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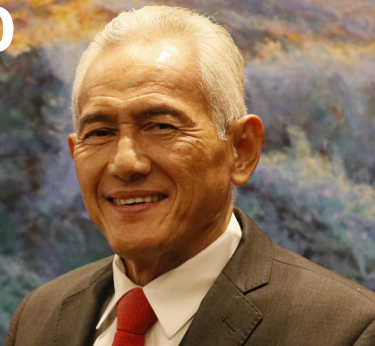**www.eventsforce.net/britishcouncil/3796/register**

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Inside
myForesight®

> **"** Not everything will work for us. We need to experiment with emerging trends; should we explore vertical harvesting or perhaps try harvesting out of a warehouse? **"**
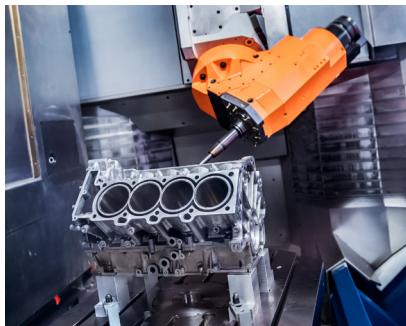>
> **10**

myForesight® is pioneering a national level foresight initiative to facilitate technology prospecting for local businesses. myForesight® advises and provides a common platform for the government, industry and academia to share experience, insights and expertise on 'futures' strategy, both locally and at a larger global level.

Key components of myForesight's mission are intelligence, research, competency framework and community engagement. myForesight® raison d'etre is set out to accomplish the following:

1. Anticipate Malaysia's future possibilities;
2. Promote foresighting at national, sectoral and corporate levels;
3. Identify key technologies to support sectoral development;
4. Outline key future R&D areas.

INITIAL THOUGHTS

CONNECT AND COLLABORATE

Rushdi Abdul Rahim
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Greetings and salutations,

Again, I am writing this from home, adhering to the restrictive movement control – though relaxed - that has been enforced since March 2020. The COVID19 has been a major disruptive force, disrupting businesses, science and engineering research and education. At present, international travel is curtailed and in-person physical collaborations are being put on pause and is uncertain in the near future. International collaborations are now faced with new challenges and opportunities.

> **" No country can do it alone. More than ever, governments must cooperate to revitalise economies, expand public investment, boost trade, and ensure targeted support for the people and communities most affected by the disease or more vulnerable to the negative economic impacts… "**

António Guterres
Secretary General, United Nations

Many of these collaborations have been hard hit by health and safety concerns, shutdowns, and unreliable internet infrastructure. However, there are others that have achieved new levels of productivity, taking advantage of technology, moving forward the collaborations through data sharing and dissemination of results.

As we imagine details of what a post-COVID19 world will look like, we know that quality international collaborations will be fundamental for dealing with existing and emerging global challenges, as well as addressing the needs of respective countries. The test will be the balancing act of meeting global challenges while still aligning with national interests and needs.

However, in uncertain times such as these, how can we plan for an effective international collaboration in a post-pandemic world? This will depend on the goals, objectives and strategies as well as the value we define out of these collaborations. Many attempts have been made to measure both the quantitative and qualitative impacts of such endeavour.

As mentioned in the previous edition of this magazine, organisations - both public or private - need to take stock of the impact of the pandemic on their operation and steps to strengthen partnerships in the post-pandemic world. As organisations go through the disruption, travel restrictions and lockdowns – they are forced into making operational changes. In many cases, parts of this shift will become the 'new normal' in the post-pandemic world. The disruptions will also heighten gaps in organisation's international partnerships function.

At MIGHT, we are a firm believer of benefits and advantages of international collaboration and that the pandemic offers opportunities to strengthen some of the cooperation even though we are still evaluating the impacts of COVID19 on these partnerships, especially in research and education. We continue to advocate and encourage efforts to enable

more robust, resilient, and sustainable collaborations. The documenting and sharing of lessons learned will from these initiatives will strengthen future efforts. Some of the fruits of these collaborations are presented in the following pages of this edition.

