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MBOT
LEMBAGA TEKNOLOGIS MALAYSIA
MALAYSIA BOARD OF TECHNOLOGISTS

TECHIES

Creating Roaring Technologists with Entrepreneurial Mindset

Autonomous Robot for Chilli Pesticide Control

MTeX
MBOT TECHNOLOGY & INNOVATION EXPO 2021
TECHNOLOGICAL TALENT FOR SUSTAINABLE DEVELOPMENT

Application of Technology in the Tokyo Olympics

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TECHIES 13th EDITION

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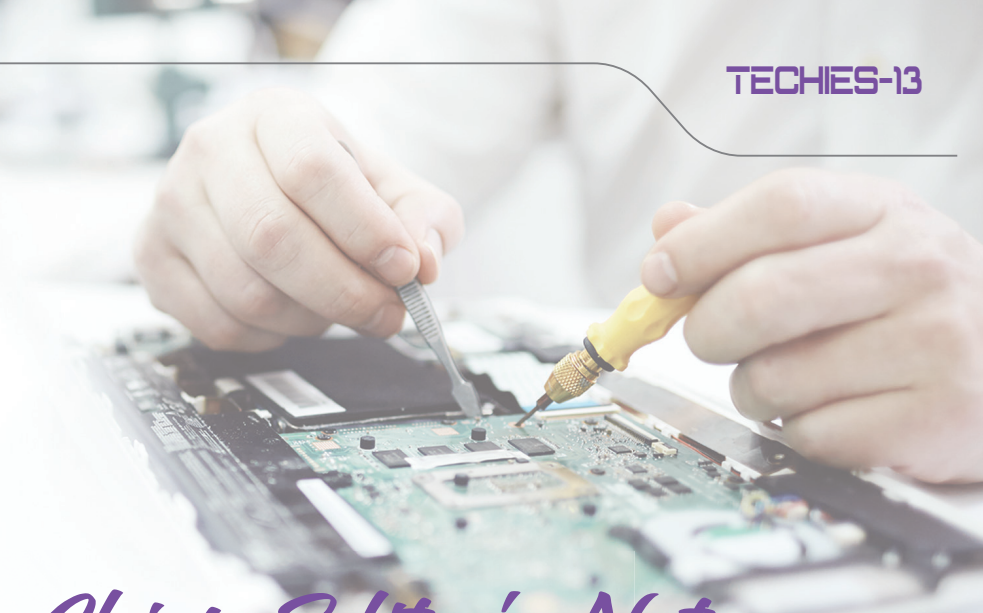

Chief Editor's Note

The recently launched Twelfth Malaysia Plan (12MP) will spend RM 400 billion over 5 years for development. Among the most important aspects of the Plan, is preparing future talent for Malaysia. This involves raising educational quality including improving learning outcomes and enhancing TVET programmes. This is important for us technologists. TVET Brand is to be promoted & strengthened thru digital learning. This will ensure that the products of TVET education will be work-ready for the future needs of industry under Industrial Revolution 4.0. Let us hope that the implementation of TVET enhancement in 12MP will include marketing TVET to students and parents so that TVET is no longer regarded as the second class education, but it is the education system FOR THE FUTURE.

Thank you.

Dato' Ts. Dr.
Mohd Mansor Salleh

TWELFTH MALAYSIA PLAN
2021-2025
A PROSPEROUS, INCLUSIVE, SUSTAINABLE MALAYSIA

MBOT REGISTRATION

(As of December 2021)

30,232	6,199	12,997	1,386
Graduate Technologists	Qualified Technicians	Professional Technologists	Certified Technicians

CREATING ROARING

Technologists with Entrepreneurial Mindset

By
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TECHNOLOGIST IN THE POST COVID-19 PANDEMIC

The world is facing a turbulent economic situation as a result of the Covid-19 pandemic since the beginning of 2020. The pandemic has hit the travel, tourism and hospitality industries directly and has resulted in a ripple effect to other industries as well. In November 2020, it has been reported that Covid-19 pandemic has forced 32,000 Small and Medium Enterprises (SMEs) to close in Malaysia alone. Large organisations such as well-known bookstores, 4-star hotels, travel agencies, and manufacturers have also faced the same fate due to the current economic condition. Due to this scenario, we can see lesser job opportunities and a staggering increase in the unemployment rate as a result of company closures. There is a rise in the need for digital technology to assist humans in innovating current processes. How can we train technologists to be able to bring the concept to reality to fit the needs and wants of the market? Technologists are creative, innovative and problem solvers that are trained with the skills and tools required for them to be able to come out with solutions to problems faced in the market. So, how can we ensure that the solutions produced are needed and wanted by customers? Studies showed that 60% - 80% of new products introduced to market failed. There is a gap between developers and customers. Can we minimize this gap? Many successful technologists of the world such as Mark Zuckerberg, Garrett Camp, Daniel Ek and Brian Chesky, to name a few have one thing in common. They possess an entrepreneurial mindset that transformed them into roaring technologists.

HOW CAN BEING ENTREPRENEURIAL HELP?

What does it mean when someone is entrepreneurial? Being entrepreneurial does not always mean that the person is starting a business or owns a business. The term entrepreneurial relates to a person being innovative, creative, resourceful and adaptable. A person possessing an entrepreneurial mindset is considered a competitive advantage whether they are self-employed, or working in any industry.

Being an entrepreneurial technologist will make any industry-leading organization successful as they always have a clear vision and able to bring that vision through actualization. Technologists with entrepreneurial mindset are successful, because they are always able to identify customer pain points and subsequently focus on introducing solutions that exceed the customers' expectations.

There are many successful technologists that are entrepreneurs. Here are Malaysia's three technology entrepreneurs:

Aaron Patel
Co-Founder and CEO of iHandal Energy Solutions

Aaron is the founder and Managing Director of iHandal, a turnkey engineering and contracting firm specialising in improving energy efficiency of commercial and industrial buildings.

Vivy Yusoff
Co-Founder of FashionValet and dUCk Group

Vivy creatively innovates the way her fashion business operates. FashionValet now stocks more than 400 brands from across the region and sells in Indonesia, Brunei, Australia and the United Kingdom. The dUCk Group, her own brand, is one of the fastest growing branded scarves and accessories in Malaysia.

Chan Kee Siak
Co-Founder and CEO of Exabytes Network

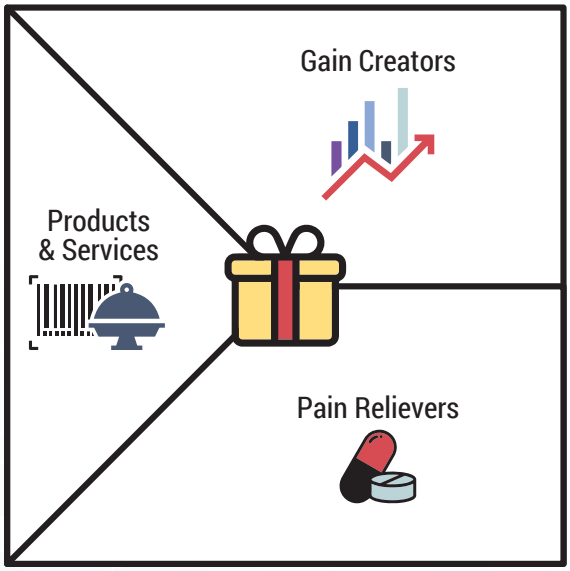
Exabytes Network is a leading web and e-Commerce hosting provider that was founded on the principle of providing the best hosting solutions to its customers. Chan's goal is to assist SMEs in operating more efficiently and effectively on the internet.

What we can learn from these successful technologists? Successful technologists always look problems as opportunities to introduce innovative solutions. The solutions that are designed take into account the job, pains and gains of the customers and offer enhancements to what they originally envisioned.

