Official Bulletin 12th Edition - KDN: PQ1780/J/187

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TECHIES

Technicians' role in the fourth industrial revolution: Perspectives from Malaysia and the United Kingdom

The Inside Story of Manufacturing Industry

Health Informatics- An Emerging Career Pathway

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Penjelmaan Teknologi Keselamatan Kenderaan Penumpang Terkehadapan (Advanced Passenger Car Safety Technology): Satu sumbangan ASEAN NCAP kepada Malaysia

Petrochemical Industry the Way Forward

ISSN 0128-1313
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CONTENT

FROM CHIEF EDITOR'S DESK

Dato' Ts. Dr. Mohd Mansor Salleh

It has been a year and a half since Malaysia had its first case of Covid-19 positive cases. Despite several lockdowns, the impact on both our healthcare and economy has not receded. In fact, it has gone worse. It is hoped that with every Malaysian's help and cooperation, we will overcome this scourge in our midst together.

Following on from my editorial comments in the last issue, we have in this 12th edition a variety of contributions for your reading pleasure. An interesting insight into the manufacturing industry is provided by comments from a senior manager from the industry.

For the first time we present an article in Bahasa Malaysia on Advanced Passenger Car Safety Technology. The article is very readable and we congratulate the author for a job well done. We hope to see more articles in Bahasa Malaysia.

I would like to extend my thanks to all authors and all MBOT Publication Committee Members which has made this issue possible.

Here is wishing everyone once again Happy Reading and Happy Writing!

TECHNICIANS' ROLE IN THE FOURTH INDUSTRIAL REVOLUTION: PERSPECTIVES FROM MALAYSIA AND THE UNITED KINGDOM

By
Ts. Ilyana Janis, Universiti Tun Hussein Onn Malaysia
Daniel Sandford Smith, The Gastby Charitabe Foundation, United Kingdom

The purpose of this article is to highlight the potential of technicians playing a pivotal role in the adoption of Industry 4.0. According to a research conducted by one of the authors with technicians in small and medium enterprises (SMEs) in Malaysia, technicians should clearly play a significant role in the transition to Industry 4.0.

Research commissioned by the Gatsby Foundation (Lewis, 2019) demonstrated that the contribution of technicians to innovation has been neglected. Innovation has often been thought of as a linear process; however, evidence suggests that innovation is a non-linear process, characterised by complicated feedback mechanisms and interactive relations involving science, technology, production, and use. The research also highlights the importance of incremental innovation at the firm level, and this is where the role of the technicians will be particularly critical in the transition to Industry 4.0.

Below, the authors consider the role of technicians in the UK and Malaysia and how they might contribute to the implementation of Industry 4.0 in each of these countries.

Who is a technician?

A Malaysia perspective

From Malaysia perspective, according to the Malaysia Standard Classification of Occupations (MASCO), the technician role is categorised as Skill Level 3, with at least a diploma academic qualification. However, technicians' skill level can also be measured according to their working experiences, as skills may also be obtained via informal training and experience (Ministry of Human Resources Malaysia, 2013). Furthermore, technicians play various roles in the shop floor production. In Multinational Companies (MNC), for instance, technicians' different roles can be seen in the shop floor production, as they engage in specific tasks. Meanwhile, a small number of technicians can be seen in the Small-Medium Enterprises (SMEs) and their role commonly involves multiple tasks, depending on their work organisation. Statistically, in 2019, 763 thousand persons were technicians and associate professionals (Department of Statistics Malaysia Official Portal, 2019).

A United Kingdom perspective

In recent years there has been growing interest in technician roles in the UK economy. Estimation suggest that there are over 1.5 million technicians employed in the UK working in the fields of engineering, science, health, and technology. The technician workforce is relatively old, with around 50,000 technicians retiring every year but employers are finding hard to replace these workers. Whilst there is widespread agreement that a lack of higher technical skills is damaging the economy, there is rather less agreement about how to define a technician. Broadly speaking, technicians would be educated to at least the equivalent of A-Level and would combine theoretical knowledge with practical skills and common sense. Technicians are seen as essential to the UK economy and will be integral to overcoming some of the great challenges of the coming years and decades – from updating our transport infrastructure and local internet access, to meeting targets for net zero carbon emissions.

Why technician?

A Malaysia perspective

The current trend of Industry 4.0 witnesses numerous studies conducted, focused on engineers or professionals (white-collar employees). Engineers (or white-collar employees) are frequently seen as responsible for planning and designing for successful Industry 4.0 implementation. Despite the importance of engineers, however, technician also can contributes to support Industry 4.0. Based on the first author's study, the qualitative research fills the gap, where technicians are also viewed as a source of knowledge for the transition process in Industry 4.0. Technicians are the closest to the issues and problems that occur in the production line. They are also responsible for ensuring that the machinery and operation line are in good condition. Thus, the transition role requirements and competencies of the technicians are critical to meet new demands in Industry 4.0.

A United Kingdom perspective

Research conducted in the UK are deem world class yet have little impact to UK businesses, most are slow to adopt new technology such as those which underpin Industry 4.0. The technician experience of using and maintaining technology, means that they provide indispensable suggestions on how Industry 4.0 could be used to improve the bottom line for businesses and increase the productivity of the UK.

Technicians will need to take on new tasks and responsibilities that will combine some of the more traditional manufacturing skills with digital skills thus resulting in a new higher skillset. Worryingly, it is precisely this higher technical, non-graduate skillset where the skills shortages seem to be most prevalent in the UK and there are few mechanisms to upskill the existing workforce.

What can we do to support technician role?

A Malaysia perspective

For manufacturers, a positive working culture and trust significantly influence technicians' performance. A positive working culture and trust from management can encourage technicians' willingness and sense of responsibility to perform tasks in the organisation. Technicians who feel trusted by their company will perform better and be willing to learn more to assist the company. Apart from that, relevant training and courses should be provided to support technicians' learning and knowledge creation process in the Industry 4.0 working environment. Additionally, manufacturers can support technicians' role through professional designation offered by the Malaysian Board of Technologists: Registered Technician (Tc).

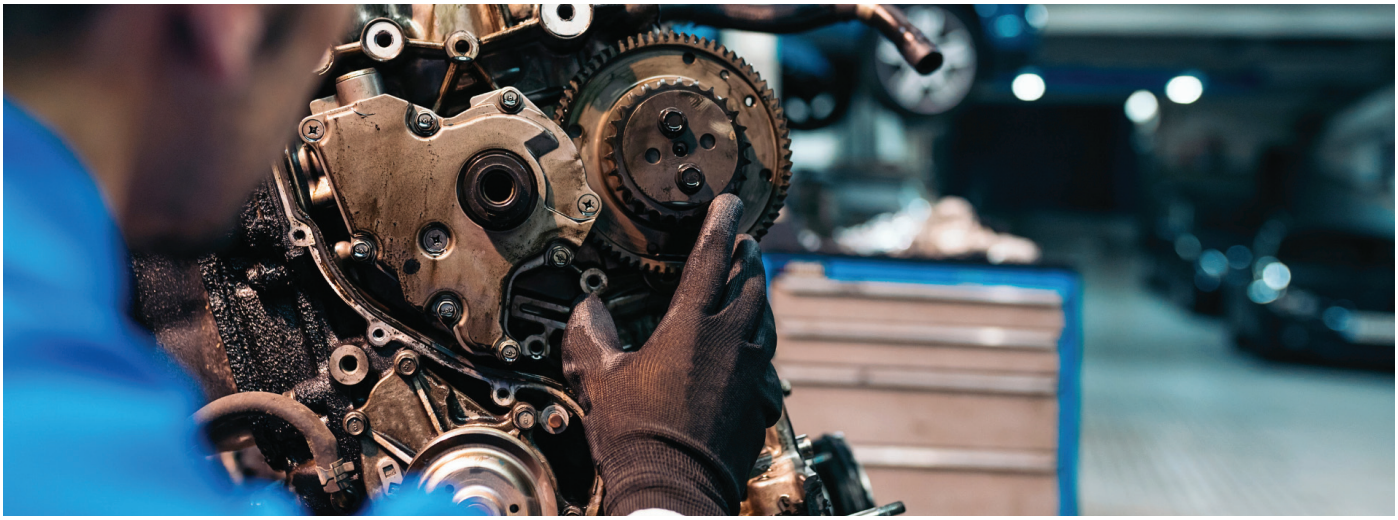
Meanwhile, for policymakers and the government, the existing accreditation needs to be reviewed to meet Industry 4.0 requirements, mainly oriented towards cognitive routine and non-routine tasks. According to the United Nations Industrial Development Organization (2019), preparing accreditation for the new digital age is required, as accreditation can also play a vital role in sustainable development. Furthermore, technicians' minimum wage is suggested to be increased to boost the work performance of technicians who work in the Industry 4.0 environment, as previously mentioned in an article published in Malaysiakini written by Hussin (2019), on reinventing the nation with high technology and high wages.

A United Kingdom perspective

Ensuring that the skills system provides proper training for technicians, it should increase the absorptive capacity of industry to take advantage of Industry 4.0 as well as empowering technicians to engage in incremental innovation. Whilst small in scale, this can in aggregate have a significant impact on productivity. Additionally, making the role of technicians in innovation explicit should make these roles much more attractive to young people.

The rapid pace of change in technology will require an increased use of flexible modular courses that can be used to upskill and reskill technicians throughout their working lives. We need to explore how these shorter courses can be accredited in a way that gives confidence to employers about what a technician can do but also such that it could support a technician looking for more formal academic recognition of what they have learnt.

One other interesting development in the UK is a growing recognition of the importance of technicians by the UK's professional bodies in science, engineering and IT. As a result, most technicians are now able to achieve the following professional designations: Registered Science Technician, Registered Engineering Technician or Registered IT Technician.



How technicians can contribute to Industry 4.0?

Despite different perspectives on the role of technicians, technicians can contribute to Industry 4.0 in several ways. Apart from fulfilling repair task requirements, technicians are encouraged to learn how to conduct basic analysis of repair, maintenance, and services data. Through basic data analysis, technicians can assist managers by providing information and data (such as the common issues that occur and the pattern of major and minor damage on the production line). More benefits can be gained from technicians the technicians in SMEs, as they are the key personnel in the shop floor production. Technicians' willingness and sense of responsibility to assist the companies are vital in the transition to Industry 4.0. Overall, technicians are encouraged to become more dynamic, as they are the experts in the technical and maintenance field.

Despite different perspectives on the role of technicians, technicians can contribute to Industry 4.0 in several ways. Apart from fulfilling repair task requirements, as they are the source of knowledge, technicians are encouraged to learn how to conduct basic analysis of repair, maintenance, and services data. Through basic data analysis, technicians can assist managers by providing information and data (such as the common issues that occur and the pattern of major and minor damage on the production line). More benefits can be gained from technicians in SMEs, as they are the key personnel in the shop floor production. Technicians' willingness and sense of responsibility to assist the companies are vital in the transition to Industry 4.0. Overall, technicians are encouraged to become more dynamic, as they are the experts in the technical and maintenance field.

Acknowledgement

The first author would like to express the deepest appreciation to her current supervisor, Ts. Dr. Aini Nazura Paimin for kind guidance towards the completion of PhD study. Also, the warmest gratitude to her former supervisor, a retired Professor Dr Maizam Alias, for kind advice during the PhD study.

A short biography of the authors

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Daniel is a Director of Programmes of Gatsby. Daniel has led on several projects designed to support the development of intermediate STEM skills including projects on technician registration, apprenticeships and technical qualifications. He has an interest in making better use of labour market information to shape technical education. Daniel taught for 10 years and worked for the Institute of Physics and the Association for Science Education before joining Gatsby. Email: d.sandfordsmith@gatsby.org.uk

Sources:

Hussin, R. (2019, July 23) Reinventing the nation with high tech, high wages, Malaysiakini, Retrieved from https://www.malaysiakini.com/news/484989.

Lewis, P. A. (2019). Technicians and innovation : A literature review. Available at https://www.gatsby.org.uk/uploads/education/technicians-and-innovation.pdf

Lewis, P. A. (2020). Developing technician skills for innovative industries: Theory, evidence from the UK Life Sciences Industry, and policy implications. British Journal of Industrial Relations, 58(3), 617–643.