It goes without saying that the future of development cooperation will be significantly impacted by the current pandemic crisis. There will be a new narrative for international collaboration, particularly with budgets coming under increasing pressure due to the economic stress. Under these circumstances, will international collaboration be increasingly multi-directional and universal? Will these developments herald a new form of cooperation or do they further reinforce of existing models and practices? Will countries be more insular and withdraw themselves from international collaboration or multi-lateral organisations? We are already seeing this with United States of America's decision on contributions to World Health Organisations (WHO) as well as its withdrawal from the Paris Agreement. Is this a blip or part of a larger trend? In one of the scenarios sessions I was involved in, we discussed about a multi-track world.

António Guterres aptly titled his address in March this year. "COVID19: We will come through this together." In it, he mentioned that "No country can do it alone. More than ever, governments must cooperate to revitalise economies, expand public investment, boost trade, and ensure targeted support for the people and communities most affected by the disease or more vulnerable to the negative economic impacts."

As we are faced with the challenges brought about by the pandemic, only by working together we will get through this - continue to practice #physicaldistancing and adhere to the necessary standard operating procedures (SOP) being outlined by the Health Authorities. #StaySafe.

A number of megatrends are changing the face of collaborative work, and chief among them is hyperconnectivity. Inevitably, this is the result of an increasingly accelerated evolution in communication.

The term 'hyperconnectivity' does not only refer to the myriad means of communications and interactions, but also the impact it has on both personal and organisational behaviours. Hyperconnectivity pushes aside the issue of unreachable distance, and therefore allows us to be much closer to those who are geographically farther apart. Also, hyperconnectivity provides us a new medium to disseminate information and elicit collaborative communication among people, institutions, experts, professionals, and service providers and their users.

HOW
HYPERCONNE
IS CHANGING
COLLABORATION

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KEY ATTRIBUTES OF HYPERCONNECTIVITY

- Always-on connection
- Readily accessible
- Rich in information
- Interactive & diverse
- Beyond people
  Includes people-to-machine and machine-to-machine communications
- Always recording
- Performance and stability

TYPES OF
COLLABORATIONS

Team Collaboration

This is one of the most common types of business collaborations in the workplace. Every team member knows their role and how it impacts other team members. Team collaborations are pegged to deadlines and tasks are carried out within a specified timescale.

Network Collaboration

Network collaborations start with individuals taking action in the scheme of their own interests. Following this, these individuals start contributing to the network to make themselves and their areas of expertise known to other members. Typically, they rely on referrals to find out who they should be collaborating with among network members.

Community Collaboration

In community collaborations, oftentimes, the goal is to share knowledge and learn. By sharing concerns, asking questions and seeking advice, eventually, all community members benefit from their associations with one another.

Strategic Alliance Collaboration

The most basic and longstanding type of collaboration for innovation is the strategic alliance. Strategic alliances are agreements between two (dyads) or more (triads, for example) independent firms, which temporarily combine resources and efforts to reach their strategic goals.

A hyper-connected world is emerging. In view of these wholesale changes, people and things will be linked together seamlessly via information sharing. Better connectivity means more collaborations and this will blur lines and ultimately, change the way businesses and our societies create value. Today, public and private sectors use technology to connect people and communities. By taking advantage of today's sophisticated collaborative tools, businesses and organisations can offer physical and remote group work a great deal of support, therefore improving productivity.

Reference

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- The Australian Business Review, The pros and cons of crowdsourcing

TECHNOLOGY, TOOLS AND PLATFORMS

HOW IT IMPROVES COLLABORATION

Cloud technology allows more than one user to access, read, and edit documents in real-time. When documents are stored on cloud, users get to access and view changes as they are being made.

Cloud collaborations can be used in organisations where teams are expected to collaborate remotely or in a case where a company has one or more satellite offices. Cloud is an especially effective means to share large files. A cloud-based collaboration overcomes traditional ICT limitations and speeds things up when it comes to transferring large files.

Collaborative screenshots and screen recording videos. By using a wide range of software that take pictures and record on-screen videos, working teams can now turn these screengrabs into condensed links. This allows colleagues and peers to collaborate as effectively as working in the same room.