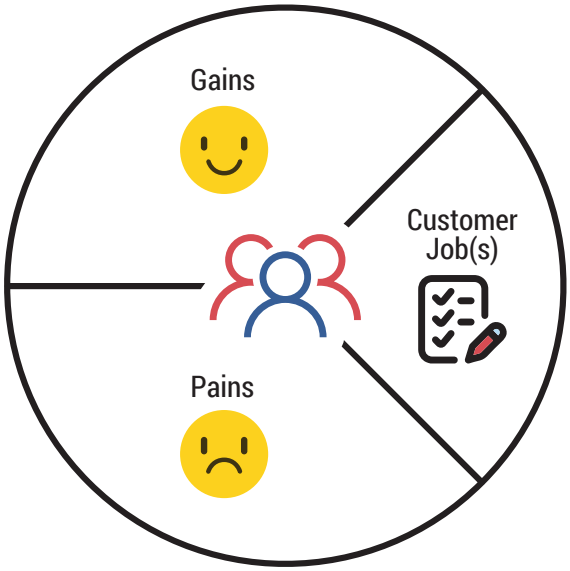
One tool that can help plan for innovative solution is the Value Proposition Canvas (VPC). The VPC was originally developed by Dr Alexander Osterwalder as a framework to ensure that there is a fit between the product and market. This tool can be utilised in the planning stage of a product or service and even for improving an available product or service. VPC gives special focus on the relationship between two parts of Osterwalder's broader Business Model Canvas; customer segments and value propositions (Figure 1).

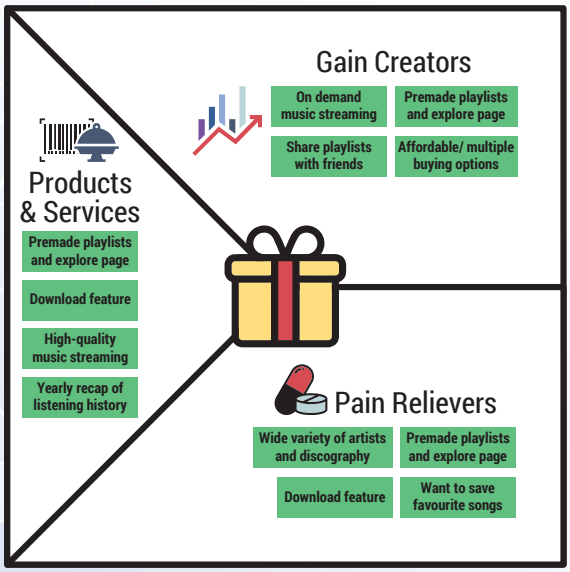
Let's take Spotify as an example. People want to listen to affordable music anywhere and anytime, and at the same time be able to share their music playlist with others. Spotify has enabled this and users are also able to explore individuals with similar musical tastes within the Spotify community (Figure 1). VPC is versatile and can be utilised in daily activities and work tasks such as choosing the right job offer, choosing the right project, or making purchase decisions. The list is endless. Knowledge of using VPC can equipped technologists to effectively communicate and pitch their ideas to the top management or venture capitalists.

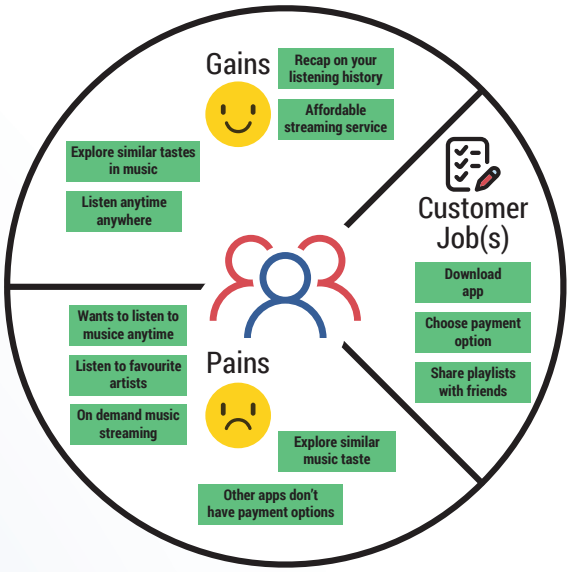
VALUE PROPOSITION



CUSTOMER PROFILE







The Value Proposition Canvas (VPC) and VPC for Spotify utilized by Dominic Scarangela to improve Spotify features
Source: *https://www.domscarangella.com/project/fusce-pharetra*

THE WAY FORWARD

Possessing an entrepreneurial mind set will be an advantage for technologists as it can be an impetus in becoming successful in their career as innovators, academics or even as entrepreneurs. Entrepreneurial technologists will work closely with customers to not only solve customer pains but also aim to exceed them. By using VPC as a tool will aid technologists to plan for innovative solutions that will be welcomed by the market because prioritizing customer pains and jobs will lead to beneficial outcomes – customer satisfaction.

5 STEPS TOWARDS DIGITAL TRANSFORMATION

By
Mahathir Muhammad Rafie,
AIBOTS Sdn. Bhd.

INTRODUCTION

The Malaysia Digital Economy Corporation (MDEC) has recently taken a lead role in catalysing the transition to Malaysia 5.0 as a new narrative for the nation. This includes the introduction of new emerging technologies, which are important tools to spearhead the Malaysia 5.0 digital economy. Adopted from the Japanese "Society 5.0", Malaysia is now in the midst of transitioning from the Fourth Industrial Revolution (4IR) to a brand new age of digital economy.

The Covid-19 pandemic has shown how fast the world evolves, and despite its undeniable negative consequences, the pandemic has accelerated digital transformation worldwide. In Malaysia, a prime example would be the MySejahtera application. With the wealth of data accrued, artificial intelligence (AI) is deployed to predict the spread pattern of the virus and to speed up research for vaccine formulation.

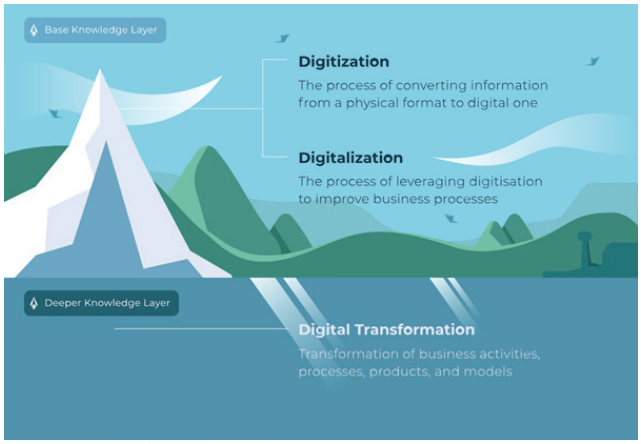
Leveraging internet access at home, students at all levels nowadays attend virtual classes through various applications, while employees work from home, and numerous businesses ease into online platforms. Many organisations adopt digital business models as a permanent strategy to optimise operational costs and to preserve some revenue flow. A number of surveys indicate that there is a rapid shift towards customer-supplier interactions through digital channels. No matter who is on either side of the screen, all parties demand better online experience. It goes without saying that in line with this growing demand, there is an increase in the number of local companies established to cater for the consumers' quest for all things digital.

AIBOTS Sdn. Bhd. is one such company. It aims 'to harvest innovation into solution' by integrating digital transformation (DX) with lean management. Established in 2017 in Johor Bahru, Malaysia, its unique proposition is the blending of Robotic Process Automation (RPA), Internet of things (IoT), Artificial Intelligence (AI), Big Data Analytics and UI/UX design to create best-fit solutions. AIBOTS is the first company in Malaysia to offer multiple integrated solutions to industry problems.

DIGITISATION, DIGITALISATION & DIGITAL TRANSFORMATION

Given the speed by which technology changes, there is much misunderstanding and confusion regarding what constitutes digital reality. Hence it is worth pondering upon some common terms. Generally, digital transformation is understood as the utilisation of technologies such as RPA, AI, Big Data and IoT. Industry 4.0 normally refers to digital transformation in manufacturing, production and other related industries. It focuses on improving value creation processes.

There is a difference between digitisation, digitalisation and digital transformation. They are often used together and sometimes even lead to project failure.