Ministry of Human Resources Malaysia (2013) Malaysia Standard Classification of Occupations 2013, pp 1-43

United Nations Industrial Development Organization (2019, June 2020) Preparing accreditation for the new digital age, Retrieved from https://www.unido.org/stories/preparing-accreditation-new-digital-age.

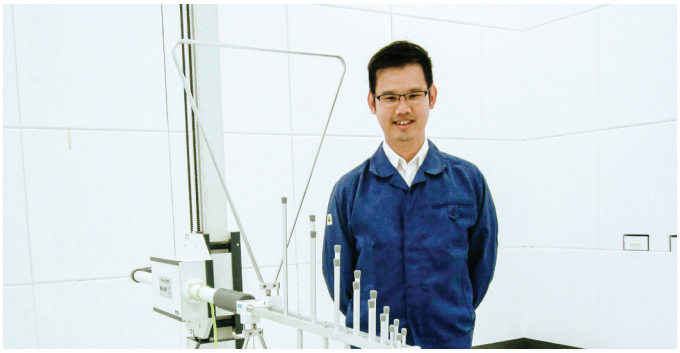
THE INSIDE STORY OF MANUFACTURING INDUSTRY

With Ts. Dr. Khoo Boo Kean

Kushairy Kadir: Thank you, Dr. Khoo for accepting the invitation to be interviewed by TECHIES. It is good to have some industry insight for our audience. Hopefully, you can share the progress of technologies and limits for technologists in Malaysia, especially now with the current COVID situation, with the IR 4.0 and everything so, if you can provide some insight, some future directions for our audience, which is in the academics, also from the government sectors so that they can see the industry hope and also the industry foresight, going forward in the future. To continue with our interview session today, I think we can start with you briefly introducing youraself.

Dr. Khoo Boo Kean: Yes, thank you, Dr. Kushairy from MBOT, for giving me this opportunity. My name is Khoo Boo Kean. I'm a Professional Technologist registered with MBOT in the field of ME. I have been in the industry for 18 years since I graduated from university, and I hold a PhD in Mechanical Engineering from Universiti Teknologi PETRONAS and I'm currently attached to K-One Industry Sendirian Berhad as a Senior Manager in charge of the technical quality, quality control, ISO system, Regulatory Affairs, and social compliances. The nature of the industry that I've been involved in for the past 18 to 19 years is in contract manufacturing that involves semiconductor processes, electronic processes, plastic injection, metal stamping, and progressive tooling. The involvement is pretty much in the industry. I started my career as an engineer until the senior manager level, which I'm currently holding. So, besides having involved in the industry, I do involve in some of the community work and non-NGO, and a government organisation called Technological Association Malaysia (TAM). During my involvement in TAM, I've been elected as the Branch Chairman to lead the Perak state for all the technologies, related work, and some of the non-government organisations work as part of the contribute back to the society. I have my diploma in Electronic Engineering, from Polytechnic Ungku Omar, as that was my first diploma then I pursued my first degree in Universiti Utara Malaysia. Then, I continued my master's and my PhD in Engineering with Universiti Teknologi PETRONAS via research.

Kushairy Kadir: You have now been a Senior Manager in the industry, can you share with us the highlights of characters required to be a successful technologist in the industries, especially in the equipment manufacturing industry.



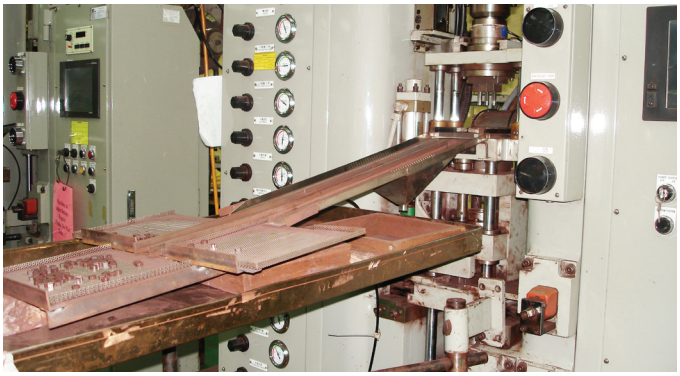
2014 Electromagnetic Compatibility (EMC) Test Chamber in the US

Dr. Khoo Boo Kean: The first criteria that I'm looking for when hiring a technologist into the manufacturing industry role is basically, willing to roll your sleeves up and get your hands dirty. So, this is one of the key points that a technologist should have. As a technologist or manufacturing engineer, he or she, needs to operate the equipment andperform minor PM on the equipment itself, and you need to troubleshoot the process. So, occasionally when we have production interruption, or when we have lying down the individual, the technologist or the engineer of the process of the product, he or she needs to fully equipped with the PPE and all the gadgets and tools and go into the process to investigate the process or the product failures.

Kushairy Kadir: So you mean that, as a technologist, especially those graduate technologist, it is important for them to have a hands-on, on the machine and the equipment, etc., as one of the criteria that you're looking in, and that's also a criteria to work in the industries. Let's share your day-to-day responsibilities as a Senior Manager in your company.

Dr. Khoo Boo Kean: In the day-to-day responsibilities, as a senior manager, firstly, it will be more on dollar and cents. You need to ensure that the profit and loss of the company are sustainable. So, we need to control the OT, we need to manage the attendance, and we need to manage the discipline of the organisation. This is number one for those non-technical perspectives. My role basically is to approve the customer's change request from a technical perspective. In the manufacturing industry, we have a lot of ad-hoc changes, and a lot of our customers request change over time, whether from the local customers or non local. So, there'll be a lot of changes that we need to manage, so that the material or the parts that will be used are up to date and able to deliver the correct specification. For example, today I have received a change of one of the components for our resistor R2 to another R3 with different resistors, or we have received the change of the mechanical part dimension from three inches to four inches long. So, we have to ensure that the manufacturability is manufacturable according to the changes and the changes able to cut off under FIFO concept so that we won't be sending parts or products to our customer end on different sizes, different batches. We have to make sure that the changes itself are manufactured in the industry where, may involve a lot of people. If the changes are within one or two people, it probably will be easier for us to maintain, sustain, or manage, but if it involves multiple processes or multiple departments, then the process control needs to be maintained and managed accordingly. I also serve as a regulatory officer to liaise with the authority. Basically, this will be the main role, those are some small roles like managing the subordinate, conducting design change, modification and we have some process changes or process improvement, continuous improvement project and where I will need to participate as part of the quality mindset role.

Kushairy Kadir: Talking about projects. Does your company get involved in a lot of research? Do they think that research is important? And do you think that research is an important element for Malaysian



Assembly Punching Equipment

industries, first to survive and the next is to move technological value change.

Dr. Khoo Boo Kean: Yes, definitely. I agree that research is very important to the manufacturing industries. The industry's research method is a little bit different from how academic research because the research that normally is conducted in the industry itself normally will be on a trial and error approach. We have to think out of the box to simulate the root cause, you know, what will be better in terms of the design change and the impact of these changes. The significant difference between the industry research and academic research based on my experience, because I involve in both parts which will be on the literature review. On academic, probably the research is prior to the literature review of what are the gaps in the past, then they will conduct research, but for our industry is more on Profit and Loss driven. It's more profit and loss driven in which when there is a problem on how you lost, meaning to say how you lost means high failure rate. So, in the event that we have a high failure rate that it will trigger the internal team to conduct research to conduct the Taguchi Method optimisation, to conduct the validation of the process, to fine-tune and to improve on the SEC important process. Along the way of the research, it will trigger the change of material or the reduction of the raw material used. So, indirectly internal research will, number one, improve the yield, meaning improve the new loss, then probably the objective. Number two of internal research, we can reduce the number of people or human to handle the process instead of 10 people operating a process probably after the research or other innovation, the number of overhead, it will reduce from 10 person to 5 person and when it comes to the research of using the robotic arm, which is the IR 4.0 approach, then the involvement of the worker in general or the cycle time will be able to reduce.

Kushairy Kadir: Can you share with us why you choose to apply for the professional title, Ts. How does having Ts. work in your career?

Dr. Khoo Boo Kean: I chose the Professional Technologist title personally because I joined MBOT through fast track. I am considered as one of the pioneer professional technologists certified at that point of time, and until now, I think the Ts. is another platform for those technologist to be recognized, appreciated and valued in our own country. I think the recognition itself does not stop, what I mean is one of the beauty of the MBOT is the recognition does not stop at the technologist level. But, it does recognise, appreciate and value the Tc. grade, the technician garde. I think it's a good platform where MBOT is able to slowly recognise all the Ts. and Tc. I feel that it's another point for all the Ts. and Tc. to be proud of, to be cherished of, and we can gain a reputable recognition, to move forward in the future.

Kushairy Kadir: Okay, thank you. So, I know that you have been an active professional assessment assessor for MBOT. Tell us about your experience as the assessor and do you have any tips and tricks for potential or future professional?

Dr. Khoo Boo Kean: I've been doing assessment and also portfolio assessment with MBOT, and I think the experience is wonderful. It's nice because, during the assessment, we can exchange knowledge. At the same time, we can evaluate each other, and we can learn from each other. One of the experiences that I would like to share is based on the portfolio assessment. So, on the portfolio assessment, normally, we'll come to the portfolio stage when the first interview does not successfully go well meaning to say the portfolio normally, we need another third-party assessor to evaluate. After going through all the additional information or the portfolio submitted, resubmitted by the candidate, I found that the criteria to meet the Ts., to me is sufficient, and based on the involvement in the community, publication and industry research, I personally think that the candidate is qualified. So, I decided to take my own initiative to call him up and perform an interview to assess him face to face again, and to understand, and to re-evaluate again based on his performance, and his contribution towards the field that he is applying. Then I made a recommendation to the board based on my portfolio report. Fortunately, I got to know that he passed the assessment with Ts. This is one of the areas I think, as an assessor, I believe, is not only to assess, but also we might help each other to grow along the way.

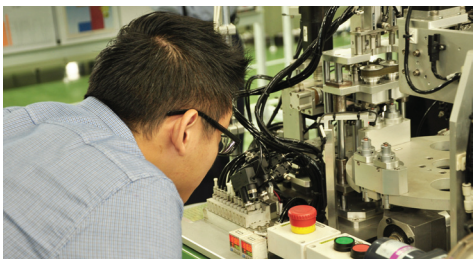
Kushairy Kadir: What are your tips for potential technologists to apply this professional title?

Dr. Khoo Boo Kean: My tips to all potential Ts. or Tc. is once you graduate or once you finish the degree or diploma, please apply through MBOT, and it's good to apply as a graduate engineer, and he or she has three years, three or four years to prepare themselves and to get Ts. certified. During these three or four years, don't be afraid to get in touch or don't be afraid to get involved in the field or technical field because especially those lady graduates or lady technologists. I know one lady technologists, she was very afraid of holding a screwdriver. When you ask her to unscrew a nut or bolt, she'll feel it's very difficult. There is another way to encourage her, she mustn't be afraid of the equipment. If you know the safety rules of equipment, operate the equipment, even the handheld equipment, within the safety capacity, we can conquer the equipment, and we can manage the equipment to our desired goal. My tip is to all the technologists, get hands-on in operating equipment or get involved or the troubleshooting process. Don't be afraid of the equipment. Roll your sleeves, get your hands dirty; once you're used to it, once you're able to do it, then it will drive towards our good intention of achieving company goal and contribute to the organisation.

Kushairy Kadir: Thank you, Dr. Khoo. Before we end, I have one last question. I think this is for the young ones. Do you have any advice for the young generation who aspired to pursue their studies or dream job in the manufacturing field?

Dr. Khoo Boo Kean: Yes, my advice is that the manufacturing industry field is changing. In the 90s, we are more people-centric, but now it's moving towards the technology-centric, which is more on the Industrial Revolution 4.0. So, the Industrial Revolution 4.0 is talking about automation, talking about managing or moving the robotic arms to perform our jobs and developing software or developing the applications that you can interconnect with each other. The IR 4.0 is coming, whether we like it or not, it definitely will be coming and in other factor socio-economic factors where the salary of a Malaysian, my regard to say it is getting higher and higher because of the minimum wages. You know, currently fixed at 1,200, probably will be 1,500. Indirectly the entire skill workforce will dramatically increase, and you will incur a lot of courses, a lot of additional courses of the manufacturing sectors. As one of the management roles is not only on the senior management but also the junior management, cost out and reduce spending is almost one of the top priorities so that the industry or the company itself is sustainable. There'll be a lot of opportunities to those in technologist, or that evolve in the IR 4.0, which is setting up the robotics, able to design the automation, implement the Poka-Yoke, the error-proofing concept, and develop apps that can autonomous some of the on-off processes, it will be the key way forward.