These communication software take screen sharing to the next level—combining videos, audios and message-based collaborations that allow users to capture, comment and share what they see on their screen. This collaborative feature makes both real-time and asynchronous troubleshooting easier.

Video conferencing is a technology that allows users across many different locations to hold face-to-face meetings. Team members interact in real-time, and address questions together by sharing their screens.

There are many ways one can make the most out of video conferencing, such as company meetings, training sessions, or to an extent, address board members. Video conferencing can be used to connect with others from various postcodes or locations and it provides an alternative solution to doctor-patient communication. Also, it increases trust between customers and sellers among others.

Social media provides a tenacious collaborative network where its members collaborate virtually with minimum fuss or the need to gain familiarity among agile working groups.

We collaborate with others almost everyday without realising it. The act of retweeting a tweet we like, subconsciously, we are conveying that we feel the same way. Or think about the last time we asked a friend for a second opinion. All these are choices that are readily available to us on social media as it allows us to collaborate with the people around us at our fingertips.

Crowdsourcing involves sharing or outsourcing project tasks to a community of collaborators in place of traditional methods such as subcontracting.

Crowdsourcing offers many tangible benefits.

It also opens up access to a wider network of resources, talents, skills and niche goods. Regardless of location, crowdsourcing promotes speed and transparency in order to find optimal solutions for projects of any size.

IoT (internet of things) enables daily tasks to be done remotely. In the not too distant future, the level of hyperconnectivity that IoT will provide will almost certainly change both our personal and working environments.

In the industrial sector, systems and devices are used to increase productivity and incorporate improvement for new tools. Hyperconnectivity in Industry 4.0 allows a higher level of connectivity and sophistication of processes, both carried out inside and outside. This way, production will be able to interact not just inside a factory, but at every step of the value chain: customers, suppliers, etc. Hyperconnectivity smoothens communication, increases trust and allows businesses to know their customers, suppliers and vendors better.

DATUK IR. (DR.) ABDUL RAHIM BIN HASHIM

MIGHT's Joint-Chairman (Government)

Datuk Ir. (Dr.) Abdul Rahim bin Hashim has a strong passion for science and research. His background in electronics and electrical engineering describes his fascination with abstract thinking and imagination; in this discipline one cannot always see what is going on. Much is simply not visible. Hence, the need for a strong grasp of fundamental concepts, the ability to think openly and abstractly, and apply nonlinear math and partial differential equations in solving problems helped create the challenge that he always thrives on.

Datuk Rahim joined Petroliam Nasional Berhad (PETRONAS) as an Engineer in 1976 and devoted the next 32 years of his career in helping grow PETRONAS into the giant it is today. His illustrious career also saw him steer two prestigious universities in Malaysia; he was appointed as the 3rd Vice-Chancellor of Universiti Teknologi Petronas and subsequently as the 12th Vice-Chancellor of Universiti Malaya, the nation's premier research University. Datuk Rahim's appointment as MIGHT's Joint-Chairman (Government) in 2019 comes as no surprise, a role befitting his expertise, knowledge and vast experience.

This edition of myForesight® is proud to feature his insights and wisdom on the importance of research, innovation and collaboration.

Flipping the script: Channelling connection & collaboration into purpose-driven high-tech action

Collaborations are pivotal for research universities and research institutes. Are we doing well in this space?

In the early years, research did not have much traction within the ecosystem of our local universities. Looking back some 15 years, the emphasis of local universities was primarily on teaching and learning. It was not until early 2000s, when research rapidly gained ground across universities and this fundamental shift was evident in the period 2006 - 2007. By 2010, five local universities gained recognition as research universities. This development although somewhat recent, displays a clear commitment on the part of local universities to champion research as a central part of its mission.