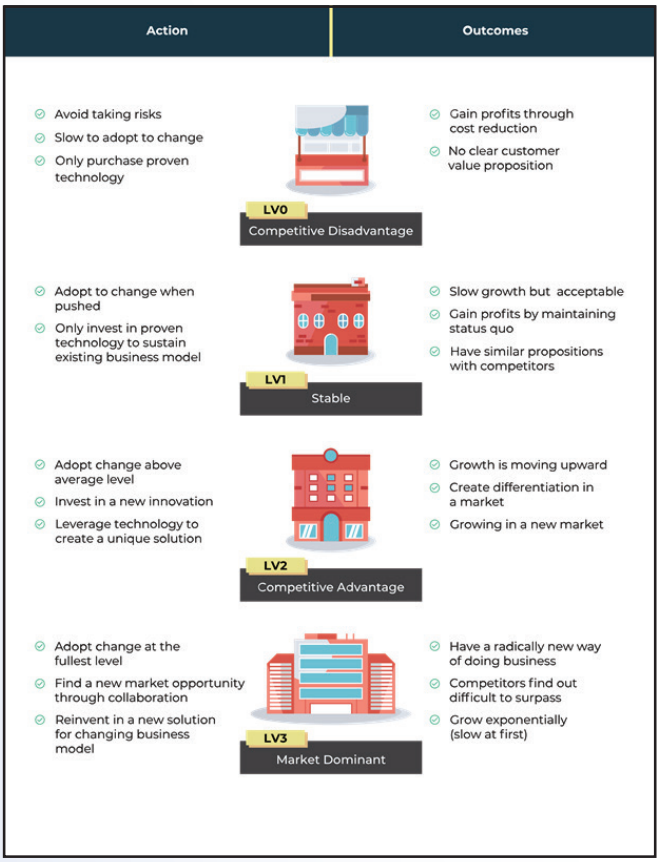
Digitisation is the process of converting information from physical to digital format. It essentially involves converting something that is non-digital into a digital representation so that it can be used by computer systems to automate processes or workflows. Its primary benefit is the creation of business value from data-driven activities.

AIBOTS has once assisted a manufacturing company install IoT sensors on its processing machines to convert data reporting from manual to digital. The sensors transmit directly to the system without human intervention to collect, write and report related data in every stage of monitoring.

Digitisation and digitalisation are closely associated. They are often used interchangeably, but in essence, they are different. Digitalisation is the process of leveraging digitisation to improve business processes, making digitised information work. It is principally the use of digital technology and data to create new sources of revenue, improve business processes and produce a culture where digital information is at its core. It converts many processes to be more efficient, productive, and profitable. AIBOTS has helped an automotive company develop social media analytics to improve its business strategy. Data from different sources are collected, analysed, and used to maximise the functionality of all departments in their decision-making processes.

Digital transformation refers to a change process that seeks to fully leverage the advantages of digital technology. The main goals are to improve efficiency, manage risk and discover new monetisation opportunities. It is about doing things in a new, digital way. For example, AIBOTS assisted a funeral service company to develop AI to analyse images before video production is carried out. AI assures that only safe images are shown to the family of the deceased. The service removes risks and human errors by having the AI to spot and fix whatever impending problems. This solution changes the business and delights customers in a whole new way.

In short, digitalisation is about applying technology into existing business activities. Digital transformation means doing things in a new way by having digital business models that cover a broader scope than mere digitalisation. It includes all aspects of the business such as customer understanding and touch points, growth strategy, enterprise mobile applications, digitisation process, worker enablement, performance, new business models and many more. Digitisation and digitalisation are important parts of digital transformation. Their proper application will lead to an entirely a new market, new customer base, and a novel business reality.



DX BUILDING BLOCK

The journey of digital transformation must begin with the strategy, not technology.

DIGITAL TRANSFORMATION: CHANGE BLOCKS

There are five change blocks to be considered in order to implement digital transformation successfully. Neglecting these blocks may lead to implementation failure. Hence, they must be understood and addressed appropriately. These are more details of the blocks:

1. DIGITAL BUSINESS STRATEGY AND CULTURE

In any business, the right strategy is crucial to remain competitive. The starting point to creating a high-performance digital business is to never be complacent, and to continuously improve the established business model. However, strategy alone is insufficient. It must be supported with the right work culture that has been proactively developed. AIBOTS has helped a company create a positive work culture by implementing a 360 digital transformation instead doing a narrow change in digitising services. Staff members are empowered, resulting in increased work speed and continuous interaction with the new digital solution. Indeed, a company that focuses on both strategy and culture are more likely to achieve breakthrough performance.

2. STAFF AND CUSTOMER ENGAGEMENT

The relationship between strategy and culture is fundamental in achieving staff-customer engagement. Customers turn to employees for advice in order to acquire the best user experience. In this way, customer feedback is garnered, which will eventually lead to better solutions. Being major users of the company's digital solutions, continuous staff-customer engagement will minimise resistance that may arise from changes that take place during the digital transformation process. Clarity on the reasons for change, how the change will happen and the benefits that will be accrued from the change can be relayed to the customers directly.

3. PROCESS AND INNOVATION

Staff-customer engagement can bring a company forward and ensures sustainability if the company integrates process with innovation. This third change block is known as the centre of digital transformation. The business needs to examine end-to-end activities and determine which areas of technology and process need to be developed further. For example, AIBOTS innovated the processing lines of a client to identify the root cause of a problem using hundreds of data points. The data points are invisible to the human eye and are almost impossible to analyse due to its high complexity. As such, we transitioned from manual investigation to a new digital solution. As a result, teams now know exactly what to do and when to do it. This new digital solution eliminates the cost of hiring human experts besides shortening the time it takes to process the problem – all made possible within a new digital landscape.

4. TECHNOLOGY

After identifying the company's process and innovation capabilities, the right technology needs to be developed. It is crucial to identify any gaps in existing business activities. Many digital businesses think that using advanced technology means all aspects of their operations are penetrated. This is one of the reasons for the failure of their digital transformation process. It takes more than just the use of technology alone. Companies should not begin by asking, "how to implement what technology and when". The technology itself will not create competitive advantage to the business although it is an essential element of the process. Rather, digital leaders should start by asking, "why and what is the root cause of the problem that hinder the improvement of the overall business process?" There are cases where expert investigation has been carried out but process losses continue to take place, with no apparent process inefficiencies. In cases like this, AI is the most appropriate technology to use to solve the problem, because normal manual/human analysis may not be able to detect the underlying issues that cause the problems.

5. DATA AND ANALYTICS

It is important to manage multiple data insights using the technology that has been implemented in the previous change block. Every interaction in the digital world will generate numerous data points that act as important pillars for digital transformation projects. Results from big data analysis will be used as the benchmark for transformation and as a good indicator to monitor current progress of the business. The ability to analyse vast amounts of data is critical to achieve the expected level of performance. For example, AI delivers hundreds of insights per day, hence helping companies reduce operational costs and eliminate hampered productivity and losses. This will help the firm advance into digital age. Without this change block, the business will face stagnation because some of the problems are beyond human comprehension and capability.

AUTONOMOUS ROBOT for Chilli Pesticide Control

Nutrition, fungicides and pest control are the most important factors to consider in the farming industry. Approximately 30–35% of crops are affected by pesticides, causing health-related issues. At the moment, Malaysia is seriously developing its agriculture sector, especially in the wake of the 4th Industrial Revolution (IR4). Government policies on IR4 have enabled farmers to boost their production and market visibility using IoT. Smart and systematic systems have been introduced. The revolution of artificial intelligence has taken place in the agriculture industry, ensuring good measures to confront issues like climate crisis, unemployment and food security.

By
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Ahmad Nasaei Md Sukhaimie, Melor Agricare PLT

CHALLENGES IN AUTONOMOUS PESTICIDE CONTROL

Our project is to develop an autonomous pesticide control (APC) robot. There are four core technologies involved, namely: (i) robust design, (ii) intelligent guidance (autonomous) & mapping, (iii) pest vision in-row weed control & target detection, and (iv) Internet of things (IOT).

Robust design and development

The development of an autonomous pesticide spraying robot would enhance the efficiencies of both labour and crop yield. This project mainly focuses on the design and development of an adaptive and practical robot that can support multiple functioning systems. The aim is to have an autonomous pesticide spraying capability with an IOT integrated control system. The operation time of pesticide application will be optimised by having a larger pesticide carrying capacity without sacrificing the manoeuvrability of the robot in the small spaces between chilli plants. An analysis on kinematics, stability and strength is needed to come up with a compact, strong and highly efficient self-driving robot, in a way that problems such as exposure to hazardous materials and tedious spraying works can be eliminated or at least reduced appropriately.

Multiple constraints autonomous guidance for APC

Accurately moving along narrow crop rows is a crucial requirement that the pesticide spraying robot must fulfil. While the most common solution to guide vehicles along pre-planned routes is to use global navigation satellite systems (GNSS), its high cost and the lack of availability in certain agricultural environments (Vázquez-Arellano et al., 2016) have led to investigations on the use of computer vision as an alternative (English et al., 2014). Global positioning systems (GPS) are the key tool utilised for positioning and maintaining maps for precision agricultural tasks, yield mapping and variable chemical applications. An intelligent row guidance method is used so that the robot can move independently between each row of crops. The crop recognition and row guidance will use machine learning.