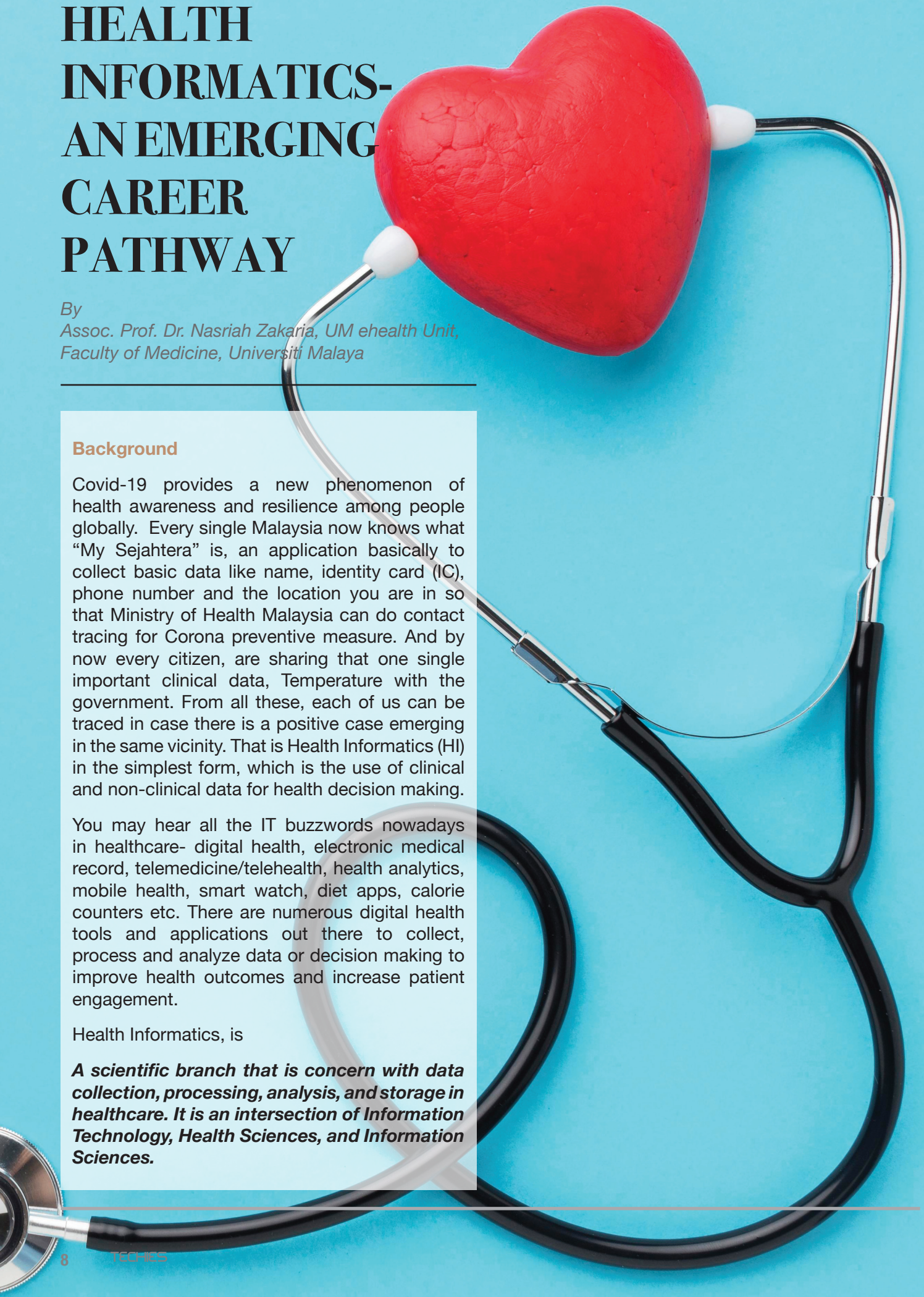
Kushairy Kadir: Thank you, I think we reached the end of our interview. Thank you for the input, thank you for sharing your experience.



Trouble Shooting Defect Camera System

HEALTH INFORMATICS- AN EMERGING CAREER PATHWAY

By
Assoc. Prof. Dr. Nasriah Zakaria, UM ehealth Unit, Faculty of Medicine, Universiti Malaya



Background

Covid-19 provides a new phenomenon of health awareness and resilience among people globally. Every single Malaysia now knows what "My Sejahtera" is, an application basically to collect basic data like name, identity card (IC), phone number and the location you are in so that Ministry of Health Malaysia can do contact tracing for Corona preventive measure. And by now every citizen, are sharing that one single important clinical data, Temperature with the government. From all these, each of us can be traced in case there is a positive case emerging in the same vicinity. That is Health Informatics (HI) in the simplest form, which is the use of clinical and non-clinical data for health decision making.

You may hear all the IT buzzwords nowadays in healthcare- digital health, electronic medical record, telemedicine/telehealth, health analytics, mobile health, smart watch, diet apps, calorie counters etc. There are numerous digital health tools and applications out there to collect, process and analyze data or decision making to improve health outcomes and increase patient engagement.

Health Informatics, is

A scientific branch that is concern with data collection, processing, analysis, and storage in healthcare. It is an intersection of Information Technology, Health Sciences, and Information Sciences.

What is important in this field is the information flow that moves across the healthcare system. From the point physicians provide care for patients, the information flows into documentation that then move to regional and national registries for research, for creating standards for prevention and treatment then develop protocols, guidelines, and educational materials. That processed information will form the knowledge base for decision support and order-entry systems.

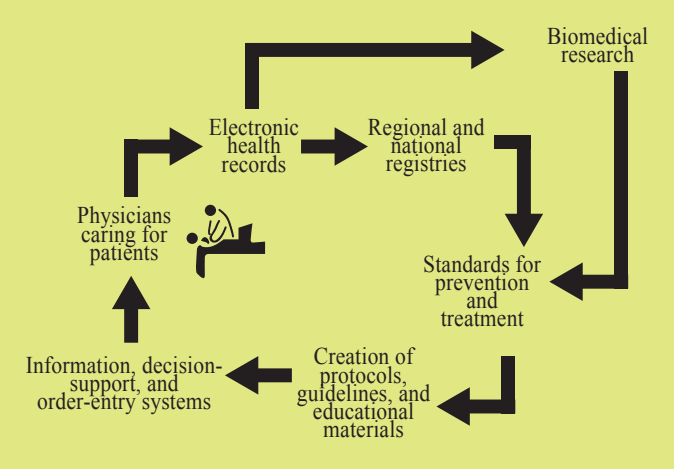


Figure 1: Information flow in healthcare system (Shortliffe, 2003)

Examples of Health Informatics

Electronic Health Record

Patients nowadays are used to sit in a doctor's clinic while the doctor enters their information. Electronic health record is a system that enable healthcare providers to enter clinical and non-clinical data, create orders for laboratory tests, imaging, and medications, retrieve records, view images, refer to guidelines and generate reports. Electronic Health can help reduce errors eliminate duplications and illegible handwritings. E-HR should contain demographics, progress notes, problems, medications, vital signs, past medical history, immunizations, laboratory data and radiology reports. The system should also have intelligence to detect drug-drug interaction, send reminders and analyze data so that doctors can make decisions.

Telehealth

Telehealth uses telecommunication technology to communication technology to interact with people and information. In telehealth, patient can talk to doctor without visiting the doctor's office and use telephone, or video conferencing. Patient can also send and receive messages from doctor or nurses via chat service, email, or file exchange program. There is also patient monitoring service where doctor can monitor patient at home using wearable devices. In some hospitals, they are using robotics to perform surgery with the help of experts who are in different parts of the world.

Health Analytics

In Health Informatics, the data science aspect is also known as Health Analytics. From the enormous data set collected by the Electronic Health Record, the big data can be analyzed using different algorithms to allow healthcare providers to make decisions. For example, IBM company came out with a health analytics tool to help hospitals process data to detect billing mistakes. There is also another solution where intelligence is used to look at patient data combined with recent evidence from the literature for doctors to make decisions. In analytics, different algorithms can be applied to the existing data for prediction purposes.

Health Informatics Area

There are five domain areas needed to become a health informatics professional which include- Programming, Healthcare Data management and Analytics, Problem solving, Interpersonal and Communication skills.

This profession is wide open for both clinicians and non-clinicians. For clinicians, the knowledge and skills in Health Informatics can help them apply their clinical and health background to ease the process of developing and maintaining any health information systems.

Along the line, a technologist who will create computing technology in healthcare, must be able to understand health sciences and health systems to build health information system. Fundamentally, they need to understand the how healthcare work- clinical workflow and the regulations that govern healthcare such as the Data Protection Act to ensure confidentiality of data. Health Informatics professionals must possess competencies in various technical components of the systems- hardware, software and the communication systems.

Competencies in Health Informatics

Many professional bodies like American Medical Informatics association (AMIA) and Certified Health Informatician Australasia (CHIA) have come out with competency framework to help recognize and certify HI professionals. For an example, CHIA has listed the competencies areas to represent these domains health science, Information science Information Technology, management science, and human and social context. In each domain, a list of competencies and level of learning are listed in order to cover the important aspects in Health Informatics. This multidisciplinary area helps to define this unique career pathway.

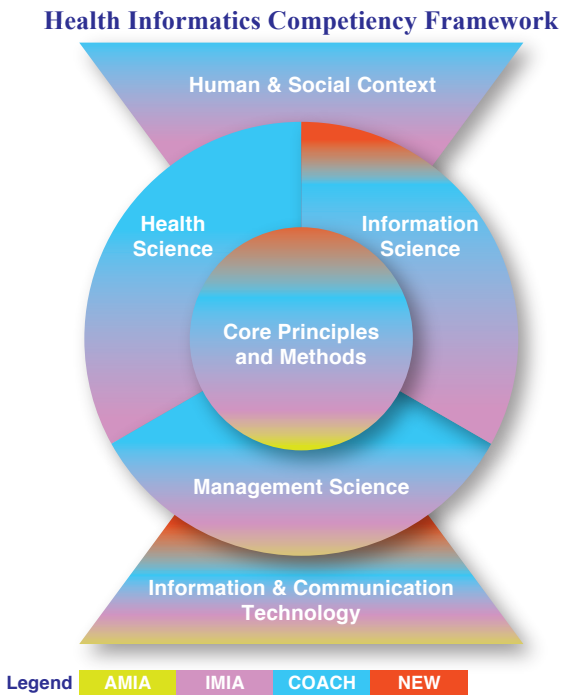


Figure 2: Health Informatics competency framework

Education and Qualifications

Qualification for Health Informatics can be obtained at various levels from certificate, diploma, bachelor, masters, and PhD. Each certificate is usually offered by universities, government agencies and professional bodies. For an example there are professional certificates provided by HIMSS and AMIA.

For Bachelor's degree, students will take courses such as Introduction to Health Informatics, Anatomy and Physiology, Electronic Health Records, Data Analytics, Database, Healthcare Coding and Classification, Computer Science, Computer Networks and System, Ethics, Finance and Business Administration. Most undergraduate programs in Health Informatics are offered under College of Public Health, College of Applied Science, College of Computer Science and College of Business. Unfortunately, in Malaysia there is no university that offer such degree.

At Masters level, students will be focusing on courses such as Electronic Medical Records, Database Management, Decision Support systems, Interoperability, Project Management and Research Methods. In most programs, students will need to complete one project either developing Information Systems in Healthcare or evaluating the use of HIS.

One of the most well-known, professional certificates in Health Informatics is called 10x10 offered by AMIA. It was launched in 2007 with the aim to train 10,000 health informaticians by the year of 2010. The course remains as the most active professional course in the world. 10x10 provide certified training in health informatics by delivering lecture and joining group discussion using by distance learning, supplemented with group discussion. The course is tailored to individuals working in the healthcare and healthcare-related industries.

In 10x10, participants need to complete a project whereby they need to identify a problem in the workplace and propose a technological solution. In the US, 10x10 certificate is an added value qualification for hiring by the companies.