In contrast, research institutions in Malaysia such as the Institute for Medical Research (IMR) and the Rubber Research Institute of Malaysia (RRIM), now renamed the Malaysian Rubber Board have had a long history in R&D. RRIM for instance made

headway for the rubber industry by producing a number of impressive innovations including the Malaysian standards for rubber and rubber products. Another shining example is in the increase in production of value-added rubbers locally; RRIM together with the Tun Abdul Razak Research Centre in the United Kingdom developed new rubbers such as epoxidised natural rubber (ENR), deproteinised natural rubber (DPNR) and thermoplastic natural rubber (TPNR) which revolutionised heavy duty engineering including earthquake isolators. Equally, medical research through IMR and palm oil research through the Malaysian Palm Oil Board also had its heydays.

Indeed, we are proud of the many tech blockbuster collaborations and discoveries by our research universities and research institutions; whether undertaken individually or by collective action. But are these institutions collaborating enough to garner scientific knowledge in solving complex social, environmental and economic challenges? Whilst pioneering mold-breaking discoveries are to be commended, a greater flow of ideas and research collaborations across institutions is imperative to reinvigorate our R&D activities and contribute towards the upward trajectory in translational research.

Perhaps it is time to pause and reset our collaborative approaches; this measure will not only strengthen our research and innovation ecosystem but will ultimately serve our nation and provide greater impact to society as a whole.

What would be the role of research universities considering today's rapid social, economic and technological change, and why?

'Change' has been the buzz-word this year. The COVID19 pandemic took the world by surprise. Its profound effect has brought about unprecedented challenges requiring creative responses more now than ever before. For research universities, the key to coping during this, or any time of upheaval is to quickly establish alternative approaches and embark on critical R&D activities to support the social, economic and technological changes. All endeavours of research universities, be it research or teaching and learning will require change; we need to pandemic-proof our routines into targeted and effective responses. Creative approaches to industrial R&D can galvanise our high-tech industry.

Take for example the global demand for oil palm and the notion of producing hybridized oil palm trees in the country. Oil palm production can be transformed into a much more significant economic sector. We are already ahead in the advancement of technology to extract palm oil, but the physical work on the field requires creative solutions. Harvesting oil palm from hybridized trees can

> **" We are already ahead in the advancement of technology to extract palm oil, but the physical work on the field requires creative solutions. "**

reduce time spent in searching for and collecting scattered loose fruits and minimise uncollected scattered fruits. For the longest time, there has been no concerted attempt to champion this cause in a holistic manner. Instead, research and solutions have for the most part only addressed pockets of issues. Our research universities need to be equipped for this challenge.

What does it take for Malaysia's oil palm industry to remain competitive in the regional and global market? Reliance on individual players in the market and the establishment of private labs may have limitations in fostering innovation. Research universities certainly play a key role here. The convergence of scientific knowledge and collective wisdom of the academic community is likely to shape the nation's response to the many social, economic and technological changes that we are confronted with today. In this context, the role of research universities in R&D activities around the much-needed vaccine against COVID19 is worth exploring. Were our research universities in a position to play a greater role in advancing this vaccine? Given possible constraints, individually this may have been a challenge but at the National level, this could have been attempted through strategic partnerships with our research universities and industry.

Beyond academic papers, how does research inculcate a scientific literate society?

Quite simply, beyond publications, research inculcates scientific literacy which helps society in making rational and informed decisions. Research and innovation can also reduce our dependency on other industries and this can have a strong impact on our import volume and the diversity of our products. Agriculture for example is one of our strengths. However, we need to keep abreast with the latest technology and practices to maximise output, outcomes

and impact. Not everything will work for us. We need to experiment with emerging trends; should we explore vertical harvesting or perhaps try harvesting out of a warehouse?

In tandem with this approach, it is crucial that our research universities and research institutes are equipped to mobilise critical pilot projects and innovative approaches which may help determine flagship products.

In terms of developing our youth in becoming scientifically literate, our education needs to be balanced and well suited to their future needs. It is no longer about choosing between arts or science courses. It is also not about the technical side of technology. What remains paramount is having a curious mind, the ability to think critically and creatively, ask the right questions, interact and communicate effectively. If we can address this, we will produce a sufficient pipeline of bright minds that can surmount challenges that come their way; and the answers might not even be science-based solutions.

