impact their organizational performance. The six dominant proposed dominant were caused by system damage, data being accessed without particular access rights, and the lack of guarantees from the system when a security threat occured.

The fifteenth paper was written by I.D. Dawangi and M.A. Budiyanto, estimated $CO_2$ emissions from ship activities in a container port. The estimation was based on the ship activities when the ship approached the port, including ship maneuvering and ship berthing. $CO_2$ emissions were analyzed using random forest regression (RF) at the default setting, and then the effectiveness was verified using k-fold cross-validation. The authors argued that $CO_2$ emissions in the container port could be reduced up to 20% by combining several voyage optimizations and cold ironing systems.

The sixteenth paper was written by R.B. Luhulima, Sutiyo, M.R. Alia, and I.K.A.P. Utama, investigated the total resistance estimation and interference analysis of two types of multi-hull vessels through towing test experimentation. Two types of multi-hull models were investigated (i.e., Trimaran and Pentamaran considering the S/L ratio). The authors argued that the Pentamaran model had a dominant resistance compared to the Trimaran model; the average total resistance interference using the trimaran was 9.5%, whereas the Pentamaran was 12.5%.

The seventeenth paper was written by B. Sugiarto, M.F. Dwinanda, D. Auliady, R.N. Andito, Mokhtar, and C.R.M. Simanjuntak, investigated the effects of oxygenated cyclohexanol additives to bioethanol–gasoline blends on spark ignition (SI) engines. The investigation focused on the performance and exhaust gas emissions of 124.8 cc SI engines employing engine test-bed experimentation. The authors argued that a 20% bioethanol fuel mixture (E20) with the addition of 18 ml oxygenated cyclohexanol produced low specific fuel consumption (SFC) and coefficient of variation (COV) values, as well as fewer toxic gases.

The eighteenth paper was written by N.B. Prihantini, F. Maulana, W. Wardhana, N.D. Takarina, E. Nurdin, S. Handayani, Nasruddin, and G.S Haryani, proposed the use of ultrasonic sound for harvesting mixed culture of microalgae from the Agathis small lake for biofuel feedstock. The authors reported that there were 11 species of microalgae from 10 genera and 4 classes. Nine of the 11 species of microalgae found in Agathis small lake could produce lipids. The total biomass obtained from water samples from all stations in Agathis was 25.18 g. The authors also reported that the average lipid content of the biomass of the Agathis water samples in March 2020 was 55.5%.

We hope this special edition of *IJTech* includes findings and insights that lead to new discoveries. We invite you to join us by sending in your research for consideration.

With warmest regards from Jakarta,

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