Opportunities in Industry

There are many job functions that HI professionals can venture at hospitals, community health center, multinational companies that develop health information systems such as GE, Phillips, Cerner, and Allscripts, research institutes and universities. Among the job titles for Health Informatics graduates are Compliance officer, Privacy Officer, Chief Information Officer, Software Application Analyst, Revenue Cycle Manager, Project Manager, Clinical Data Manager and Medical Coder.

In university, graduates can teach and conduct research in Health Informatics or build and maintain systems for research projects and innovations.

Resources

There are many valuable resources to understand this field. Two active organizations like International Medical Informatics Association and AMIA offer resources, conferences, special interest groups (SIGs), educational opportunities and links to the industry. HIMSS also conduct exhibitions and conferences to share the state-of-the-art Health Informatics technology in the global market. In Malaysia, the Ministry of Health with universities along with hospitals often participate in conferences and seminars related to Health Information Technology.

Way Forward

At UM ehealth unit at Faculty of Medicine, one of the strategic goals is to produce International Health Informatics technologists and leaders

whereby we will be developing educational and training programs at certificate, diploma and postgraduate levels to train Malaysians in this area. There will be numerous of certificate courses will be offered so that we can produce technologists who can work in the Health Informatics area. We are also developing Masters program so that professionals in Health Informatics can be leaders and make transformation in the healthcare settings.

Conclusion

There are many opportunities that are available in this career pathway as healthcare is a complex domain and technology is still evolving. Data that are generated in healthcare setting can be analyzed and utilized to improve healthcare services performance.

IMPACT OF COVID-19 ON JOB OPPORTUNITIES AND GRADUATE JOB SEEKERS IN THE CONSTRUCTION AND CONSTRUCTION MANAGEMENT SECTORS

By
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According to the Ministry of Higher Education Graduate Tracer Study report, public and private universities in Malaysia produce approximately 51,000 graduates annually. Unfortunately, nearly 60% of them are unsuccessful in securing a job within one year after graduation (D'Silva, 2020).

In 2016, the government announced Mybrain15, which was a critical agenda programme developed under the National Higher Education Strategic Plan. The scheme aimed to increase the number of PhD holders from 23,000 in 2016 to 60,000 by 2023. But with rising unemployment among graduates, education planners had been rightfully concerned. The data seemed to indicate that having a university degree no longer guaranteed the graduate with a job.

The total number of graduates in Malaysia was 4.96 million in 2018, which was 7.6% higher than the previous year. The total graduate labour force increased 8.0% from 3.84 million in 2017 to 4.15 million in 2018.

Figure 1 displays the statistics of graduate employment for 2018 and 2019. According to the Department of Statistics Malaysia, an 'employed' person is one who works at least one hour per week for salary, while an 'unemployed' person is someone who is actively and inactively unemployed. Meanwhile, 'outside of the labour force' is described as those who do not work for salary, namely, housewives, students, retirees, disabled persons and people who do not seek for employment.

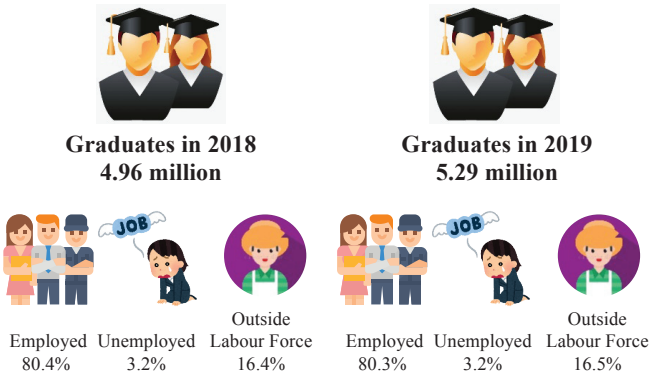

Figure 1. Graduates statistics in 2018 and 2019 (Department of Statistics Malaysia, 2019 & Department of Statistics Malaysia, 2020)

Even though the number of graduates has increased, the number of unemployed graduates is also increasing. Many experts are of the opinion that there is a gap between the knowledge given in higher education and the skills required by employers. The majority of employers require their staff members to do more than just working on mechanical tasks that have textbook solutions. Rather, they are expected to perform tasks that are beyond their field of expertise. Employers are lamenting that the graduates they hire lack communication, problem-solving, and multi-tasking skills that are much needed in an environment where the employee should be useful beyond a limited, confined scope of work.

An official source recently quoted that unemployment rate among youths between the age group of 20 to 24 has increased to 25%. In other words, there has been an increase of approximately 13.8% in the beginning of 2020. Before the Covid-19 pandemic, a typical fresh graduate would normally take six months to secure a job, but this is no longer true. Graduates now face multiple challenges including high competition, extra skills requirement, language barriers and, to some extent, nepotism. Job seekers may take up to 12 months to be called for an interview after sending hundreds of online job applications to job vacancy-related websites.

It is expected that 75, 000 graduate job seekers will be added to the existing pool of unemployed graduates in these post -Covid19 days. This is because many businesses have been badly affected, which has led to merges and shut downs of companies.

Prior to the pandemic, the number of fresh graduates was higher than the number of job vacancies, especially the executive level vacancies. Figure 2 shows that there were only 30,000 vacancies of executive jobs from a total of 600,000 vacancies in the job market. This meant fresh graduates, approximately 200,000 of them, needed to compete with each other to fill executive job positions. It has been found that the majority of the fresh graduates were reluctant to apply for the non-executive positions because the positions were seen to be of low-grade, less salary and having non-conducive working environment.

Figure 2. Job versus graduates in Malaysia (Panirselvam, 2021)

The year 2020 was particularly difficult, for, many businesses had to stop operation. The surviving ones minimised their number of employees in order to cut operational costs. Many employees were forced to accept pay cuts because they wished to remain in their current employment.

The impact was higher in certain sectors like aviation, manufacturing, hospitality, tourism and construction. In fact, nearly 40% construction workers were retrenched due to sites shut down. Many small-scale construction companies either lost their businesses or were running in lost. As construction projects slowed down, workers were not paid on time. In response to the need to reduce contact, working from home and a myriad of standard operating procedures (SOPs) were introduced.

The Department of Statistics (2021a) reported of a survey conducted between April to May 2020 to identify the effects of Covid-19 on the economy and business firms. A total of 4,094 companies participated. As shown in Figure 3, more than 16% of employees were forced to take unpaid leave, while about 4% lost their jobs.

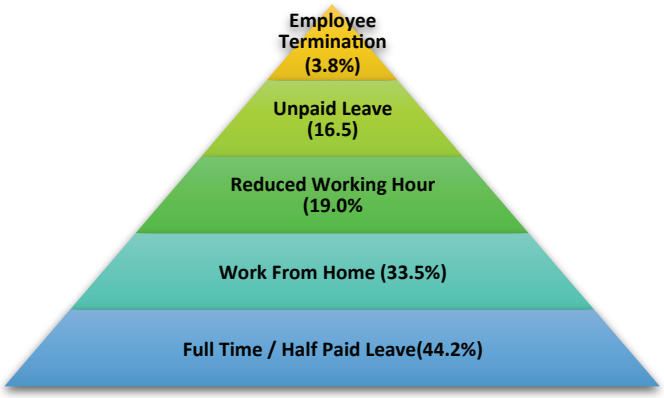

Figure 3. Impact of employee (Department of Statistics Malaysia, 2021a)

Survey period 10th April - 1st May 2020 (MCO Phase 2 to Phase 4)

Another survey was conducted (2021b) in the period of 23rd -31st March 2020 to identify the effects of Covid-19 on the economy and individuals. It was found that the food and beverage service sector was highest in terms of the percentage of employees losing their jobs (35.4%) while the construction industry was lowest with only 11.8% employees losing their jobs.

In terms of numbers, this means, close to 150,000 jobs have been lost. Unless there is a massive investment in the construction sector by both private and public companies, new job entrants to the construction market will have to wait for some time to find suitable employment for themselves.

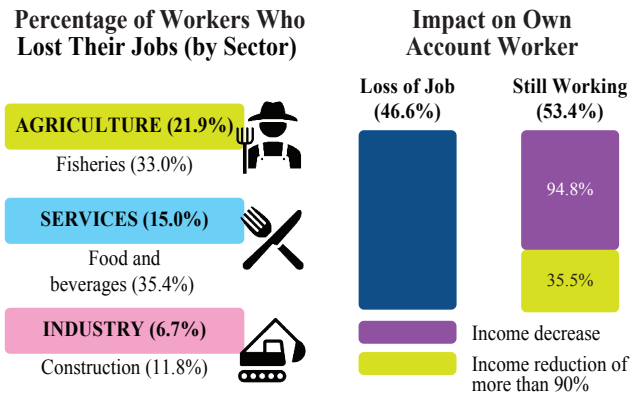

Figure 4. Employment (Department of Statistics Malaysia, 2021b)
Survey period from 23rd to 31st March 2020
Have not been solved

Although the government-imposed lockdown is necessary to break the chain of Covid-19, the consequence is economic knockdown. Jobs, income, and livelihood affected a big portion of society, particularly among members of the B40 community. Even with stimulant packages announced by the government, problems faced by the majority of the people have not been solved.

According to Bank Negara, Malaysia's Gross Domestic Product (GDP) was expected to decline from 4.3% in 2019 to be between -2.0% to 0.5% in 2020 (International Labour Organization, 2021). As seen in Table 1, the percentage of construction share in the first quartile of 2019 was 0.4% but this percentage dropped to -7.9% in the first quartile of 2020. Many construction projects either stopped, slowed down, or delayed, in line with the use of standard operating procedures (SOPs) implemented during the lockdown period.

	2019			2020	
	Share %	1Q	4Q	Share %	1Q
Services	57.7	6.4	6.2	6.1	3.1
Manufacturing	22.3	4.1	3.0	3.8	1.5
Mining	7.1	-1.5	-3.4	-2.0	-2.0
Agriculture	7.1	5.8	-5.7	2.0	-8.7
Construction	**4.7**	**0.4**	**1.0**	**0.1**	**-7.9**
Real GDP	100.0	4.5	3.6	4.3	0.7

Table 1. Annual growth for the year 2019 and 2020 (International Labour Organisation, 2021)

According to a survey by JobStreet, during Covid-19, administration and human resource positions topped the rest in terms of demand, while insurance and public/civil service were the lowest. Figure 5 shows that the construction industry will be at the middle rank in the job vacancies pyramid.

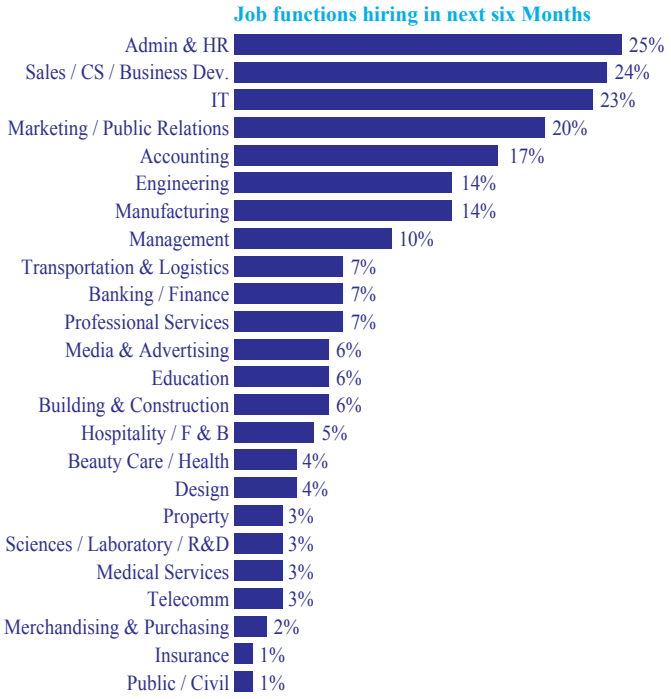

Figure 5. Roles in demand (JobStreet, 2020)

In short, it is obvious that a good strategy must be implemented so that unemployment can be curbed, and graduates can find jobs in order to contribute to the GDP of the country.

Along the same lines, graduates need to also think about creating new jobs instead of just waiting to be hired. Entrepreneurship pursuits using new approaches such as Grab, GrabFood, and FoodPanda are seen to be very successful.

Indeed, the use of cloud computing and digital platform show how Industrial Revolution 4.0 (IR4.0) has shaped the economy. Graduates must enhance their technical skills by enrolling in numerous free trainings courses under the Human Resources Development Fund (HRDF). Extra technical skills will no doubt make the graduates to be more appealing to potential employers.

