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FOSTERING PARTNERSHIPS AND STRATEGIC ALLIANCES IN SUSTAINABLE INFRASTRUCTURE DEVELOPMENT

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This note continues from our previous note on infrastructure, sustainable infrastructure development was framed as vital in providing the necessary conditions for fostering growth and the economic development of a country. Infrastructure can refer to various sectors that represent a large share of an economy. Both components of infrastructure, physical infrastructure and social infrastructure, are required to provide necessary services for the public. The provision and the maintenance of adequate infrastructure is essential for achieving rapid and sustainable economic growth. The adequacy of a country's infrastructure is reflective of success in increasing productivity, expanding trade and industry, coping with population growth, reducing poverty, improving environmental sustainability, and bettering the living standards of society. The development of adequate public infrastructure is therefore required to achieve urban sustainability.

Fostering Partnership and Strategic Alliances

Infrastructure developments that are in the interest of the public also provide numerous business opportunities to investors and private investors. Successful participation in infrastructure development must be supported by project planning and delivery and knowledge transfer and technology, which can strengthen local industries and promote collaboration in Public-Private Partnership (PPP) schemes. Some key factors for the successful implementation of PPP schemes among involved parties are the guarantee of return on investment, the use of clear and measurable key performance indicators, fair risk-sharing, continuous performance monitoring, good communication, and mutual cooperation and trust.

PPP schemes play an important role in the success of infrastructure development by producing optimum benefits for stakeholders. Even so, the government must play a role in providing public infrastructure and reasonable community pricing for accessing infrastructure services, as well as in generating adequate revenue for the private sector. In order to create optimum benefits and increase project feasibility, the principles of innovation and value-added infrastructure projects must be contemplated during the early project planning stage. Value-added projects will directly affect financing and partnership schemes.

In short, a key factor for the success of infrastructure developments is project feasibility, which is assessed through value for money. Efforts to achieve cost effectiveness and to create value-added projects form the basis for accelerating infrastructure development when financial constraints are present. The allocation of funds for infrastructure financing can be supplemented by a country's domestic financial potential in the stock market, government bonds, projects bonds, mutual funds, pension funds, and insurance. Financing potential can be maximized by enacting laws and policies that are conducive to the inclusion of infrastructure investment and by implementing government incentives that provide payback options and consider rates of return. Value-added infrastructure projects and effective infrastructure financing schemes can improve project feasibility and therefore boost strategic alliances between governments and private sectors.

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Furthermore, the establishment of a dedicated institution for formulating, coordinating, and evaluating cross-sector infrastructure policies, which thereby focuses on the facilitation and the provision of incentives and partnerships, is one means of accelerating infrastructure development, channeling the transfer of knowledge and technology, and strengthening industries.

The creation of new technologies that foster research and that stimulate innovation is thus required to accelerate sustainable development in all fields of study related to infrastructure. In this context, this edition presents twenty papers dedicated to various studies in science and engineering that form a framework for fostering the development of sustainable technology and improving the end results of infrastructure projects.

The first paper, written by P. Arkhipov, Y. Zaykov, Y. Khalimullina, and A. Kholkina, presents three types of electrolytic cells for electrorefining antimony and bismuth from metals containing lead. The authors argue that electrolytic cells with a porous diaphragm were able to double the production rate and to greatly decrease the electrical potential of cells.

The next paper, written by M. Khalil, N. Liu, and R.L. Lee, investigates the synthetic method of hematite nanoparticle formation using ultrasonic sonochemistry. The authors argue that the formation of hematite crystals can undergo two possible reaction pathways and that most iron-oxide polymorphous precursors can be transformed into hematite crystals via a sintering process at high temperature.

The third paper, written by D. Thiyagarajan and R. Ganesan, proposes user-verifiable multiple keyword search schemes using the Merkle tree for outsourced data in cloud computing. The authors argue that the retrieval time is less even with an increasing number of documents, thereby reducing the storage overhead on the client and user side.

The fourth paper, written by S. Atsawaraungsuk and T. Katanyukul, discusses the development of an Online Sequential Circular Extreme Learning Machine (OS-CELM) and Structural Tolerance OS-CELM (STOS-CELM). The authors argue that STOS-CELM can deliver high accuracy, especially for problems involving high-dimension datasets.

The fifth paper, written by A.P. Pasaribu, M.F. Siddiq, M.I. Fadhila, M.H. Hilman, A. Yanuar, and H. Suhartanto, presents a study on shifting from virtual machines to docker containers for insilico drug discovery in the cloud. The authors argue that the docker produces better results and reduces the performance gap present in the use of virtual machines.

The next paper, written by K.S. Bouayoune, E.M. Boudi, and A. Bachir, examines the use of the Markov Model of Unit-Jump to analyze the crack growth of a material. The authors argue that the more the jump approximates to zero, the more the system is maintained in acceptable operating conditions, despite the disruptions that may influence it.

