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Empowering Healthcare, Economic, and Social Resilience during Global Pandemic Covid-19

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The World Health Organization (WHO) declared COVID-19 to be a world health emergency in early 2020. Many governments quickly responded by strategizing their policies to support healthcare facilities, economic sectors, and social safety nets during the pandemic. Those various essential policies and programs must continue to be executed even after the pandemic or in the 'new normal' situation.

Improved testing capacity and contact tracing is required both when confirmed cases of COVID-19 are detected and to mitigate new clusters. The governments need to increase the number of health facilities and implement strict health protocols, such as handwashing, physical distancing, using face masks, and staying physically and mentally healthy. To define effective government interventions, it is necessary to gather data on hazards, vulnerability, and healthcare capacity in responding to COVID-19.

The pandemic is negatively affecting global economic growth, slowing down business activities, reducing production, and increasing unemployment and income uncertainty. As the virus continues to spread, restrictions on mobility are curtailing economic activities, which has created an economic shock that is prompting a global recession. Less investment, job losses, and disrupted national and global trade and supply chains have caused many governments to take necessary actions and to collaborate to enable a robust global recovery. Global coordination and cooperation are required to mitigate the spread of the pandemic and its impact on economic and social stability. At the same time, clear and accurate information is needed to maintain public social stability; hoaxes and disinformation can cause public panic and disrupt the process of recovery.

All countries dealing with the pandemic have been refocusing their government funds and programs to tackle COVID-19. We are all hoping that a global economic recovery will start in the third quarter of 2020.

Building Resilience and Adapting to Change

Attempting to revive the economy, many governments begin transitioning to implement the 'new normal' during the pandemic. While transitioning to jumpstart industrial sectors, the new normal requires solidarity and self-awareness among the general public to mitigate the spread of the virus. Social cooperation is essential to building resilient health systems, and society's discipline in carrying out health protocol for COVID-19 during daily activities is key to suppressing transmission of the virus. Following this protocol creates a culture of a healthier lifestyle.

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Governments are attempting to reopen businesses by supporting various policies, including the relaxation of taxes, providing bank loans, and increasing financial assistance and incentives to stimulate economic productivity and growth. Companies need to strategize their operational activities to survive and form contingency plans to recover their business by utilizing digital media, sharing cost burden and business operation if necessary.

While there is no vaccine, product and service transactions remain slightly different from before. Businesses should expand their product or services offerings by virtual options and manage remote work using digital platforms. In the new normal, a need for best practices for a cashless society, managing public spaces for social distancing, and protecting population health, such as health testing and digital contact tracing, may become increasingly vital. The use of technology and automation will play a significant role in increasing productivity.

Responses to COVID-19 have also prompted a strong drive to reduce inequal access to and the quality of public education and health facilities supported by government policies to increase the country's resilience. Furthermore, this drive will prompt stronger support for small and medium enterprises through business incubators and start-up companies to ensure urban economic resilience.

What we will see in the future is a development model with an emphasis on innovation, inclusivity, and sustainability.

Improving Scientific and Technological Capacity

Technology has always emerged to improve the performance of projects, products, or services. In this edition, we are pleased to present twenty selected papers dedicated to technology improvement in science and engineering.

The first paper, by M.A. Shihab, M.A. Dhahir, and H.K. Mohammed, presents a kinetic study of air bubbles-cetyltrimethylammonium bromide (CTAB) surfactant for recovering microalgae biomass in a foam flotation column. The authors argue that the maximum recovery predicted by the fitted Kelsall model was achieved at all CTAB concentrations in which the recovery of microalgae cells was favored at high rates of air flow.

In the next paper, K.T. Basuki, A. Rohmaniyyah, W.R. Pusparini, and A. Saputra examine the extraction development for the separation of gadolinium (Gd) from yttrium and dysprosium concentrate in nitric acid. The authors find that the optimum conditions for the separation are obtained at a 30-minute stirring time with a stirring rate of 250 rpm, a feed concentration of 150×10^3 ppm with pH 3, and a Cyanex 572 concentration of 30%.

The third paper, by A. Ocieczek and Z. Otremba, investigates the water vapor sorption on the surface of selected organic samples in an artificial static magnetic field of 10 mT. The authors argue that the magnetic field can determine food stability during storage and may offer further possibilities for reducing the costs of food preservation.

In the fourth paper, T.E. Agustina, E. Melwita, D. Bahrin, R. Gayatri, and I.F. Purwaningtyas, examine the synthesis and characterization of a nano-photocatalyst of ZnO natural zeolite with the capacity to degrade Procion red. The authors achieved the highest synthetic dye degradation percentage (96.23%) of 50 ppm Procion red under 120 minutes of sunlight irradiation.

The fifth paper, by D.M. Cortés, Y.A. Garcés-Gómez, and S.I. Pacheco, evaluates an improvement of biomethane potential by the anaerobic co-digestion of sewage sludge and cocoa pod husks. The authors argue that the biogas solves two problems by using sludge, which is mostly deposited in the municipality's landfill site, and waste from the municipality's cocoa production.

In the next paper, A. Maulida, Zahrati, H. Kamila, T. Mukhriza, A. Gani, and M.D. Supardan present the process of the synthesis of fatty acid isopropyl esters from crude palm oil (CPO) using microwaves. The authors demonstrate that the highest yield of 80.5% of fatty acid isopropyl esters was obtained at a molar ratio of CPO to isopropanol of 1:11, a catalyst concentration of 0.2%, and a reaction time of five minutes.