WORKPLACE INNOVATION: PERSPECTIVES ON OCCUPATIONAL SAFETY, HEALTH AND WELLBEING

By
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> **The workplace innovation (WPI) approach is to help employers improve productivity, creates better products, and improves the health and well-being of their workforces**

Introduction

Workplace Innovation (WPI) nowadays is important to solve emerging new challenges in our global economy relating to psychosocial wellbeing at work (Peter R.Z. Oeij et. al, 2017). The nature of work has changed significantly during the course of human history. However, the pace of this change has accelerated in recent years, largely due to digital technologies. New technologies are already affecting job definitions and work patterns. They are transforming the relationship between employers and employees, the organization of work, and the types of business models used.

Many of today's jobs and skill profiles did not exist a decade ago, while routine tasks are often vulnerable to automation or system. Competitiveness, flexibility, Faster time to market and continuous to market, continuous customized product innovation are characteristics of nowadays' organization challenges. There is no secret recipe but sharing experiences and learning from each other will help to increase agility and to move faster.

The need for workplace innovation is obvious and enormous, but until now, it has mainly been excluded from the public and become technology-driven debate. What is the meaning of WPI? Generally, the workplace innovation approach is to help employers improve productivity, creates better products, and improves the health and well-being of their workforces. It will become much better if the concept research to practice. In the meantime, The National Institute for Occupational Safety and Health (NIOSH), Centers for Disease Control and Prevention (CDC), r2p is an approach focused on the use, adoption, and adaptation of NIOSH knowledge, interventions, and technologies within the workplace. r2p can be applied to study the effectiveness of the WPI implemented at workplace.

Occupational safety and health (OSH) policies and performance cut through elements of workplace innovation, which makes OSH an integral element of workplace innovation, not something that can be easily distinguished conceptually in a model. There may be indirect links between workplace innovation and OSH, which could emerge in the research findings as the implementation of OSH policies and measures at organizational level and/ or as improvement of the OSH of employees (for example, low accident rates and absenteeism, OSH culture, good quality of working life).

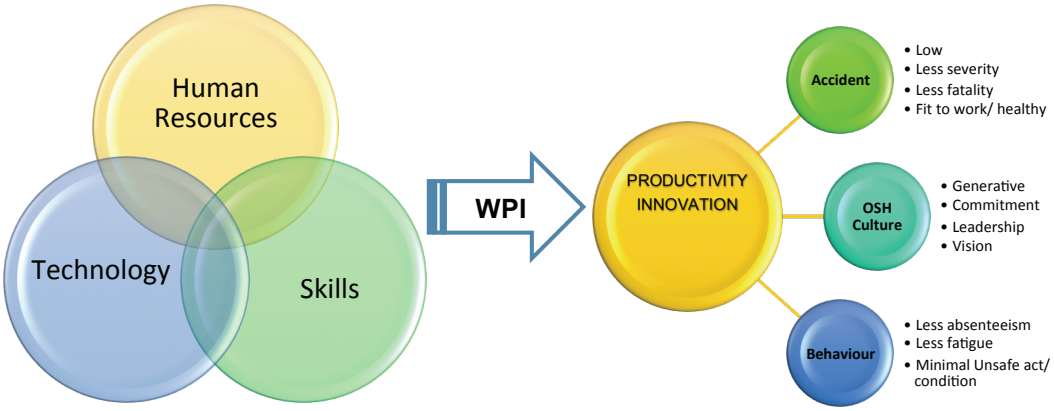

Figure 1: Workplace innovations elements and benefit to OSH issues (Source: Adapted from WPI Europe)

Workplace Innovation (WPI)

What is WPI? It can be defined as an evidence-based organizational or workplace practices and cultures which enable employees at all levels to use and develop their skills, knowledge, experience, competences and creativity to the fullest possible extent, simultaneously enhancing business performance, engagement and well-being (Workplace Innovation Europe, 2020). It builds organizations in which people come to work to do two things:

1) To undertake their functional tasks in the most effective way possible, and
2) To improve and innovate the business and organization.

Such workplaces are likely to include empowering i) job design; ii) self-organized team working, iii) open and fluid organizational structures, iv) delegated decision-making and simplified administrative procedures, v) a coaching style of line management, v) regular opportunities for reflection, vi) learning and improvement, vii) high involvement innovation practices, viii) the encouragement of entrepreneurial behavior at all levels, and employee representation in strategic decision-making. WPI can lead to significant and sustainable improvements in organizational performance (OP), employee engagement and wellbeing.

WPI is gaining a higher profile as certain group such as in European Union (EU) made it a policy embedded in a broader economic and social profile policy to support organizational change in companies. Today's digitalization and automation offer opportunities for a more integrated EU policy. In Germany, Industry 4.0 policy to stimulate innovation, notably in smart and advanced manufacturing was introduced. The workplace innovation (Work 4.0) should be given a more central place in the process of digitalization.

Vision Zero

In the industry throughout the world, there is a growing attention to Vision Zero (VZ), the ambition and commitment to create and ensure safe and healthy workplace and prevent all serious accidents and occupational diseases.

VZ in recent years has become a major concern for policy makers around the globe for promoting OSH and wellbeing. Simply doing the same things better than before, is not a successful strategy to achieve zero (which means no accident and occupational disease). Both technical and social innovations are needed as well as out-of-the-box thinking for solving existing problems. Zwetsloot et al. (2017) suggest six innovative perspectives of VZ shown in Figure 2 as below:

Figure 2: Six innovative perspectives of Vision Zero (VZ) (Source: Adapted from VZ)

WPI implementation

In theory, WPI promises to improve organizational performance, quality of working life and, consequently, wellbeing at work simultaneously. There is an emphasis on improving wellbeing via individual coping behavior as well as appreciating the most valuable asset in the organization, people. There were few projects conducted intensively on WPI in European countries like UK, Denmark and Germany. The research found out that there was a significant relationship between WPI and Work & Organizational Psychology (WOP) as well as job flexibility, quality of working life (QWL) and OP. The successful WPI implementation resulted from an interplay between management-driven business goals and employee-driven quality of work goals. One of key success factor is constructive cooperation between management, employees and employee representatives. The whole-system approach focusing on the interplay between strategy, structure, and culture is most likely to lead to successful WPI implementation.

There are five steps to develop WPI: 1) Why WPI, 2) A systemic approach, 3) Starting the change, 4) Guide to the elements, and 5) The process of change. WPI not only aims at fostering innovation capacities, it also allows business to remain innovative and adapt to change more quickly and smoothly. One of the WPI example is Innovation Resilience Behavior tool (IRB-tool), aimed at improving teamwork as an example of a workplace innovation intervention (Figure 2). The IRB-tool is mainly a diagnostic tool to assess the present situation regarding three aspects:

1) the presence of defensiveness, and thus insight into possible causes for risk-avoidance;
2) the presence of mindful infrastructure, that is, characteristics that facilitate IRB; and
3) the presence of IRB, that is, the behaviors and competences to keep an innovation team on track and to get it back on track.

The primary advantage of applying the IRB-tool is the opportunity to boost entrepreneurship, intrapreneurship and innovation within the organization. The tool and its theoretical underpinnings reflect the vision that innovation requires employee participation. Another advantage is that the application of the tool is not necessarily restricted to innovation teams. The tool basically deals with improving problem-solving behavior, and this could be relevant to other types of teams, to project management in general and to any project-based organization.

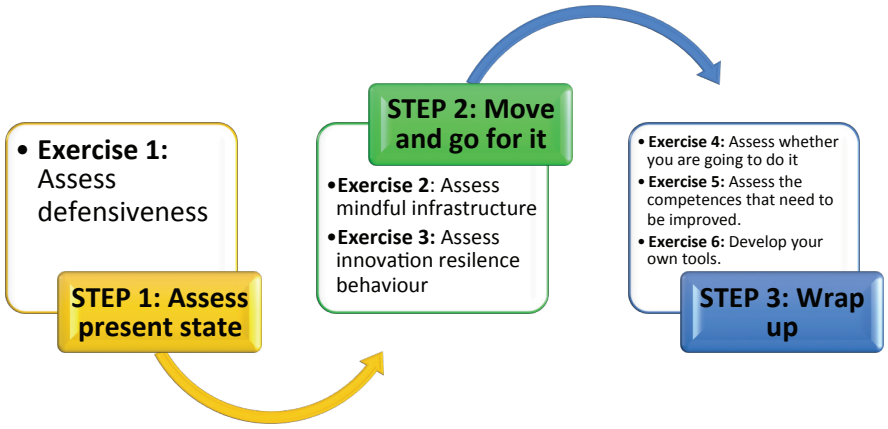

Figure 3: Framework of IRB-tool: Step and exercise (Source: WPI Europe)

Conclusion

WPI contributes to our understanding of simultaneously improving wellbeing at work and organizational performance. It also discusses the current state of the art on European and national policies on workplace innovation, novel theoretical approaches to WPI, as well as international WPI case studies, and practical tools for the implementation of WPI. It can be concluded that:

1) Successful WPI implementation is a result from an interplay between management-driven business goals and employee-driven quality of work goals;
2) A consistent approach to shared leadership can stimulate employee empowerment and bottom-up effective communication, which, in turn, lead to successful WPI interventions;
3) Lean management methods can only be a successful tool for WPI if employees are actively involved in the process;
4) WPI should really include the aspect of QWL otherwise low employee engagement will be the consequence; and
5) Institutional alliances are relevant for the sustainability of WPI activities within companies.

WPI doesn't just change organizations. It changes the people who work in them, not least the senior team members and managers. It is strongly associated with trust, accountability, curiosity, creativity, coaching behaviors and emotional intelligence, all of which grow with the workplace innovation journey.

> **WPI doesn't just change organizations.**
>
> **It changes the people who work in them!**

TEKNOLOGI TERMAJU BAGI KESELAMATAN KENDERAAN PENUMPANG: *(ADVANCED PASSENGER CAR SAFETY TECHNOLOGY)* - SATU SUMBANGAN ASEAN NCAP KEPADA MALAYSIA

Oleh
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01 Pengenalan

Sejak tahun 2011, Program Penilaian Kereta Baharu bagi Negara-Negara Asia Tenggara (ASEAN NCAP) telah diberi mandat untuk menjalankan ujian perlanggaran ke atas kereta baharu di pasaran Malaysia, serta di seluruh rantau Asia Tenggara. Dengan jumlah populasi seramai 630 juta, sepuluh negara di rantau ini telah menyaksikan angka jualan kenderaan penumpang melonjak kepada hampir 3 juta unit. Hari ini, kesemua kenderaan penumpang yang memasuki pasaran Malaysia serta rantau ASEAN telahpun menjalani ujian perlanggaran yang dikendalikan ASEAN NCAP. Ciri keselamatan kenderaan-kenderaan ini, terutama dari sudut teknologi keselamatan, telah dipertingkat secara signifikan. Selain aspek keselamatan penumpang kenderaan, ASEAN NCAP turut menitikberatkan keselamatan para pengguna jalan raya yang lebih berisiko tinggi. Golongan rentan *(vulnerable road users)* ini terdiri daripada pejalan kaki, penunggang basikal serta penunggang motosikal.

Pada November 2018, ASEAN NCAP telah mengumumkan roadmap terbaharunya yang menumpu kepada keselamatan pengguna motosikal di rantau Asia Tenggara. Usaha ASEAN NCAP mendapat pengiktirafan kerajaan Malaysia, di mana bermula 2020, semua penjual kenderaan penumpang perlu memaparkan label penarafan bintang yang dikeluarkan ASEAN NCAP pada cermin hadapan dan tingkap sisi kenderaan yang dipamer di pusat-pusat jualan seluruh Malaysia. Label penarafan ini membolehkan para pembeli kenderaan memilih model yang menawarkan tahap keselamatan terbaik, dengan dilengkapi teknologi keselamatan yang mampu mengurangkan risiko kecederaan bahkan kematian sekiranya berlaku kemalangan jalan raya.