Closing remarks

There are obviously a lot of dots that we need to connect. Connecting and collaborating is no longer an option. We need to ensure that we have a clear end-goal in mind. We cannot solve issues in a holistic manner by merely addressing specific areas of research.

As an early step, our government, research universities, research institutions and industries will need to coordinate and synthesize research to build a comprehensive focus on the economic threats posed by emerging new realities. Ultimately, this can help us to translate research into robust guidelines that fully balance economic, and social risks and rewards. This would also inject accountability and transparency into vital decisions that often do not receive the input they deserve. Our research universities and research institutes should leverage on their expertise in shaping best practices for our high-tech industry in ensuring optimised economic outcomes. All said and done, we are in dire need of a coherent national research strategy and guidance from the relevant authorities, without which, we could be left scrambling for impactful execution and outcomes.

> **Not everything will work for us. We need to experiment with emerging trends; should we explore vertical harvesting or perhaps try harvesting out of a warehouse?**

IDA SEMURNI ABDULLAH ALI
Vice President, MIGHT

Ida Semurni is a vice president at Malaysian Industry-Government Group for High Technology (MIGHT). Ida oversees the delivery of Newton-Ungku Omar Fund's programmes; the largest bilateral partnership between Malaysia and United Kingdom in STI since 2015. Following this, the partnership's impact has rippled through other similar international partnerships with Spain and Qatar. Quite significantly, these multilateral collaborations have injected focus, accountability and speed into member countries' technology and innovation growth.

Trained as a chemist, Ida graduated from University of Science Malaysia (USM). Her corporate CV to date includes managing Malaysia's Performance Management and Delivery Unit's (PEMANDU) National Transformation Programme—increasing high-leverage activities via the "Big Fast Results" methodology. Previously, Ida's work includes numerous involvements in the development of the National Biotechnology Policy, the National Nanotechnology Policy and the Third Industrial Master Plan (IMP3).

Newton-Ungku Omar Fund:
Its impact and future expectations

What are the characteristics of current international collaboration activities?

Most countries today share similar challenges and issues—health, environment and food security and not to forget, COVID19's impact on people's livelihoods around the world. However, these challenges come with unique opportunities to create a better future. As such, international partnerships and collaborative efforts are key in order to mitigate these issues together.

Since independence, Malaysia has been open to international partnerships and collaborations. As a country, we participate in numerous inter-governmental organisations namely the United Nation (UN) and the Organisation of Islamic Cooperation (OIC). Local businesses are also encouraged to foster partnerships with global players to accelerate growth and tap into larger global markets. As a result, our higher learning institutions have greatly benefited from such collaborations as a way to advance research and disseminate new applications of knowledge and innovation both locally and globally.

As an organisation that thrives off partnerships with public and private sectors, MIGHT strongly advocates partnerships and collaborations as a key component of organic and non-organic growth. From day one, we have always welcomed collaborations with both local and international organisations. What lies before us is the opportunity to build a more equitable way of life and partnerships give us tremendous insights and expertise to strengthen our understanding of key industries.

How policies and funding mechanisms encourage international collaborations?

The Newton-Ungku Omar Fund (NUOF) was established as a partnership effort between Malaysia and the United Kingdom government to promote science, technology and innovation (STI). NUOF is a part of the Newton Fund bilateral programme. It promotes innovation partnerships in a bid to unlock new opportunities for both countries.

As NUOF's country representative and coordinator, MIGHT works hand in hand with United Kingdom's Department of Business, Energy and Industrial Strategy (BEIS). To date, 30 joint-programmes have been implemented under NUOF and MIGHT's banner as well as other delivery partners from both countries.

In addition, the funding model introduced by these programmes ensures mutual commitment and win-win propositions for all parties involved. Given this, the success of this model has also attracted other countries' interests the likes of Spain and Turkey to initiate similar bilateral programmes with MIGHT.

NUOF: "The Fund is creating opportunities to build science skills and capabilities; to forge new partnerships between UK and Malaysian researchers; to carry out fundamental research; and to support the translation of research into innovations that improve economic and social welfare in Malaysia." HE Charles Hay, British High Commissioner to Malaysia

How would researchers benefit from international collaborations?