The seventh paper, by R. Ahmad, M.A.M. Ishak, K. Ismail, N.N. Kasim, A.R. Mohamed, A.Y. Ani, R.R.R. Deris, and K.A. Radzun, investigates the effect of pretreated palm kernel shell and Malaysian coal co-gasification on product yield and gaseous composition. The authors argue that enriching the properties of PKS_{To}/MB_{Pr} improved the co-gasification performance in terms of product yield and gas composition.

The eighth paper, by D.R. Barleany, C.V. Ananta, F. Maulina, A. Rochmat, H. Alwan, and Erizal, studies the release of metformin hydrogen chloride using alcohol composite through a freezing and thawing procedure and gamma irradiation at room temperature. The authors find that poly(N-isopropylacrylamide) (pNIPAAm)-chitosan-polyvinyl alcohol (PVA) hydrogels could be employed for the controlled drug release of metformin HCl.

In the following paper, S. Jamilatun, Budhijanto, Rochmadi, A. Yuliestyan, M. Aziz, J. Hayashi, and A. Budiman examine the effects of differing amounts of catalysts on the pyrolysis characteristics of *Spirulina platensis* residue thermochemical behavior and kinetics parameters. The authors argue that the presence of a catalyst can reduce activation energy to the lowest value, while still increasing the reaction rate constant and resulting in a low Arrhenius equation.

The tenth paper, written by D.I. Widiputri, I. Julisantika, I.S. Kartawiria, M.D. Gunawan-Puteri, and F. Ignatia, shows how the *cymbopogon citratus* (lemongrass) extraction process can be upscaled to obtain optimum alpha-glucosidase inhibitor (AGI) levels. The authors demonstrate that lemongrass extract can produce an extraction yield of 39.45±1.59%.

The eleventh paper, by H. Susanto, Y. Fahmi, A.T. Hutami, and Y.T. Hadi, examines the effects of fly ash loading on the characteristics of PVC-based cation exchange membranes for reverse electrodialysis. The authors argue that the composition of the polymer solution significantly influenced the membranes' properties with the highest swelling degree, ion exchange capacity, and conductivity.

In the twelfth paper, M. Maila, S. Bhat, and K. Prasad present the design of an electrolarynx to increase energy efficiency by varying the driving source. The authors find that the alternative electrolarynx driving signal leads to less power consumption and hence more energy efficiency with either improved or analogous performance in terms of formant distance, amplitude, quality, and leakage noise.

The thirteenth paper, by E. Susanto, M.I. Alhamid, Nasruddin, Budihardjo, Prabowo, and S. Novianto, examines the characteristics of air flow and heat transfer in serpentine condenser pipes with attached convection plates in an open channel. The authors argue that the increase in the gap ratio from 1.05 to 2.10 caused a significant increase in the total condenser heat transfer by as much as 2.2% or 6.33 watts.

In the fourteenth paper, A. Abdurrakhman, T. Soehartanto, H.S. Hadi, M.B. Toriki, B.L. Widjiantoro, and B. Sampurno present the design of output power control systems based on a mass flow rate comparison of the air-fuel ratio (AFR) on a dual fuel generator set. The authors report that a stable output power response occurs with an overshoot maximum value that averages below 20% and an error value below 2% in each of the set point values between 100 and 1200 watts.

The next paper, by D.R. Munaf and Y.A. Piliang, discusses a sociotechnological perspective on the development of lunar and martian infrastructures made of concrete materials. The authors argue that the sociotechnological approach can bridge technology

and human beings and become a model or standard operational procedure for safety precautions for infrastructure development.

The sixteenth paper, by C. Ganeshkumar, M. Prabhu, S.P. Reddy, and A. David, examines mushroom products in India in relation to value chain analysis, consumers' awareness levels, and their buying motives. The authors argue that more efforts should be made to increase production, to solve marketing problems, and to produce effective government rules and regulations.

In the next paper, R. Maulidya, Suprayogi, R. Wangsaputra, and A.H. Halim present a batch scheduling model for a three-stage hybrid flowshop fabricating products with hierarchical assembly structures. The authors report that the scenarios provide the minimum total actual flow time value.

The eighteenth paper, written by A. Supriatna, M.L. Singgih, E. Widodo, and N. Kurnianti, examines equipment performance using equipment effectiveness performance (OEE) and optimum maintenance strategies**.** The authors argue that the use of OEE has a different value depending on the renting period, amount of corrective and preventive maintenance, failure, repair time, and maintenance level.

In the nineteenth paper, R. Ardi, B.M. Iqbal, S. Sesarea, and Komarudin assess disposal behaviors regarding mobile phones**.** The authors find that environmental awareness significantly affects individuals' motivations for keeping, reselling, donating, or recycling waste mobile phones.

The last paper, written by K. Aritonang, M. Nainggolan, and A.V. Djunaidi, presents an integrated supply chain for a single vendor with multiple buyers and products with a crashing lead time. The authors propose that the optimal solution is based on the following three decision variables: the number of buyer orders, the lead time of each buyer, and the frequency of vendor shipments to all buyers in one production cycle.

I hope that this edition of IJTech conveys new insights into the way we conduct research. I am pleased to accept and respond to any comments or enquiries on the direction and content of IJTech, and I invite you to join us in this venture by submitting your work for consideration.

With warmest regards from Jakarta,

Dr. Mohammed Ali Berawi
Editor in Chief