Modular pest spatial detection system using deep learning

One of the main challenges to pesticide reduction using robotic sprayers is target detection. Intelligent devices and systems of unmanned vehicles such as autonomous robots and drones will enable farmers to efficiently spew agrichemical using automated identification systems, which will allow for precise chemical application and pest elimination (Chen et. al, 2007; Waltera et. al, 2017). However, in Malaysia, the use of such intelligent systems is relatively small. Enter the DPest - a modular (i.e., plug-and-play) device which is able to detect pest spatial location in a farm. The device consists of a power unit, a processing unit and controller, an RGB camera, an infrared depth camera, a GPS, and an accelerometer. The idea is to deliver precision pesticides at identified locations in the farm. The system will first acquire RGB photos of the plants, detailed photos of the area, the GPS location, and the movement of the pests. Then, it will do segmentation, classification and identification of the pest through a machine learning approach. Next, it will reconstruct the area map based on the GPS location and photos. The system will then locate the infected area and create a heat map to suggest the type of pesticides to be used for treatment purposes. Instead of applying agrichemical for the all the crops, the right pesticides can be delivered at the right crop location in the right quantity. This will no doubt reduce the cost of pesticides and will result in healthier plants.

With consumers now increasingly demanding foods with less pesticides (King, 2017), this project, which offers a systematic and efficient pesticide dispersal system, is timely indeed. There are 2500 Ha chilli farms across Malaysia, which produce approximately 24,000 Mt chillies annually (MAFI, 2020). An autonomous system is needed to sustain the production in an efficient manner. This is where the APC comes in handy.

Analysis of APC on productivity and ROI in agriculture

The interplay and balance between productivity, growth, structure, manual labour cost, cost of technology, and return on investment (ROI) are often contemplated. For this purpose, an analysis will

> “IoT makes it possible to cater for huge and complex number of data streams from various sensors onto scalable IoT platforms. The platforms collect, process, and analyse information in real-time, hence enhancing the decision-making process by providing more factual support and prescribing smart solutions.”

be conducted. The objective of the analysis is to identify the factors that contribute to productivity in order to optimise the process. Figures relating to productivity will be calculated using statistical methods and the Maynard Operation Sequence Technique (MOST). Subsequent calculations of productivity and ROI will be used as the base to make long-term production planning control decisions.

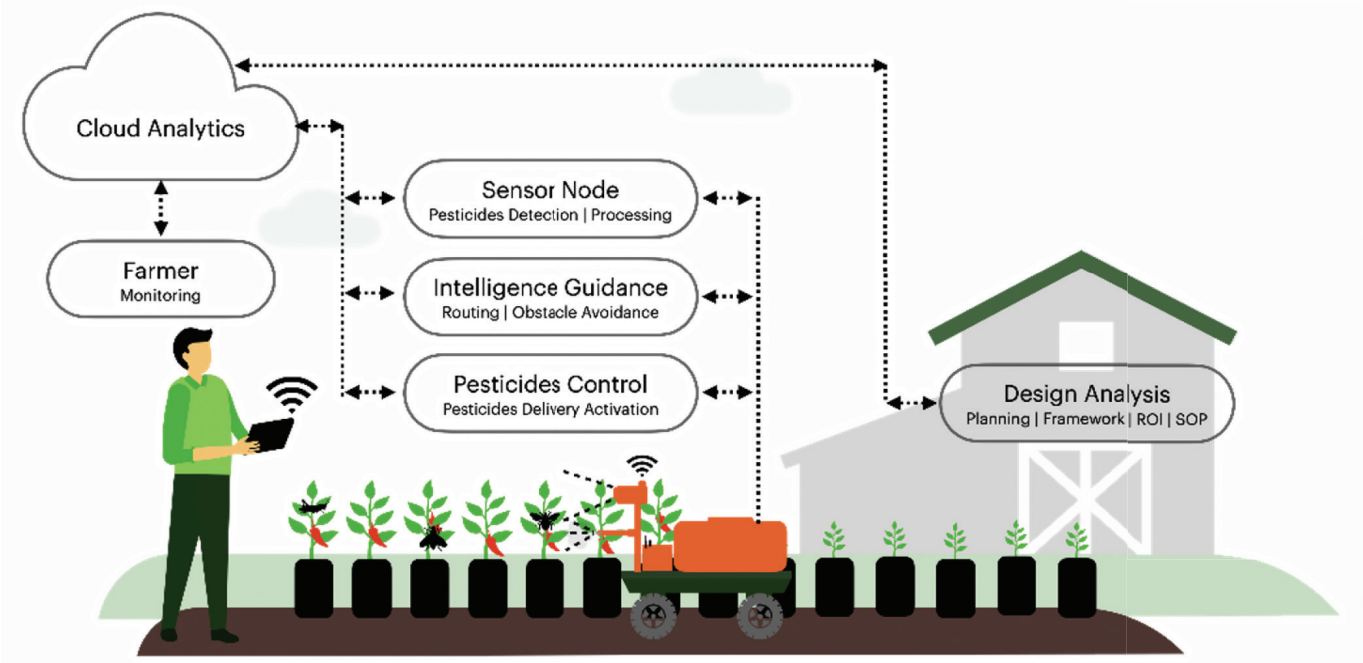
Design and implementation of an IoT-based monitoring and management systems for APC

Crop and pesticide control in chilli is carried out based on manual capture of data (e.g., type of pest, area of plant, etc). It is a slow process since the crops are located in remote and distributed locations. As result, the data collected is relatively poor and might even be invalid. On the other hand, precision agriculture uses emerging technology to increase yield and profit, as well as to reduce adverse impact on the environment. IoT makes it possible to cater for huge and complex number of data streams from various sensors onto scalable IoT platforms. The platforms collect, process, and analyse information in real-time, hence enhancing the decision-making process by providing more factual support and prescribing smart solutions. IoT makes it possible to go for huge processing capacity, reliable network security, efficient communication protocols and timely performance.

Since there are a multitude of challenges to overcome, and a host of technologies to develop and use simultaneously, the APC requires an efficient and effective integration strategy. Each component of the bigger system must be in-sync with one another in order to produce a workable and proficient overall structure.

Field visit at chili farm in Melor Agricare PLT in Alor Gajah, Melaka.

INTEGRATION STRATEGY TO OVERCOME CHALLENGES



Integration strategy in autonomous pesticide control (APC).

WAY FORWARD

The agricultural industry is facing a myriad of problems including worldwide population growth and ageing (Gerland et al., 2014), climate change, and mass migration of people. Field robots may help humanity cope with some of these difficulties. The question is - in the midst of all the challenges - how well will the APC fare?

ACKNOWLEDGEMENT

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THE C2L – CONE COLLECTING AND LAYING MACHINE

By
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The expanding network of highways all around the world has increased the need of having assisting technology in maintaining its condition. The main concern of all highway operators is not only limited to providing great service to the consumers but also to ensure the safety of the road workers. The establishment of The Road Workers' Safety Forum (RoWSaF) is committed to improving the safety of road workers. The main aim is to eliminate serious injury and fatalities among the on-road workforce. It is carried out by eliminating the need for road workers to be on foot on the highway as a key element of reducing injury risks. Similar phenomena are faced by countries in Asia especially in Malaysia. The economic development has also pushed the increase of highway networks all around this region. Currently in Malaysia, the total length of the highway is 1,821 km with another 219.3 km is still under construction. This increment leads towards more workforce has been involved in the operation of maintaining this highway network. The increased number of workers also increases the risk of humans being exposed to hazardous conditions during road maintenance works.

In Malaysia, the fatalities and serious injuries among the road workforce have become an alarming issue. Malaysia authorities have come out with stricter guidelines to ensure the safety of these workers. For example, the Malaysian Highway Authority (MHA) has put in mandatory regulation for all highway operators to provide all highway workers and contractors with Expressway Operation Safety Passport (EOSP) before they can perform their tasks on highways. This measure is introduced to ensure all the safety procedures are being fulfilled before all the maintenance works can be performed. In addition, the Malaysian Institute of Road Safety Research (MIROS) also has established a ranking system to evaluate performance in terms of safety and comfort among highway systems. The aim is to enhance the road safety standards in Malaysia to be at par with the best highway systems in the world. Because of that, the demand for a technological solution in assisting road maintenance works is increasing to achieve better work efficiency and safety.

To perform the maintenance work on the highway, one of the required processes is to lay traffic cones for lane closure. The workers need to be on foot on the highway to perform the task. It exposes these workers to greater risk due to the flow of active traffic. The need for road workers on the highways during placement and retrieval of traffic cones has been established as the main cause of fatality cases to the road workers. Furthermore, an increase in personal injury is associated with handling the large number of traffic cones required for road works has been reported.