Fig 1: Ujian Perlanggaran ODB 64 bagi Proton X50

Sebelum kemunculan ASEAN NCAP, teknologi keselamatan bagi kenderaan penumpang di Malaysia kurang diberi penekanan. Sebagai contoh, pemasangan beg udara tidak dianggap mandatori. Nisbah kenderaan yang dipasang beg udara berbanding kenderaan yang tidak dipasang beg udara adalah 20:80. Oleh itu, penubuhan ASEAN NCAP dianggap sebagai langkah tepat ke arah menghasilkan anjakan paradigma dalam ekosistem permotoran setempat (Zulhaidi et al., 2013). Penulisan ini meninjau keberhasilan ASEAN NCAP, termasuk kejayaannya dalam meningkatkan teknologi keselamatan termaju *(advanced safety technology)* bagi kenderaan penumpang di Malaysia.

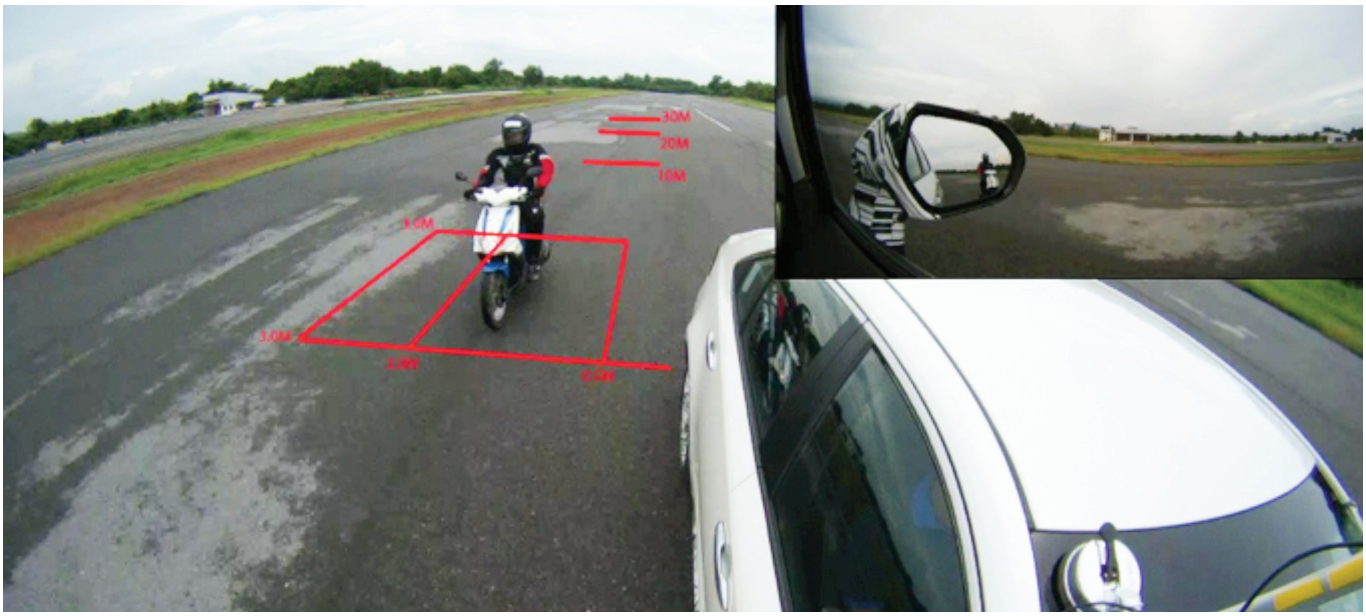

Fig 2: Blind Spot System di dalam Toyota Altis sedang diuji keberkesanannya.

02 Sejarah ASEAN NCAP

Program Penilaian Kereta Baharu bagi Negara-Negara Asia Tenggara atau ASEAN NCAP ditubuhkan pada Disember 2011 melalui jalinan kerjasama antara Global NCAP yang berpangkalan di United Kingdom dan MIROS di Malaysia. Selari dengan objektif program-program penilaian kereta baharu di seluruh dunia termasuk di Amerika Syarikat, Amerika Latin, Eropah dan Australia/New Zealand, matlamat utama ASEAN NCAP ialah bagi meningkatkan standard keselamatan kenderaan bermotor bagi pasaran Malaysia dan Asia Tenggara, mencipta pasaran bagi kenderaan lebih selamat serta memupuk kesedaran pengguna tentang tahap keselamatan kenderaan khususnya kenderaan penumpang (GNCAP, 2011).

ASEAN NCAP secara konsisten menekankan penggunaan teknologi bantuan keselamatan termaju yang mampu menghindar perlanggaran di jalan raya. Salah satu teknologi yang dapat mengelakkan perlanggaran kenderaan tunggal, serta kenderaan terbabas, ialah kawalan kestabilan elektronik (ESC). MIROS bersama-sama ASEAN NCAP telah berusaha mempercepatkan pemasangan ESC pada kebanyakan kenderaan penumpang yang dipasarkan di Malaysia. Susulan cadangan yang dikemukakan

MIROS, Kementerian Pengangkutan Malaysia telah mengumumkan bahawa semua model kenderaan penumpang baharu yang dipasarkan di Malaysia perlu dilengkapi sistem keselamatan tersebut bermula Jun 2018.

Seterusnya, pada November 2018, *Roadmap ASEAN NCAP 2021-2025* telah diumumkan. Program ini menyasarkan perlindungan lebih baik untuk penunggang dan pembonceng motosikal, di mana 70 peratus daripada kadar kematian di jalan raya Asia Tenggara melibatkan kelompok tersebut. Untuk mencapai matlamat yang ditetapkan, kebanyakan kereta yang dipasarkan di Malaysia perlu dilengkapi teknologi titik buta. Selain itu, *Roadmap 2021-2025* turut memberi lebih penekanan kepada tonggak teknologi bantuan keselamatan atau *safety assist technologies pillar.*

03. Peningkatan Teknologi Keselamatan Kenderaan Penumpang di Malaysia

Pada 2014, dalam usaha memastikan standard keselamatan asas ASEAN NCAP mampu diraih kebanyakan kereta baharu yang dipasarkan, termasuk kereta yang berharga rendah konsep, konsep Keselamatan Mampu Milik (Affordable Safety) bagi kenderaan penumpang telah diformulasi. Dua model kereta buatan Malaysia telah meraih kelebihan daripada konsep tersebut. Model Iriz keluaran Proton telah dianugerahkan penarafan 5-Bintang bagi Perlindungan Penumpang Dewasa (Adult Occupant Protection) dengan (14.07/16.00 markah) selain 4-Bintang bagi Perlindungan Penumpang Kanak-Kanak (COP) dengan 82 peratus. Proton Iriz ditawarkan pada harga serendah RM 41,520 di pasaran tempatan.

Satu lagi model kereta keluaran Malaysia, Perodua Axia, telah mencapai penarafan 4-Bintang untuk AOP (12.91/16.00 markah) serta penarafan 4-Bintang bagi COP (71 peratus). Model kenderaan ini ditawarkan kepada pembeli pada harga sekitar RM 24,437 (USD 6,054). Model-model ini mencerminkan slogan ASEAN NCAP

04. Kejayaan Meningkatkan Teknologi Keselamatan Kenderaan Penumpang Di Malaysia

Ekoran usaha gigih ASEAN NCAP, teknologi keselamatan kenderaan penumpang di Malaysia dan di Asia Tenggara telah menyaksikan peningkatan mendadak berbanding dahulu. Sebagai contoh, pada 2008, sebuah model kereta tertentu hanya didatangkan dengan satu unit beg udara sahaja. Namun, model yang sama hari ini ditawarkan di Malaysia dan negara-negara lain di rantau ini dengan dilengkapi 7 unit beg udara serta ESC.

Selain keselamatan penumpang kenderaan, ASEAN NCAP juga cakna tentang keselamatan golongan pengguna jalan raya yang berisiko tinggi (VRU) terutamanya penunggang dan pembonceng motosikal. Lantaran itu, kebanyakan model kereta baharu yang ditawarkan kepada pembeli di Malaysia kini dilengkapi teknologi titik buta bagi mengurangkan risiko perlanggaran melibatkan penunggang motosikal (ASEAN NCAP, 2018).

Di masa akan datang, ASEAN NCAP berhasrat mempromosi pelbagai lagi teknologi yang mampu

Fig 3: Pegujian AEB pada Perodua Aruz

membantu pemandu, termasuk cermin pandangan belakang canggih, pengesanan kehadiran kanak-kanak (child presence detection) serta lampu suluh tinggi automatik. Selain itu, tumpuan akan terus diberi kepada keselamatan pengguna motosikal dengan menggalakkan pemasangan pembrekan anti-kunci (ABS) motosikal serta sistem brek kecemasan berautonomi (AEB).

ASEAN NCAP akan turut menyasarkan penekanan terhadapan isu keselamatan melibatkan para pejalan kaki melalui penggunaan teknologi pemanduan berautonomi.

5.0 Kesimpulan

Sejak ASEAN NCAP menjalankan ujian perlanggaran sulungya di PC3 MIROS pada Mei 2012, pengeluar-pengeluar kenderaan penumpang termasuk Proton, Perodua, Volvo, Toyota, Honda, Ford, Nissan, Hyundai, Mitsubishi serta banyak lagi jenama terkemuka telah tampil menyokong usaha program keselamatan kereta baharu ini. Selain itu, Bahagian Standard Kepenggunaan Malaysia KPDNHEP menganjurkan kempen-kempen kesedaran bagi mendidik orang ramai tentang sistem pelabelan ASEAN NCAP serta penarafan ciri-ciri keselamatan kenderaan.

Kehadiran ASEAN NCAP telah meningkatkan kesedaran tentang teknologi keselamatan kenderaan bermotor dalam ruang lingkup industri automobil di Malaysia. Kebanyakan pengeluar kenderaan penumpang kini menyertakan penarafan ASEAN NCAP dalam brosur kereta yang mereka tawarkan. Ternyata, ASEAN NCAP telah berjaya menjelmakan konsep Keselamatan Mampu Miliki dengan menekankan penggunaan teknologi keselamatan kenderaan termaju bagi melindungi para pengguna jalan raya di Malaysia dan di rantau Asia Tenggara.

Biodata Penulis

Ir. Ts. Dr. Khairil Anwar Bin Abu Kassim, Prof. (Adjung) merupakan Ketua Pengarah Institut Penyelidikan Keselamatan Jalan Raya Malaysia (MIROS). Beliau juga bertanggungjawab dalam penubuhan Program Penilaian Kereta Baharu di Asia Tenggara (ASEAN NCAP) pada tahun 2011 serta berperanan selaku Setiausaha Agung ASEAN NCAP.

Rujukan

ASEAN NCAP (2018). ASEAN NCAP ROAD MAP 2021-2025, MIROS, Malaysia [Online]. Available from: http://www.aseancap.org/v2/wp-content/uploads/2019/01/ASEAN-NCAP-ROADMAP-2021-2025.pdf

GNCAP (2011). ASEAN NCAP: Making Cars Safer in ASEAN Region, December 8, 2012. www.globalncap.org/News/News_archive/2011/Pages/making-cars-safer.aspx

Khairil Anwar, A.K. (2018). Reach For The Stars: The ASEAN NCAP Story, SAE Malaysia.

Zulhaidi, M.J., Mohd Hafzi, M.I., Mohd Syazwan, S., Aqbal Hafeez, A., Khairil Anwar, A.K., and S.V. Wong. (2013). New Car Assessment programme for Southeast Asian Countries (ASEAN NCAP) – A New Paradigm Shift in the ASEAN's Automotive Ecosystem. In Proc. of 10th Intl. Conf. of Eastern Asia Society for Transportation Studies, Taipei, Taiwan.

PETROCHEMICAL INDUSTRY: THE WAY FORWARD

By
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Current Numbers

Oil and gas sector traditionally are divided into three major streams; upstream, midstream and downstream. Upstream activities include exploration, drilling and extraction. Midstream activities include storage, processing and transportation of petroleum product while downstream activities include processes to convert oil and gas into finished products such as polymers, solvents and fertilizers.

Since the mid of 2014, the oil and gas industry had shown destabilization due to sudden decrement in oil prices. The steep decline in oil prices from 2014 to 2016 was caused by over supply factors which include the booming of United State oil production, regional geopolitical issues in gulf countries and slowing rate of oil consumption by China. The oil price plunged from USD 108.56/barrel at 2013 to USD 55. 27/barrel on December 2014 [1]. Since then the oil price/barrel in average had been recorded as USD 50.80, USD 65.83 and USD 56.99 for the year 2017, 2018 and 2019, respectively. According to a report by PricewaterhouseCoopers (PWC) oil price could fall between 25 - 40% from 2017 to 2021 due to increment of production of shale oil and gas in United States [2].