The seventh paper, written by N. Hossain, R. Jalil, T.M.I Mahlia, and J. Zaini, investigates the effect of the calorific value and the potential of *Azadirachta excelsa* and *Endospermum malaccense* as solid-fuel feedstocks. The authors argue that a decreasing value of moisture content (MC) increased the calorific value (CV) because of the high oxygen to carbon (O:C) ratio in the wood.

The eighth paper, written by K.N. Fitriana, M.A.E Hafizah, and A. Manaf, examines the synthesization of nanoparticles by the combined destruction process as well as their magnetic characterization. The authors argue that mean particle size is driven by the amplitude but also by the mechanical properties of materials and the initial size of the particle.

The next paper, written by A. Sholehah, A.H. Yuwono, N. Sofyan, C. Hudaya, and M.I. Amal, examines the effect of post-hydrothermal treatments on the physical properties of the

ZnO layer derived from chemical bath deposition. The authors argue that the post-hydrothermal process provided a high degree of crystallinity, and an optimum ZnO layer was obtained after post-hydrothermal treatment at 150°C for 3 hours at atmospheric pressure.

The tenth paper, written by O. Daghfas, A. Znaidi, A.B. Mohamed, and R. Nasri, presents a behavior model of 7075 aluminum alloy. The authors argue that the best shaping in the design of a fuselage using the 7075 alloy is in the 45° direction, which demonstrates adequate mechanical strengths and a low percentage of elongation.

The eleventh paper, written by M.D. Ghatak and P. Mahanta, presents a mathematical model for evaluating the effect of temperature on the rate of biogas production from various lignocellulosic biomasses. The authors argue that the proposed model is suitable for lignocellulosic biomass mixed with cattle dung at the temperature range of 35 to 55°C.

The next paper, written by S.K. Saha and N. Nandi, investigates the change in flow separation and velocity distribution at a downstream section as a result of the guide vane effect. The authors found a flow separation region at the bend outlet for flows with a 90º pipe bend without a guide vane, although this was absent in flows through a 90º pipe bend with a guide vane.

The thirteenth paper, written by A. Hasnan, N. Putra, W.N. Septiadi, B. Ariantara, and N.A. Abdullah, evaluates the use of a vapor chamber for rapid cooling in the conventional plastic injection molding process. The authors argue that the use of vapor chambers can speed up the process of heat transfer in injection molds by to 67% at various heat inputs, cooling temperatures, and cooling rates.

The next paper, written by A.R. Antariksawan, E. Umar, S. Widodo, M. Juarsa, and M.H. Kusuma, presents a model for analyzing reactor thermal-hydraulic characteristics of TRIGA-2000. The authors argue that the engineered safety features of TRIGA-2000 play an important role in keeping the reactor safe from the postulated risk of loss-of-coolant accidents.

The fifteenth paper, written by O. Sutresman, R. Syam, and S. Asmal, presents the design of an unmanned surface vehicle (USV) rocket to maneuver water surfaces. The authors argue that the USV model creates maximum thrust force at about 40.7 N with a torque of 1.41 Nm, and several kinematics parameters, including the angular and the linear acceleration, are considered.

The sixteenth paper, written by E. Budiman, I.G.P Raka, and E. Wahyuni, proposes the use of a submarine pipeline in a submerged floating tunnel (SFT). The authors argue that slack occurs when the buoyancy weight ratio (BWR) value = 1.2 and the maximum pipeline weight in the SFT is placed at 534 tons.

The next paper, written by J. Eddhie, proposes the use of nanosilica to improve the mechanical properties and the durability of high-performance concrete. The author argues that the proposed mathematical models of generalized compressive strength against concrete age were successfully modelled to measure the use of natural nanosilica.

The eighteenth paper, written by A.P.N. Siregar, examines the effect of increasing concrete strength on the behavior of concrete failure. The author argues that increasing concrete strength increased the value of fracture energy (G_F) and the stress intensity factor (K_{IC}).

The nineteenth paper, written by L.Z. Mase, presents an experimental test of soil liquefaction using a shaking table. The author argues that the combination of dynamic loads strongly influences the liquefaction potential, initial time of liquefaction, dissipated time of pore pressure, liquefaction duration, and excess pore pressure ratio.

The last paper, written by Fachrurrazi, S. Husin, Munirwansyah, and Husaini, proposes an ANN model for selecting subcontractors according to the company's strategic goals. The authors argue that the quotation price is the most significant selection criterion and reflects the best outcomes in terms of the contractor's strategic goals.

I hope that this edition of the International Journal of Technology conveys some new insights into the way we conduct our research. I am pleased to accept and to respond to all comments and enquiries on the direction and the content of the International Journal of Technology, and I invite you to join us in this venture by sending in your work for consideration.

With warmest regards from Jakarta,

Dr. Mohammed Ali Berawi
Editor in Chief