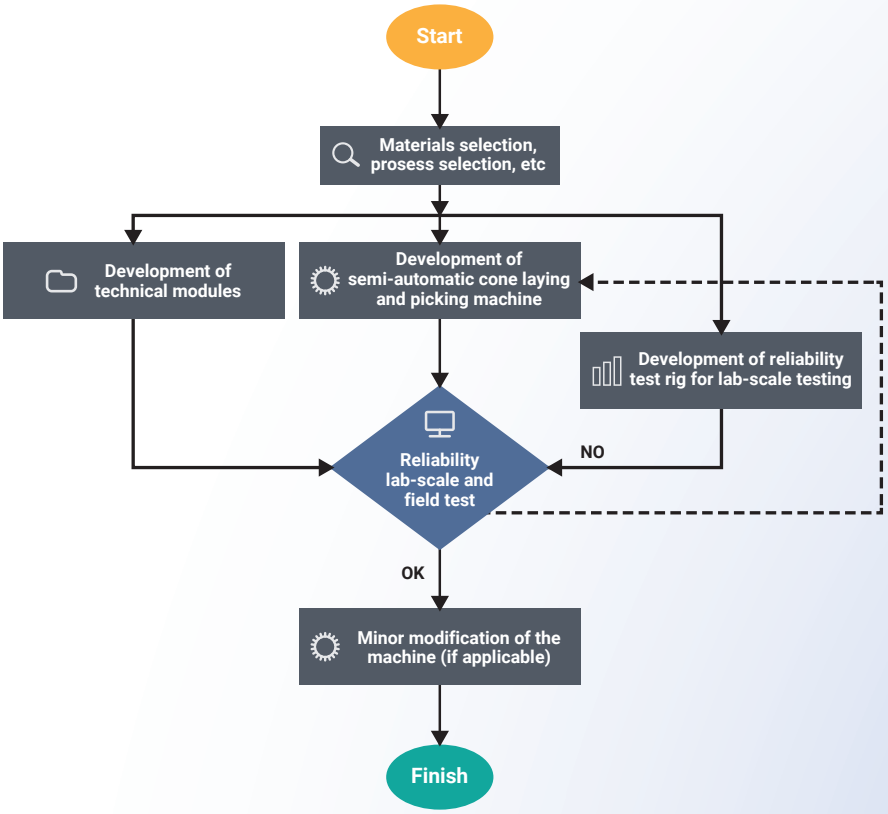
In an effort to overcome these issues, the use of technology has been proposed to assist the process of laying and picking up traffic cones. Many possible designs of cone placement and retrieval systems have been developed by the traffic management industry and others internationally. But the technology used in these systems is specifically catered for specific highway systems. Because of that, there is a need of developing similar systems that is suitable for the current conditions of Malaysian highway systems. This system must comply with local highway operators' working procedures and local traffic patterns.

Design and Development

The existing systems that are available in the markets are too complicated, expansive, and only developed in Europe and America. Most of them are not suitable to be used in local highway conditions and require major modifications. Because of that, the collaboration between Intelligent Engineering Technology Services Sdn. Bhd (IETS), UTeM 1st spin-off company, and Plus Malaysia Berhad (PLUS) has been initiated to develop a semi-automatic machine to lay and pick up traffic cones namely as Cone, Collect and Laying (C2L) machine.

The development of the C2L consists of two main phases. Phase 1 consists of designing and developing the functional prototype of the system. It has been successfully completed in 2019 and shows good functionality performance. This system fulfills all the requirements set by PLUS according to the current practice and standard operating procedure. Based on these positive outcomes, the development process has been approved to make improvements to the current machine that is ready to be used in the real application and potentially can be sold to other local highway operators. The development of the system can be summarized in the flowchart as in Figure 1 below. Currently, the system is in Phase 2 of development to evaluate the functionality and reliability of the system to fulfill the pre-commercialization requirements. It had been tested in the laboratory environment to determine the functionality and reliability of every working component. It had undergone a cyclic functionality test that exceeded more than 3000 cycles, impact, and weather tests. Failure Mode and Effect Analysis (FMEA) had been performed to acquire data for further required improvement before the machine is ready to be used in the real environment. Presently, the machine is tested in the real working environment by performing the task of laying and collecting traffic cones at Rawang to Tanjung Malim and Taman Perling to Second-Link stretches of PLUS Highway.

> "Many possible designs of cone placement and retrieval systems have been developed by the traffic management industry and others internationally."



Development of C2L system

The C2L is the first-ever semi-automatic cone laying and picking machine that has been developed in Malaysia and ASEAN. There are some unique features of the machine and its function that can create value to customers which can be highlighted to position the product in the market effectively. Firstly, it is a one-man operation machine. In the current working practice, the manual process of laying and picking cones requires 3 workers. By eliminating the use of 2 workers, it can reduce the manpower cost and the exposed risk facing by the workers when performing their work. In addition, it possesses a portability feature, which can be attached to the rear side of any type of lorry. The machine only needs to be attached to the lorry when it is required to perform the work and can be detached for storage. Because of that, the users do not need to put any investment to buy a specific vehicle for this machine. Furthermore, this machine is also built using local technology and mostly on-the-shelf components. It significantly reduces the operational cost in terms of replacement components and lead time for service and maintenance works. One of the main one-of-a-kind features of this machine as compared to other similar functional types of machinery is C2L has the capability to lay and pick up traffic cones in straight and curve patterns by utilizing the machine sliding attachment mechanism. All the other available systems in the market can only lay and pick up cones in straight lines.

Based on the niche design and functions of C2L, its Intellectual Properties (IP) have been registered with MyIPO to protect its originality. It proves the ownership of the system to the inventors and prevents the others from copying the system. By having the registered IPs, it allows C2L to be broadcasted to wider audience or potential customers without the imitation risk of the product. It also helps for the system to stand out from the competitors that produce system with similar functions.

“Based on the niche design and functions of C2L, its Intellectual Properties (IP) have been registered with MyIPO to protect its originality. It proves the ownership of the system to the inventors and prevents the others from copying the system.

The development of the C2L machine has the potential to change the Malaysian highway industry by encouraging the use of technology in assisting the current operational works. This low-cost product with the use of local technology can significantly increase the efficiency of the laying and picking up cones operation as compared to the manual process. Most importantly, it can reduce the risk exposure of highway facing by the workers when performing their work. The outstanding features as compared to the currently available systems show great marketing potential not only for the local market but also for ASEAN and international markets. Furthermore, the current system has been designed and developed with the potential to be further improved and automated. The continuous improvement process of the system has been currently performed to enhance its efficiency, functionality, and reliability.

Application of Technology in the Tokyo Olympics

by
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Universiti Malaysia Sarawak