In the beginning of 2020 the sector faced another blow due to Covid-19 outbreak. International Energy Agency (IEA) reported one third drop in crude oil consumption worldwide which caused the price of crude oil per barrel to drop more than 70% between January to April 2020. At the end of year 2020 oil price rebounded slightly due to reduction of oil production by the oil producing countries in line with the agreement set by Organization of the Petroleum Exporting Countries (OPEC). Ease of lockdown measures in countries worldwide also recovered partial demand for oil and gas. However even with all these progress, the recent price of crude oil is still one third lower than the price in 2019.

Demand of Crude Oil

According to various reports 76.5 – 82% of crude oil per barrel is used as fuel for transportation, 10-12% is used for heat generation, 5-7.5% for petrochemicals production, 1% as lubricants and 2-3 % for roadworks. In another report by EIA, in the year 2019, nearly 82% of crude oil per barrel produced in United States are converted to fuel for transportation which includes finished motor gasoline (49%), distillate fuel oil (25%) and kerosene type jet fuel (9%) as shown in Figure 1[3]. However, the demand for fuel for transportation is expected to remain low for the coming five years because the transportation sector will be affected for some period of time due to Covid-19. Adaptation to new normal which includes social distancing, working from home or remote working practices are likely to stay for some time. Organizations will probably adapt some online practices which will not require members to travel and at the same time reduces their operational and capital cost. Booming of virtual businesses especially in trading, education and service sectors will reduce the demand for fuel for transportation[4]. In addition, the fuel demand for transportation is also projected to reach plateau by the year 2030 due to vast usage of electrical vehicles by public.

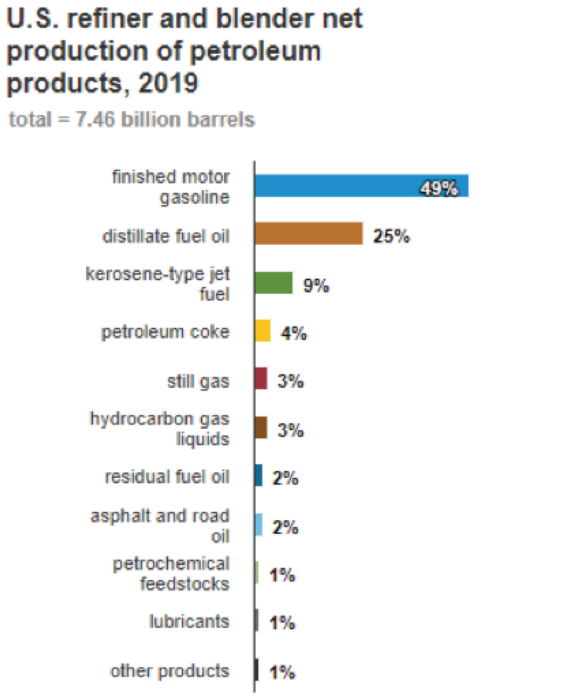


Figure 1: Conversion product of crude oil per barrel in United States (Source: U.S Energy Information Administration, Petroleum Supply Annual, August 2020)

Thus to ensure the survival of oil and gas sector in a profitable mean, oil producing countries and corporate organization are shifting their attention to other options in petroleum business, which involves the conversion of crude oil to petrochemicals rather than fuel for transportation. Figure 2 shows the projected crude oil demand by product from the year 2000 to 2035 [5].

Petrochemical products could be seen as the major contributor of profit for the oil and gas sector in coming decades. Covid-19 has definitely forced the refiners to accelerate the effort to improve the yield of high value petrochemicals from crude oil to keep the business profitable.

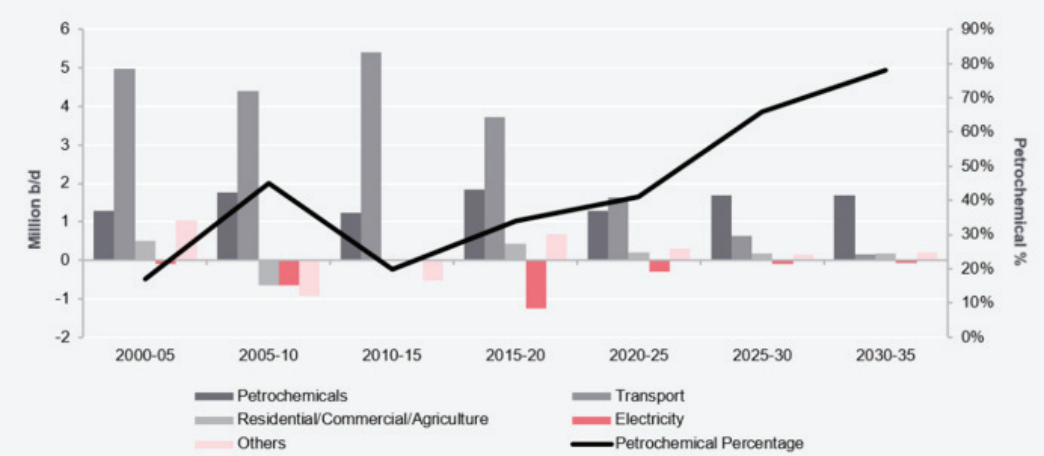


Figure 2: Crude oil demand by product (2000-2035)

(Source: https://www.woodmac.com/nslp/the-oil-market-in-crisis/ Accessed on 3rd February 2021)

Petrochemical Products and Upcoming Trends

Petrochemical products play a major role in our daily life. Packaging, detergent, paint, tires, digital devices, clothing, fertilizers and many more items around us are made from petrochemicals. Petrochemicals such as ethylene, propylene, butadiene, benzene, xylene, toluene and methanol has large demand in the market and used as feedstock for wide array of products in automotive, construction and manufacturing. Currently the demand for petrochemical feedstock from global oil production is around 12%. On the bright side, more than 50% of global petrochemical market share is held by Asia Pacific countries in the year 2019 due to favorable regulatory policies and development of the manufacturing sector in this region, Figure 3 [6]. The global petrochemical market size was estimated at USD 44.0 billion in 2019 and USD 476.2 billion in 2020.

The main usage of petrochemical feed stocks is in the production of polyethylene, ethylene oxide, polypropylene, styrene-butadiene rubber, ethylbenzene, solvents, polystyrene and formaldehyde. In 2019 ethylene product segment has accounted for 33% of the petrochemical product market volume [7]. The accelerated growth in packaging sector during Covid-19 has boost its consumption. Volume based compound annual growth rate (CAGR) of 4.0% from 2020 to 2027 is expected for polypropylene due to an increase in demand for injection molded polypropylene in electronic manufacturing industries. Demand of benzene is also expected to increase due to increasing demand for manufacturing of paints, adhesives, rubbers and inks.

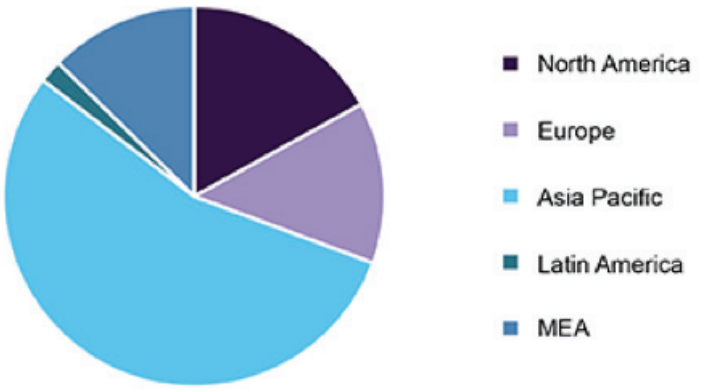


Figure 3: Global petrochemical market shares by region, 2019 [6]

Moving Forward: Crude Oil to Chemical Technology

In conventional refinery, intermediate refinery products such as off-gas, ethane, ethylene, propylene and butylene are sold as low valued products in the form of liquefied petroleum gas (LPG) or blended as gasoline or diesel. These products are produced by fluid catalytic cracking (FCC), delayed coking (DC) and catalytic reforming (CR) units separately [6]. These refineries could convert approximately 10% petrochemicals from crude oil.

From the classic system, refiners had moved into integrating refineries with petrochemical complexes as shown in Figure 4. These approach could convert 17-20% crude oil to petrochemicals.

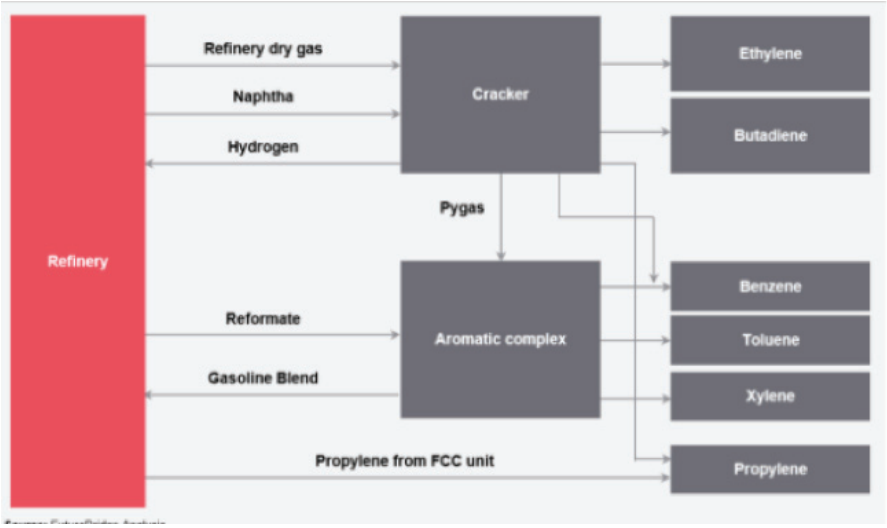


Figure 4: Block diagram of classical integration of petrochemical and refinery (Source: https://ihsmarkit.com/research-analysis/refinery-petrochemical-integration-trends.html Accessed on 3rd February 2021)[8]

However, to ensure optimum profit and high yield, refiners has to adapt to new technologies such as Crude Oil to Chemical Technology (COTC). This technology is expected to improve yield by 40-45%. Industrial complexes with COTC technology are being operational in China and Middle East from 2020 where these facilities could produce petrochemicals at refinery scale. This technology is developed based on three main strategies which are; direct processing of crude oil in steam cracking, integrated hydro-processing and steam cracking and processing of middle distillates and residues using hydrocracking technology. Saudi Aramco and SABIC COTC had partnered to setup a COTC plant which will operational in the year 2025. This plant is projected to process 400, 000 barrel per day to produce 9 million tons of petrochemicals per year. Saudi Aramco plant configuration are shown in Figure 5 [8].

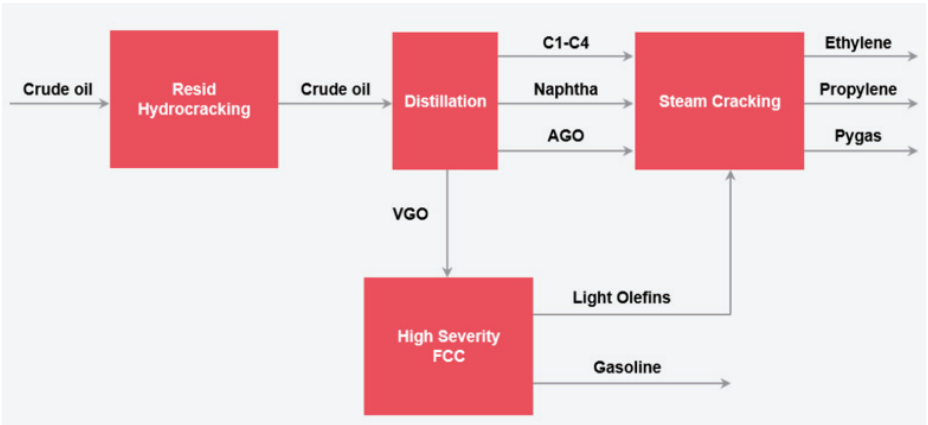


Figure 5: Saudi Aramco's Refinery Configuration Source: https://ihsmarkit.com/research-analysis/refinery-petrochemical-integration-trends.html Accessed on 3rd February 2021)[8]

In the Perspective of Malaysia

Over the decade Malaysia has been known as a reputable petrochemical production hub. Malaysia has been one of the largest producer of polymers, solvents and other chemicals which had been exported to more than 30 countries. The main reason for petrochemical sector development in Malaysia remains as the government's investor friendly policies and availability of feedstock. The production capacity of basic and derivatives chemicals is expected to escalate with completion of PETRONAS' Refinery and Petrochemical Integrated Development (RAPID) project in Pengerang Integrated Complex Johor.

