



### **The Trend of Medical Technology and Healthcare Engineering in the Time of COVID-19. What is an Engineer's role?**

by Ir. Shamila Ariaratnam

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On Saturday, 27 June 2020 at 11:30 a.m. Dr Hau Yuan Wen, a research fellow and the Head of Cardiac Informatics Cluster at UTM-IJN Cardiovascular Engineering Centre, also a Senior Lecturer at the School of Biomedical Engineering and Health Sciences, Faculty of Engineering, Universiti Teknologi Malaysia delivered a two hour talk to 190 participants online on "The Trend of Medical Technology and Healthcare Engineering in the Time of COVID-19. What is an Engineer's role?"

Medical Technology, termed Medtech for short are products, services or solutions used to save and improve human lives through prevention, diagnosis, treatment, monitoring and care. According to Statista.com the Global Medical Technology Revenue is steadily increasing and projected to bring in USD 594.5 billion revenue in year 2024. Proclinical.com has listed the Top 10 Medical Device Companies in 2019 generating a revenue between USD 13.6 to 29.9 billion.

In Malaysia, according to Malaysian Investment Development Authority and/or Ministry of International Trade and Industry, Medtech is targeted to contribute RM17.1 billion in revenue and RM11.4 billion in Gross National Income as well as generate 86,000 jobs by the end of year 2020. It also projects Malaysia to be the world's leading producer and exporter of catheters, surgical and examination gloves: supplying 80% of the world's market for catheters, and 60% for rubber gloves, including medical gloves. Malaysia is also favoured to be the outsourcing destination and a medical device manufacturing hub within ASEAN. Hence, making it the largest market for medical devices in ASEAN region with an estimated total market size of USD 1.4 billion.

In order for the Medtech manufacturer's to stay ahead of the competition they need to continuously look at quality improvement initiatives that relate to early diagnosis, minimal invasive treatment, shorter hospitalization / rehabilitation duration and cost reduction whilst not compromising accuracy, reliability, safety and reproducibility of the treatment and care given to patients. They should also focus in the future of Medtech which lies in Telehealth / Telemedicine, Internet of Medical Things (IoMT), Cloud Computing, AR/VR/MR, Artificial Intelligence (AI) and Data Science, Quantum Computing, 3D Printing, Wearable Medical Devices, Mobile App, Medical Imaging, Robotic, Blockchain and Nanorobotics.

Distribution of health-related services and information via electronic information and telecommunication technologies (ICT) have been steadily increasing. Moreover, combining IoT development with telemedicine / telehealth technologies has resulted in wearable devices connected to mobile applications to track and prevent chronic illness. Cloud computing has paved the way for collaboration to link and share data in real time with multiple sources. AI uses smart algorithms to approximate human cognition in the analysis of complex medical data as decision support systems. Augmented reality (AR), Virtual reality (VR) and Mixed Reality (MR) has aided healthcare personnel in training and actual functions. Printing of organic tissue for use in burn victims as well as organ replacement. Use of robotic equipment to provide treatment and care. Additionally, blockchains allow large numbers of users to securely have access to a common ledger and genome mapping or population-wide health data analysis has far higher calculation capacity. Examples were shared on the use of this futuristic Medtech amidst the battle with Covid-19 including some applications in hospital designs.

Some of the challenges that Medtech manufacturers must be prepared for besides ensuring the quality and safety of their devices are greater demand on synchronous and asynchronous messaging systems, increasing need to deploy fast Wide Area Network connections that are secure and stable, making certain that these devices are compliant to Health Insurance Portability and Accountability Act (HIPAA) to protect private health information, preventing cybersecurity attacks and the long turnaround time for approvals from regulatory authorities

The speaker concluded her talk by sharing her own personal experience developing a Medtech called myThrob: Intelligent Home-based Heart Rhythm Monitoring Device for Early Heart Disease Detection and Prevention. This device was later modified to process an algorithm to detect the QT interval of patient's electrocardiogram signal which is one of the important indicators for monitoring of COVID-19 patient medication.