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Ts. Augustus Raymond Segar and
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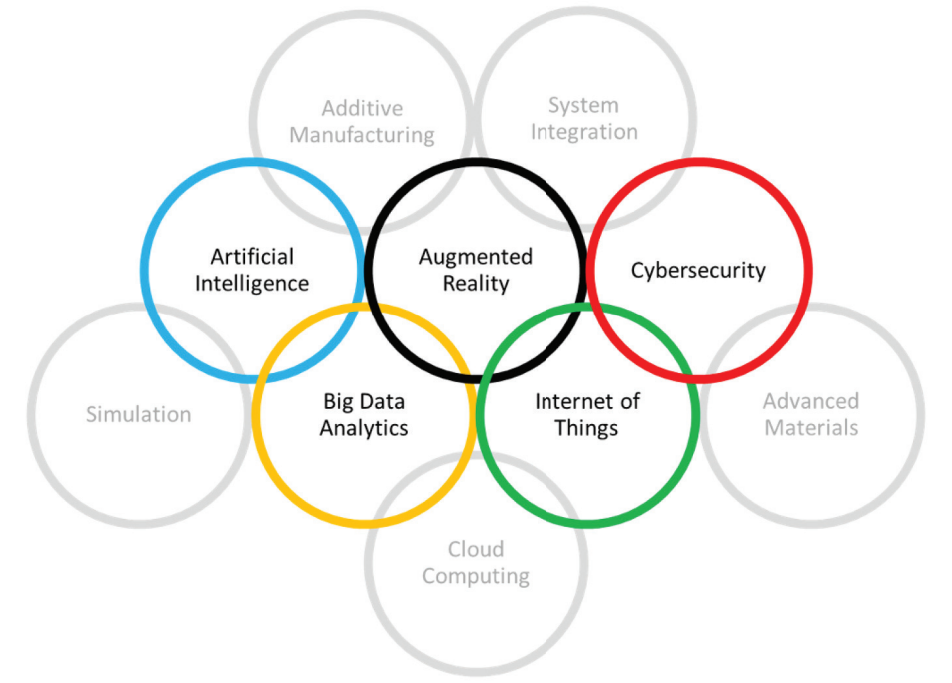
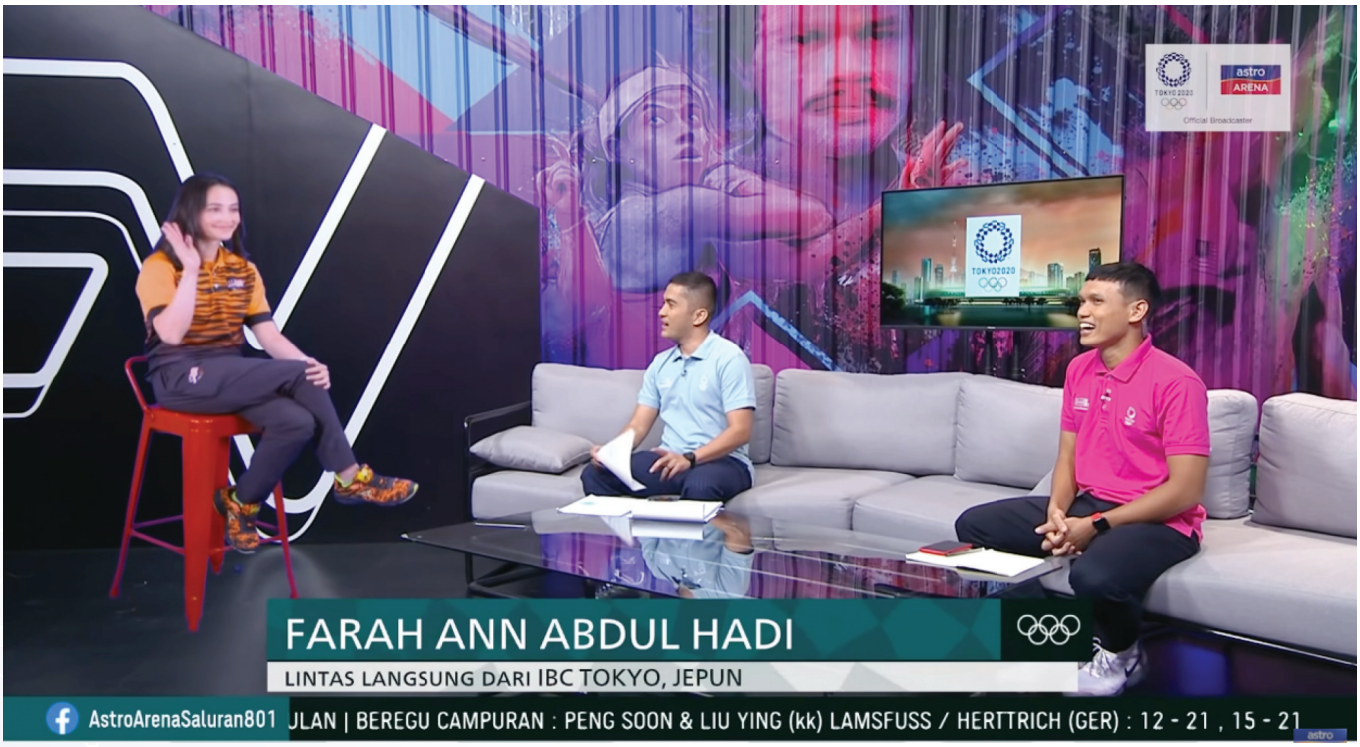
Swinburne University of Technology
Sarawak Campus

Japan and its robotics technology have a long history of technological advancement, whereas it progressed to unprecedented levels of expertise in robot creation and deployment since debuted in 1928. According to the International Federation of Robotics, Japan is now the world's leading robotics producer. Japanese history shows that they have successfully created a friendly-looking humanoid name "Gakutensoku", which was also the first Japanese robot, which was considered a big success at the time (Frumer 2020). The advancement has created "CUE5" robot, which is a basketball thrower that was introduced in the Tokyo Olympic (Golliver, 2021). This motivated the government to use its cutting-edge technology to address the unprecedented challenges of Covid-19, especially for the 2020 Olympic Games.

The pandemic of the Covid-19 outbreak affected most of the industrial sector everywhere else in the world, especially the current host of Tokyo Olympic itself. The issues range from many factors, including, the subsequent economic slowdown, global raw material scarcity, wars, and Brexit-related uncertainties. Many manufacturers use this Tokyo Olympics as a starter or an example, whereas games' technology would initiate and help the industry, by creating new cost-cutting and productivity-boosting solutions. Although Industry Revolutions 4.0 and Olympic have nothing in common, unfortunately, both of these areas are bind with the new technologies usage. Figure 1 highlights some of the technologies that were used in the event, along with other technologies of IR4.0 given in grey.



Industry 4.0 evolving and converging technologies (Ministry of International Trade & Industry, 2018).



Screengrab of the interview with Farah Ann's hologram broadcasted by Astro.

The use of technologies in The Tokyo Olympics was boosted with the new guidelines of spectator-free events. This was done to enable fans all over the world to get a better view of their favorite athletes' performance experience than they have ever had. Due to the vast and mass event of athletes compete, AI-based technologies and big data are crucial to be used for collecting and analyzing data, especially related to real-time performance, which enables the teams to build better training plans, judges and decisions. Omega, a Swiss watchmaker collected the data and processed it by using sensors, which are affixed to athletes' shirts. This may boost the collection and analyze the 2000 datasets every, including speed, acceleration, and jump height. Big data is also used to monitor the health of the athletes and industrial equipment, i.e., temperatures, pressure, vibration levels, and more. (Ballinger, 2021). The AI algorithms detect and alert potential behavior or spikes, especially on the equipment's or athletes. The athletes' data, is also used by companies for further research and development for new products, for example, the creation of bicycles, trampolines, shirts, etc. According to IBM, dark data, or data collected but not used, is projected to account for about 90% of all data created by sensors, with peaks of 95% in the engineering and construction industries. Likewise, Intel revealed its 3D Athlete Tracking (3DAT) technology (Intel, 2021) for the first time at the 2020 Olympics. The technology leverages artificial intelligence (AI) and motion-tracking software to capture skeletal data of an athlete's velocity, acceleration and biomechanics when sprinting. The lesson for manufacturers to take away from the Olympics in this circumstance is that data is only useful if a clear vision of how to use it exists.

With the social distancing rule that was strictly taking place, The International Olympic Committee (IOC) collaborate with Intel to create an immersive virtual reality (VR) training experience for athletes and management (Kelley and Saechou, 2019). It provides accurate projection and feedback on their performance using the VR system. This reduced the training costs while

improving information retention by both athletes and companies. The VR, AR and MR were also used to trained maintenance personnel and provided charts and instructions for smooth tasks. For example, safety expert AST has developed an e-training solution based on the VRdirect platform to teach users how to safely operate earth-moving equipment (Ballinger, 2020). It is observed that virtual reality might aid with staff emergency procedures training, teaching them how to detect risks and respond appropriately while keeping everyone safe. Also, AR was used to break the barrier of location as done by Malaysian Broadcast "Astro Arena", where an interview with Farah Ann was done with her "presence" in the studio using holograms for the first time, as shown in the screengrab from Astro Arena Youtube (Astro, 2021).

To improve and boost security, face recognition technology was utilized for the first time during the Olympics, whereas it speeds up the ID verification for over a few hundred thousand participants, sponsors, media, and staff members (Shankland, 2019). The technology prevents identity theft and illegal entry to restricted locations, especially at the venue and hotel admission points. The technique is twice as fast as standard ID checks, resulting in shorter lines and fewer people at access points. Face recognition may successfully replace less reliable means of tracking access to classified areas in manufacturing, such as key cards and USBs, which are easily stolen or hacked. Facial recognition offers an additional layer of security by ensuring that only authorized personnel have access to potentially hazardous regions or places containing sensitive data. Furthermore, the use of robots for security, cleaning and signage were deployed in Narita Airport during the Olympics for enhanced security and labor-saving of operation especially during the Covid-19 situation (Olympics, 2020).