These integrated petrochemical zones have been developed with centralized utilities, efficient storage system and excellent transportation network which will reduce investors capital and operational cost. These efforts had attracted many petrochemical major players to setup their facility in Malaysia such as Mitsui, Toray Industries, Polyplastics, BASF and Lotte Chemical Titan.

In 2018, a methanol project investment worth of RM5.7 billion by Sarawak Petchem Sdn. Bhd was also initiated. The plant is expected to be operational by the year 2022. Existing companies such as Idemitsu Chemical (M) Sdn. Bhd. and Toray (Malaysia) Sdn. Bhd also expanding their business and facilities in Malaysia with investment worth of RM 400 million and RM1.1 billion, respectively. These continuous expansion of investment shows continued confidence in Malaysia's petrochemical industry development [7].

Importance of Technologist and Engineers Now More Than Ever

With the accelerated change in the way of doing things and intend to increase the yield of value added petrochemical products during the Covid-19 pandemic situation, the industry now needs more technical knowledge contribution than ever. In Malaysia development of integrated petrochemical zones with world class infrastructure, which has attracted large foreign investment, has catalyzed the further growth of the petrochemical industry.

However, to stay competitive, new technology which could increase the conversion of crude oil to high value petrochemical products has to be integrated into these plants and facilities. Integration between plants and implementation of COTC are crucial for survival of petrochemical industry in Malaysia. Skilled and qualified technologist and engineers are much needed to materialize this vision.

Focus had also been given to development in specific areas such as high end polymers, engineering plastics and composite materials by establishing R&D centers, innovative utilization of catalyst and diversification in utilization by production of hybrid material from renewable resources. Shortage of skilled personal in this area instigate a need to enhance collaboration between petrochemical industries with professional bodies such as Malaysia Board of Technologists (MBOT) and Institute of Engineers Malaysia (IEM) to provide training to nurture the technical skill and instill awareness and responsibility towards safety, health and environmental concerns related to this sector.

Awareness and interest also has to be cultivated among young generation in Malaysia to pursue their studies in the field related to petrochemical industries to ensure that the country can continuously supply professional workforce to the sector. Failure to do so will cause loss of foreign investment to Malaysia in this field.

Conclusion

Despite the less demand of fuel for transportation, over supply of crude oil, adaptation of renewable energy and the new norm due to Covid-19, the oil and gas industry will continue to grow progressively. The focus to convert large fraction of crude oil to fuel for transportation are being replaced with a new outlook to convert the crude oil to petrochemical products. New technologies and revolution in the refinery complexes have started to emerge to ensure profitable production of petrochemicals. Skilled and professional technologist and engineers will be the driving force in implementation of these technologies in the oil and gas industries.

Citation

[1] F. Gregory Gause, The geopolitics of falling oil price (2015), Policy Briefing, BROOKINGS INSTITUTION 1775 Massachusetts Avenue, N.W. Washington, D.C. 20036 U.S.A.

[2] Okoro, E. E., Dosunmu, A., Igwilo, K. C., Anawe, P. A. L., & Mamudu, A. O. (2017). Economic advantage of in-country utilization of Nigeria crude oil. Open Journal of Yangtze Gas and Oil, 2, 226-236.

[3] Oil and Petroleum Product Explained, https://www.eia.gov/energyexplained/oil-and-petroleum-products/refining-crude-oil-inputs-and-outputs.php Accessed on 3rd February 2021.

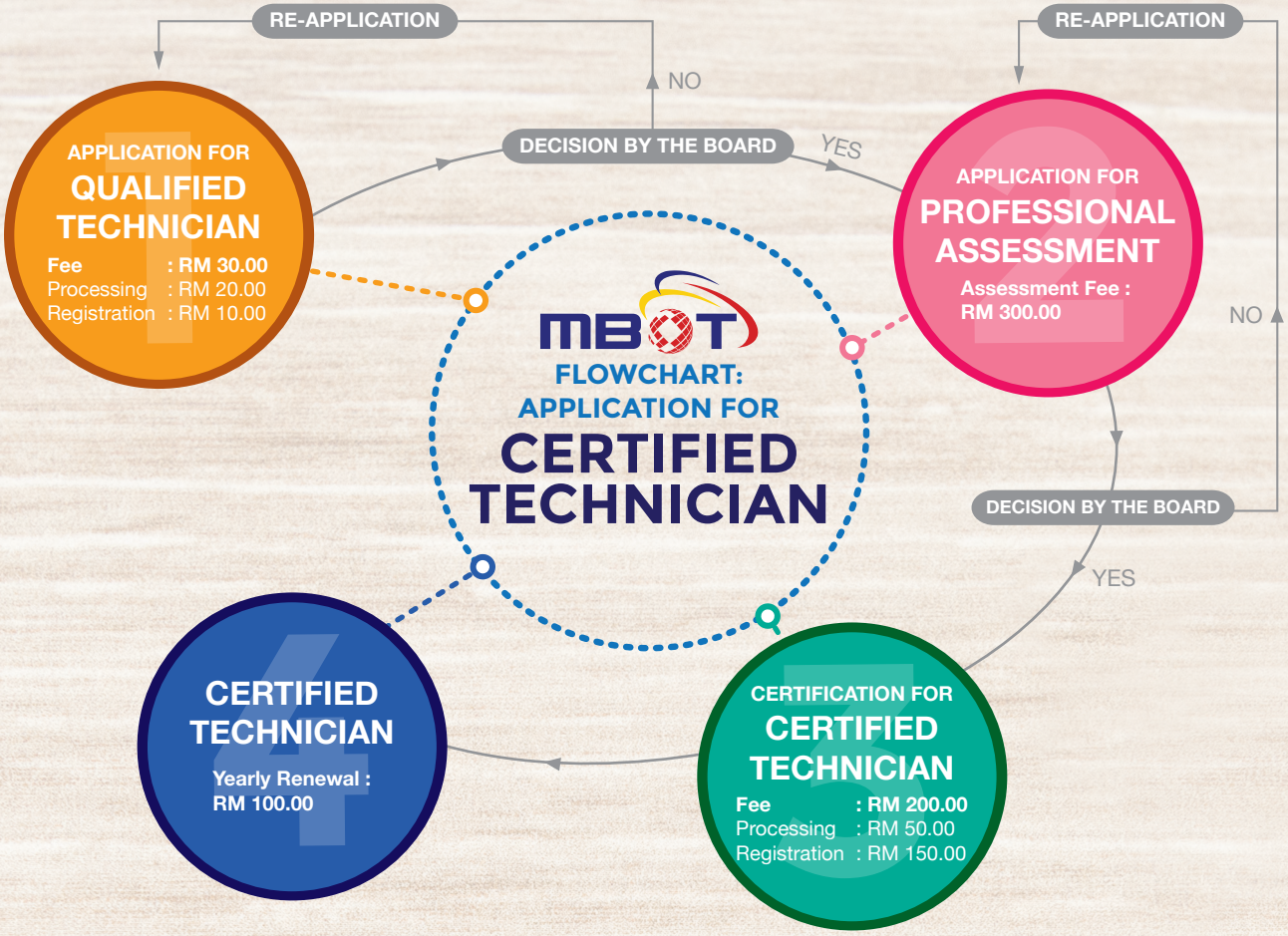
[4] Oil and Gas Sector: Covid-19 will Affect Oil and Gas Price Even in the Medium to Long Term. https://www.credendo.com/country-risk-monthly/oil-and-gas-sector-covid-19-will-affect-oil-and-gas-prices-even-medium-long Accessed on 3rd February 2021.

[5] The Oil Market in Crisis, https://www.woodmac.com/nslp/the-oil-market-in-crisis/ Accessed on 3rd February 2021.

[6] Size, E. H. M. (2020). Share Trends Analysis Report by Product. By Application, By Region, And Segment Forecasts, 2027.

[7] Malaysia Petrochemical Country Report 2018, APIC-ASIA Petrochemical Industry Conference 2019, Taipei, Taiwan.

[8] Refinery -petrochemical integration trend, https://ihsmarkit.com/research-analysis/refinery-petrochemical-integration-trends.html Accessed on 3rd February 2021.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MBOT
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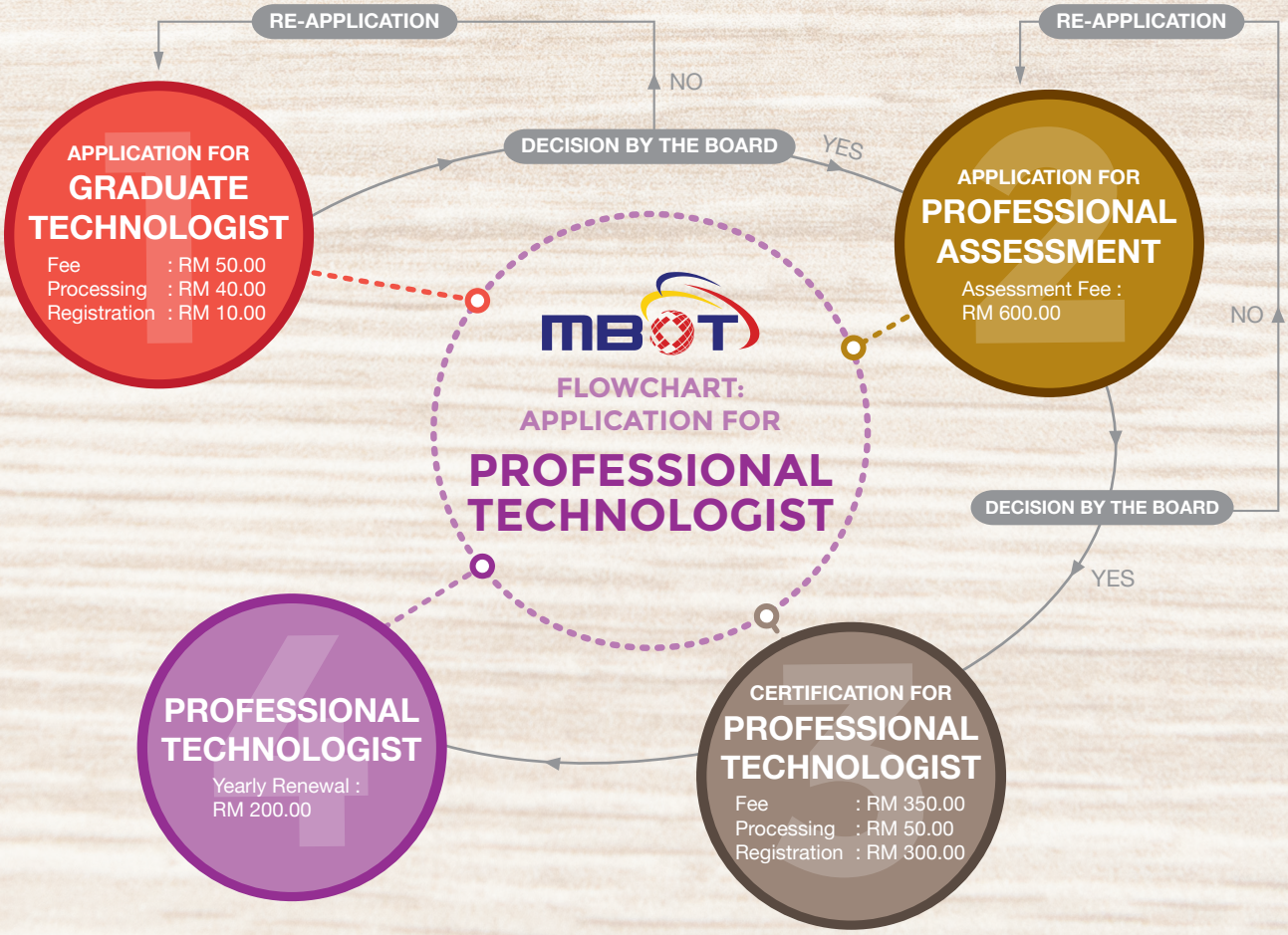
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