

Editorial Notes

Welcome to International Journal of Technology

Theme: Advancing Scientific and Technological Capacity Development

The modern world has changed and improved the quality of our lives, and in this sense, science and technology has flourished for the gain of mankind. Furthermore, the development of science and technology plays a crucial and pivotal role for economies to grow by improving work productivity and human resources development. It can be seen that the source of scientific and technological advancement comes from our creative potential and a continuation of the natural evolution of things. A positive trend of global expenditure on science and technology has been significantly increased, the level of public sector awareness has been greatly elevated, and collaboration between government functionaries, business practitioners, and academicians has been extensively merged in addressing science and technology capacity development issues.

This season, we are pleased to present ten selected papers dedicated to advancing science and technology capacity development issues in various knowledge areas. This issue is particularly aimed to promote the generation, diffusion and management of industrial technology. With this theme, this issue discusses the scientific analysis and design of key factors in advancing technology in terms of (i) research and development and (ii) mechanisms to improve policy and promote technological innovation (iii) opportunities to strengthen scientific and technological capacities.

The first paper, written by M. R. Dris, C.K. Sheng, M.I. Isa, and M.H. Razali, investigates the use of cadmium sulfide nanoparticles with starch as a capping agent to protect semiconductor nanoparticles from aggregation and to obtain uniform structures. Grain sizes of the samples, which were determined by X-ray Diffraction (XRD) and calculated with Scherer's equation, were relatively dependent on the pH applied in the synthesis process. Infrared spectroscopy (FT-IR) indicated that the starch and the nanoparticles were bonded by R-N=C=S bonds, but the bonding depended further on the pH used. The band gap of the CdS nanoparticles measured by UV-Vis spectroscopy was 2.39 eV, which was lower than CdS in bulk phase due to distorted structures in the obtained CdS nanoparticles.

The second paper, written by N. Saksono, B. Ariawan, and S. Bismo, investigates the effectiveness of plasma electrolysis on hydrogen product quantity and energy consumption by varying the voltage and glycerol concentration. This paper presents a design-scheming of a semibatch reactor for non-thermal plasma electrolysis, which includes a plasma generator that is able to create up to 300 V (DC). The result showed that an increase in voltage led to the increase in hydrogen production and energy consumption; the addition of glycerol caused a decrease in hydrogen production, but still resulted in an increase in energy consumption. The process effectiveness of plasma electrolysis at 300V and 0.1M KOH was 8.1 times higher than Faraday electrolysis.

The third paper, written by H. Abral, E. Kasmianto, and M. Perdana, investigates the strength of metroxylon sago (MS) palm fiber treated with alkali solution that might be used as a valuable alternative reinforcement material for natural fiber composite. The investigation focused on measuring the mechanical properties and observing the microstructures of MS fibers before and after treatment with 5% sodium hydroxide. Electron microscope scanning was used to observe the microstructure of MS fiber, and the result showed that there was a decrease in fiber diameter after mercerization. The average ultimate strength of untreated MS fiber was recorded as 46 MPa; treatment with sodium hydroxide resulted in a significant increase in the average ultimate strength to 163 MPa.

The fourth paper, written by I.W. Susila, Rachimoellah, and I.N. Sutantra, investigates the performance of diesel engine using biodiesel fuel from rubber seed oil produced by a catalytic method. This research investigates the quality of rubber seed oil methyl ester (RSOME) which produced via catalytic method of dry wash system by using magnesol (magnesium silicate) as an absorbent. Based on the comparison of RSOME produced by a non-catalytic method and diesel fuel, it was found that RSOME of catalytic method and non-catalytic method gave the same effective power, whereas the power of diesel fuel was lower than both methods. The thermal efficiency of RSOME of non-catalytic method is higher than of catalytic method and diesel fuel, and the emission of the RSOME of the non-catalytic method is the most eco-friendly, followed by the RSOME of the catalytic method, and lastly the diesel fuel.

The fifth paper, written by S.A. Sulaiman, S.M. At Naw, and M. N.Z. Moni, discusses an experimental gasification carried out on an Oil Palm Fronds (OPF) using a 50 kW lab-scale downdraft gasifier. The

experimental works focused on the temperature distributions within the reactor and the characteristics of the dynamic temperature profile for each temperature zone during operation. An average pyrolysis zone temperature of 324°C and an average oxidation zone temperature of 796°C were obtained over a total gasification period of 74 minutes. As a result, a maximum oxidation zone temperature of 952°C was obtained at the rate of 486 lpm inlet air flow and 10 kg/hr feedstock consumption. In addition, stable bluish flare was produced for more than 70% of the total gasification time.

The next paper, Z. Arifin and K.W. Axhausen evaluate the dynamic behavior of commuters' mode and route choices in Jakarta by using Global Positioning System (GPS) devices. A series of algorithms was developed to analyze the GPS raw data, including data filtering, identification of commute trips, derivation of commute trip characteristics, detection of commute main modes, and identification of routes. As a result, the observation data proves the presence of dynamic behavior in choosing both modes and routes for commuting and mobility system in Jakarta.

The seventh paper, written by R. Padfield, E. Papargyropoulou, and C. Preece, provides an assessment of greenhouse gas emission trends in the production and consumption of food in Malaysia. Across the different components of the supply chain, the likely greenhouse gas emission hot spots have been identified, with the production of palm oil and rice, and livestock rearing, singled out. The authors argue that the development of a sustainable food systems framework is thus recommended to establish a baseline to monitor progress. This framework can then be used to set the priorities for increasing food production through sustainable means and reducing the food system's greenhouse gas emissions.

The eighth paper, written by E. Djonaedi, C.F. Chi, F. Dianawati, and T.Y. Zagloel, presents the efforts to develop a database program for fatal electrocution and fatal fall accidents in construction industry. A form of an accident analysis connected to the database has been developed using MYSQL, along with an accident report in qualitative format and meaningful categories to provide analyzable data. The accident database including 30 cases were coded and categorized according to age, company size, work experience, task, source of injury, and secondary source of injury. The authors argue that the program can be used to prepare real time information about accident trends and patterns for the prevention of repetitive accidents.

The next paper, written by P. Smith, explores his practical analysis on correlation of men's underwear sales to the economy indicator debate. By looking across a further 56 counties empirical data, he argues that men's underwear sales appear to be unrelated to the economy as a whole, although seeming to behave as a basic commodity. However, for Armenia, Ecuador, and Kuwait, there may be some validity in understanding the relationship further. These findings are consistent with men's underwear being treated as a basic commodity in most economies, but in a few countries, they have only become disposable fashion items.

The last paper, written by M. Suryanegara and K. Miyazaki, examines the technological agenda opportunity of implementing the use of 4G mobile technology. This paper adopts a concept of linking knowledge, innovation, technology and actors in the mobile technology sector. Based on these analyses, the continuous development of mobile technology can be seen as the evolutionary process of technological innovation. Since the operation of 4G technology would be indicated by the heterogeneous network and interoperability with other technology platforms, the research activities on emerging topic, particularly in relation to Security, Interoperability, Real time, and Ubiquitous computing, are therefore needed.

I hope that this special edition of IJTech conveys some new insights in the way we conduct our research. I am pleased to accept and respond to any comment and enquiry you may have on the direction and content of IJTech and I invite you to join us in this venture by sending your work for consideration.

With warmest regards from editorial desk,



Dr. Mohammed Ali Berawi
Editor-in-Chief
International Journal of Technology