This technology may also improve safety, for example, by comparing an employee's identity to a company's training records to ensure that individuals working at a particular station have the requisite expertise to operate potentially dangerous equipment. During the Olympics, countries competed in a variety of sports, but their economy was also competing in a technology race. Manufacturing businesses might profit from the Tokyo Olympics' innovations in terms of improving safety and efficiency, as well as future-proofing their operations.

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MAJLIS PELANCARAN MBOT TECHNOLOGY & INNOVATION EXPO (MTeX'21)

Menteri Sains, Teknologi dan Inovasi (MOSTI), YB Dato' Sri Dr. Adham Baba telah melancarkan MBOT Technology & Innovation Expo (MTeX'21), bertemakan 'Technological Talent for Sustainable Development' pada 2 November 2021.

Ekspo yang berlangsung dari 25 Oktober 2021 sehingga 28 Februari 2022 ini bertujuan untuk memupuk budaya inovasi dalam kalangan Keluarga Malaysia di samping menyediakan bakat berkemahiran tinggi seperti yang digariskan dalam Dasar 4IR Negara, Rancangan Malaysia Ke-12 (RMKe-12) dan Rangka Kerja 10-10 MySTIE.

Pelancaran ini diterajui oleh MOSTI menerusi MBOT yang menyasarkan supaya lebih banyak unicorn dan syarikat bertaraf dunia seperti Aerodyne dan Carsome dapat dilahirkan di Malaysia.

YB Dato' Sri Dr. Adham berkata, "Dalam Pemangkin Dasar 1 RMKe-12 iaitu 'Membangunkan Bakat Masa Hadapan', tumpuan diberikan kepada penjajaransemula pasaran buruh, pendidikan dan latihan. Kerajaan menyedari bahawa pembangunan bakat adalah asas yang amat penting kepada dasar jangka panjang negara ini".

MOSTI komited untuk memastikan budaya inovasi yang berimpak tinggi dan berkualiti untuk dikomersialkan bagi memenuhi kehendak pengguna dan sekali gus mendapat permintaan tinggi dalam pasaran. MOSTI akan membantu dengan membangunkan ekosistem, kapasiti, lembaga kawal selia serta geran yang bersesuaian untuk membantu anak muda dalam bidang teknologi dan teknikal.

Program MTeX'21 kali ini mempertandingkan tiga kategori iaitu kategori pelajar tahun akhir diploma, ijazah sarjana muda dan ahli profesional MBOT. Hadiah keseluruhan bagi pertandingan ini adalah berjumlah RM30,000. Majlis pelancaran ini diadakan di Dewan Sultan Ibrahim, Universiti Tun Hussein Onn Malaysia (UTHM) Batu Pahat yang disertai oleh 70 orang wakil dalam kalangan universiti, pemain industri dan organisasi berkaitan.

MTeX
MBOT TECHNOLOGY & INNOVATION EXPO 2021
TECHNOLOGICAL TALENT FOR SUSTAINABLE DEVELOPMENT

TIGA (3) KATEGORI PENYERTAAN:

KATEGORI A
AHLI PROFESIONAL MBOT

KATEGORI B
PELAJAR TAHUN AKHIR IJAZAH SARJANA MUDA

KATEGORI C
PELAJAR TAHUN AKHIR DIPLOMA

02 Nov 2021	31 Jan 2022	28 Feb 2022	20 April 2022	01 Jun 2022
Majlis Pelancaran MTeX 21 di UTHM	Pemilihan 10 Projek Terbaik	Penilaian Peringkat Pertama	Penilaian Peringkat Kedua	Penilaian Akhir serta Majlis Penutup dan Penyampaian Hadiah

TERMA & SYARAT PENYERTAAN

1. Penyertaan terbuka kepada semua pelajar tahun akhir bagi program Diploma, Ijazah Sarjana Muda dan ahli profesional berdaftar MBOT (Teknologis Profesional – Ts./ Juruteknik Bertauliah – Tc.)
2. Hanya warganegara Malaysia sahaja dibenarkan.
3. Penyertaan adalah secara individu atau berkumpulan; tidak melebihi 5 orang bagi setiap kumpulan.
4. Pertandingan berlangsung dari **25 Oktober 2021 sehingga Jun 2022.***
5. Tarikh akhir penyertaan adalah sebelum **25 Januari 2022 jam 11.59 malam.*** Penyertaan lewat tidak akan dipertimbangkan. Penghantaran penyertaan hendaklah berserta video dan kertas cadangan produk inovasi seperti beikut:

i. Video:
a) Tidak melebihi 3 minit
b) Penerangan mengenai produk dan fungsi keberkesanannya
c) Perlu dimuatnaik di laman Youtube dan pautan video tersebut perlu disertakan ketika menghantar penyertaan

ii. Kertas cadangan perlu mengandungi:
a) Nama Inovasi
b) Penyataan masalah
c) Cadangan penyelesaian masalah
d) Impak dan faedah kepada pengguna
e) Rujukan

6. Hanya satu produk inovasi sahaja yang boleh dipertandingkan oleh peserta/kumpulan.
7. Penyertaan wajib bertemakan ***"Technological Talent for Sustainable Development"*** manakala skop pertandingan inovasi perlu merujuk kepada Rangka Kerja dalam dasar 10-10 MySTIE.
8. Peserta atau seorang wakil kumpulan yang disenarai pendek **wajib** mengikuti kursus *pitching* yang akan dianjurkan oleh pihak penganjur.* (untuk kategori B dan C sahaja).
9. Penyertaan produk inovasi yang telah dipertandingkan di peringkat kebangsaan atau antarabangsa tidak akan dipertimbangkan.
10. Segala kos penyertaan adalah di bawah tanggungan peserta.
11. Keputusan juri adalah **MUKTAMAD** dan sebarang rayuan dan aduan tidak akan dilayan.

**Sebarang perubahan akan dimaklumkan dari semasa ke semasa*

HADIAH BAGI SETIAP KATEGORI

KATEGORI A
Tempat Pertama:
• RM7,000.00
+ Plak + Sijil Penghargaan
Tempat Kedua:
• RM4,000.00
+ Plak + Sijil Penghargaan
Tempat Ketiga:
• RM2,500.00
+ Plak + Sijil Penghargaan

KATEGORI B
Tempat Pertama:
• RM5,000.00 + Sijil Penghargaan
+ Pendaftaran GT MBOT
Tempat Kedua:
• RM3,000.00 + Sijil Penghargaan
+ Pendaftaran GT MBOT
Tempat Ketiga:
• RM2,000.00 + Sijil Penghargaan
+ Pendaftaran GT MBOT

KATEGORI C
Tempat Pertama:
• RM3,000.00 + Sijil Penghargaan
+ Pendaftaran QT MBOT
Tempat Kedua:
• RM2,000.00 + Sijil Penghargaan
+ Pendaftaran QT MBOT
Tempat Ketiga:
• RM1,500.00 + Sijil Penghargaan
+ Pendaftaran QT MBOT

GT = Graduate Technologist QT = Qualified Technician

Untuk pendaftaran dan maklumat penyertaan program, layari **www.mbot.org.my**

Memorandum Persefahaman (MoU) antara Lembaga Teknologis Malaysia (MBOT) dan Yayasan Peneraju Pendidikan Bumiputera (Yayasan Peneraju) ditandatangani oleh YBrs. Ts. Mohd Muzzammil Ismail, Ketua Pegawai Eksekutif, Yayasan Peneraju dan YBhg. Datuk Ts. Ir. Dr. Siti Hamisah Tapsir, Presiden MBOT yang disaksikan oleh YB Datuk Seri Mohd Redzuan Md. Yusof, Menteri di Jabatan Perdana Menteri (Tugas-Tugas Khas) dan YB Datuk Haji Ahmad Amzad Hashim, Timbalan Menteri Sains, Teknologi dan Inovasi.

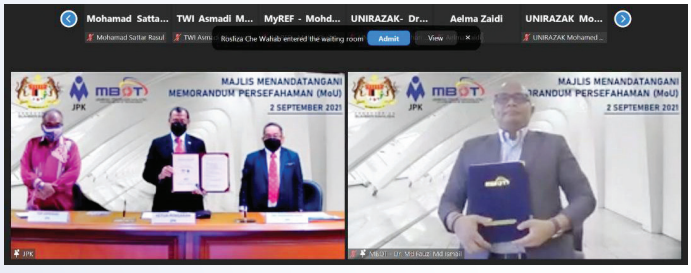
SOROTAN 2021

Lembaga Teknologis Malaysia (MBOT) telah menerima lawatan rasmi dari YB Dato' Sri Dr. Adham Baba, Menteri Sains, Teknologi dan Inovasi bertempat di Pejabat MBOT, Putrajaya.

Lembaga Teknologis Malaysia (MBOT) dan EduCity Iskandar Malaysia Sdn Bhd (EduCity) telah memeterai Memorandum Persefahaman (MoU) bersempena Majlis Pelancaran Program PERANTIS Iskandar yang telah disaksikan oleh YAB Dato' Haji Hasni Mohammad, Menteri Besar Johor. Pemeteraian dan pertukaran MoU ini telah disempurnakan oleh Presiden MBOT, YBhg. Datuk Ts. Ir. Dr. Siti Hamisah Tapsir dengan Pengarah Urusan EduCity, Encik Wan Ahmad Saifuddin Wan Ahmad Radzi.

Lembaga Teknologis Malaysia (MBOT) telah memeterai Memorandum Persefahaman (MoU) bersama Johor Centre for Construction Development (JCCD) bersempena majlis Johor Construction Awards (JCA). YAB Dato' Haji Hasni Mohammad, Menteri Besar Johor turut menyaksikan pemeteraian beberapa MoU di antara JCCD dengan rakan-rakan strategik yang berkaitan.

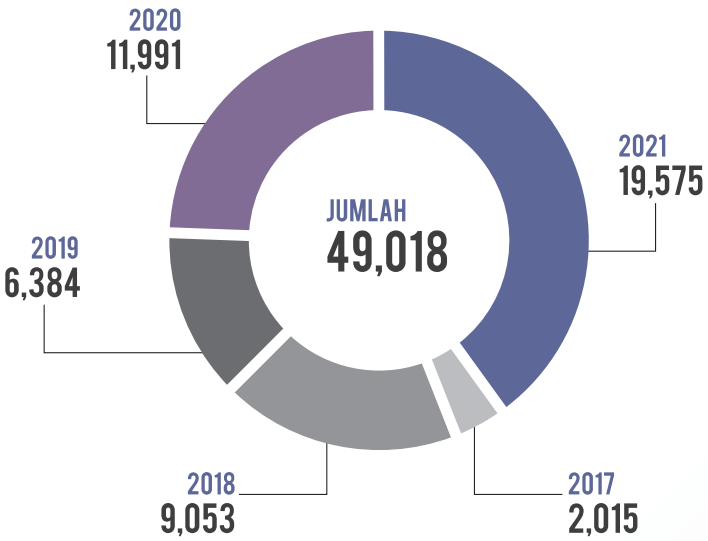
YAB Dato' Haji Hasni Bin Mohammad, Menteri Besar Johor telah mendapat penganugerahan sebagai Teknologis Profesional (Ts.) yang disampaikan oleh YBhg. Datuk Ts. Ir. Dr. Siti Hamisah Tapsir, Presiden Lembaga Teknologis Malaysia (MBOT) semasa majlis Johor Construction Awards (JCA) anjuran Johor Centre for Construction Development (JCCD).



YBhg. Dato' Ts. Hj. Zaihan Shukri, Ketua Pengarah Pembangunan Kemahiran mewakili JPK telah menandatangani Memorandum Persefahaman (MoU) manakala MBOT diwakili oleh YBrs. Dr. Md Fauzi Md Ismail, Pendaftar MBOT. Majlis yang diadakan secara atas talian ini turut dihadiri oleh YBrs. Ts. Dr. Mohamad Sulaiman, Timbalan Ketua Pengarah (Pembangunan) dan YBrs. Dr. Mohd Rashid Buyong Hamzah, Timbalan Ketua Pengarah (Operasi).

PENCAPAIAN MBOT 2021

PENDAFTARAN MENGIKUT TAHUN



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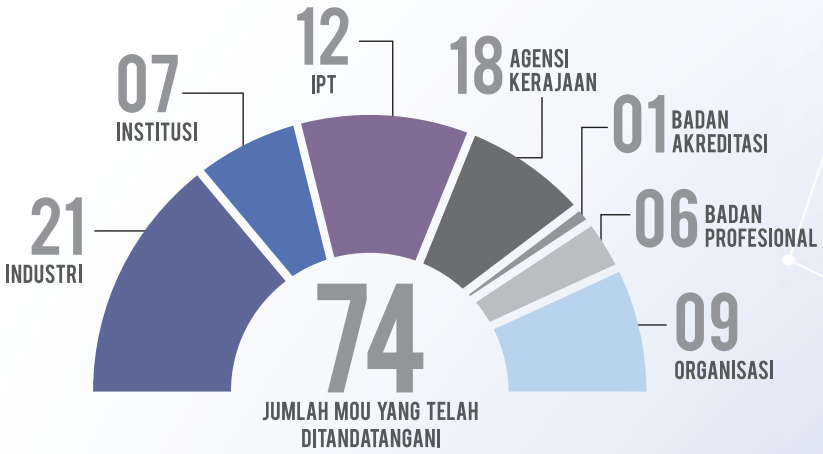
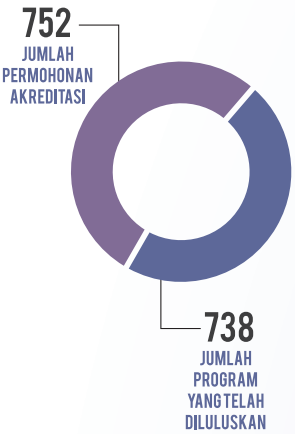
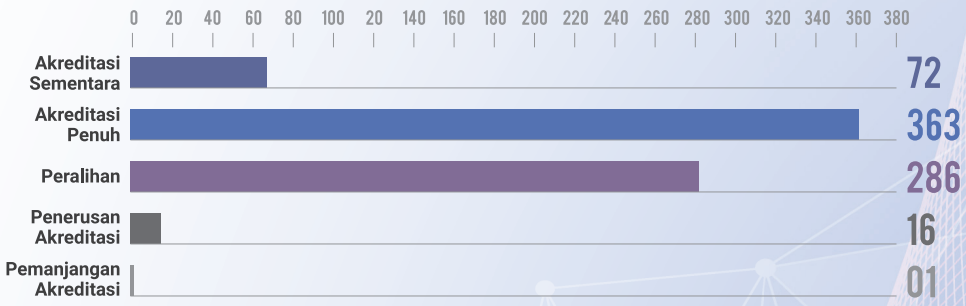


KUMULATIF PROGRAM AKREDITASI



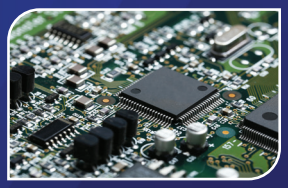


24 FIELDS OF TECHNOLOGY & TECHNICAL

RECOGNISED BY MBOT

To-date, MBOT has recognized 24 Technology and Technical Fields. These technology fields are not permanent and will dynamically change based on the rapid growth of technology. Each Technology Fields has gone through rigorous verification and requirements study before it was being approved by the Board and recognised as MBOT Technology and Technical Fields.

Each Technology and Technical fields was defined by MBOT's Technology Expert Panel which consists of representative for the industry, relevant government agency and academia. The Key Area for each Technology and Technical Fields was also defined properly to cover the wide angle of Technology Fields and its implementation in the industry.



(EE) Electrical & Electronics Technology

(IT) Information & Computing Technology

(CM) Chemical Technology

(TB) Telecommunication & Broadcasting Technology

(BT) Biotechnology

(BC) Building & Construction Technology

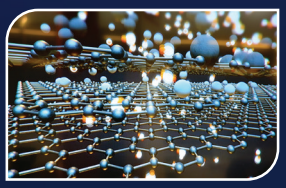
(RB) Resource Based, Survey & Geomatics Technology

(ME) Manufacturing & Industrial Technology

(AF) Agro-based Technology

(CS) Cyber Security Technology

(TL) Transportation & Logistics Technology



(MT) Material Science Technology

(MR) Marine Technology

(MI) Maritime Technology

(AC) Atmospheric Science & Environment Technology

(GT) Green Technology

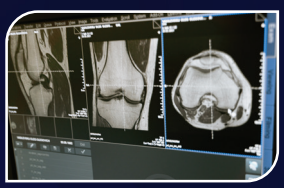
(OG) Oil & Gas Technology

(AT) Automotive Technology

(AV) Aerospace & Aviation Technology

(FT) Food Technology

(NT) Nanotechnology



(NR) Nuclear & Radiological Technology

(AM) Art Design & Creative Multimedia Technology

(HM) Health & Medical Technology