NUOF programmes are tailored to meet Malaysia's national priorities in science, technology and innovation. NUOF gives priority to translational joint-programmes as we seek to bring key research outputs and new technologies from the laboratory to the market. To this end, MIGHT brings together world class researchers, industry players and government agencies to turn our most pressing challenges into shared-opportunities. To illustrate, one of our flagship programmes is the Research and Innovation Bridge. Launched in 2017, the programme is jointly managed by MIGHT and Innovated UK

" **I am proud to see the development of the Kuala Lumpur Multi-Hazard Platform (MHP). It integrates selected meteorological and hazard models onto a common platform designed for managing and communicating risks and enhancing disaster resilience.** "

and within a short span of time, the programme has pushed through at least two new innovations and real solutions born out of these enterprising research and industry partnerships.

Also, I am proud to see the development of the Kuala Lumpur Multi-Hazard Platform (MHP). It integrates selected meteorological and hazard models onto a common platform designed for managing and communicating risks and enhancing disaster resilience. The MHP is now located at the Kuala lumpur City Hall (DBKL) to support and strengthen the management of flash floods, landslides, sinkholes and air pollution as climate changes. The Kuala Lumpur MHP can be replicated across other cities in Malaysia as well as Asia Pacific. Saliently, the project's output has demonstrated the importance of leveraging technology and innovation to facilitate a more efficient city management.

> " We are very keen to see Malaysia-UK collaborations deliver real benefits to both countries. In today's almost borderless world, international partnerships are becoming more and more important to address challenges of the highest needs. "

Additionally, another major breakthrough facilitated by NUOF is the Edgibility Data Centre which is now the only Titanium level certified data centre in Asia Pacific and the Middle East. With a PUE metric of 1.046, the data centre uses half the energy of conventional data centres. The Submersify coolant; the Malaysian innovation in this project is renewable, sustainable and biodegradable. These 2 innovations act as notable evidences of partnership and collaborative efforts' impact in formulating actionable solutions to address pressing global issues such as the climate change.

What are the socio-economic benefits of international collaborations?

Significantly, the outputs and outcomes of NUOF's joint-programmes are far-reaching and diverse. We realise that science communication is important to help our change actors, especially our scientists and researchers tackle the

demand of an increasingly competitive global market. Since, we have established a number of science communication programmes. These programmes include masterclasses conducted by established science communicators from the UK, targeting young professionals in STEM areas to participate. Over the last three years, two of our science communication participants had been recognised as the World's Best Science Communicators in 2016 and 2018.

Looking ahead, at MIGHT, we are very keen to see Malaysia-UK collaborations deliver real benefits to both countries. In today's almost borderless world, international partnerships are becoming more and more important to address challenges of the highest needs. Indeed, MIGHT is proud to have been given the opportunity to play such a pivotal catalytic role in engineering impactful partnerships with a reputable partner like the United Kingdom.

PATENT SCANNING
Artificial Intelligence

Global & Local Patent Trends

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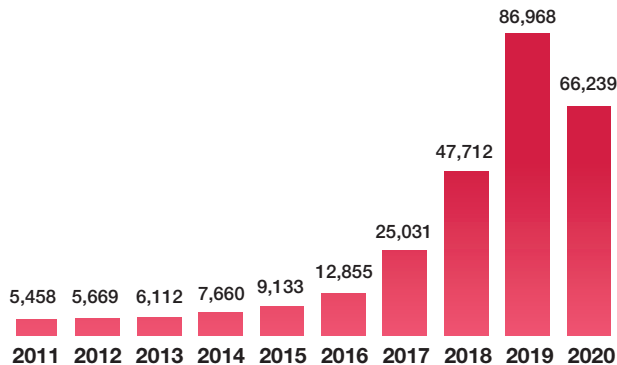### Trends in AI patent registration

Lining up Malaysia's AI patents against global patent registrations.

As evidenced by global patent application and registration trends in the last 10 years, Artificial Intelligence can be counted as a leading indicator of exponential tech trends that will fuel future growth.
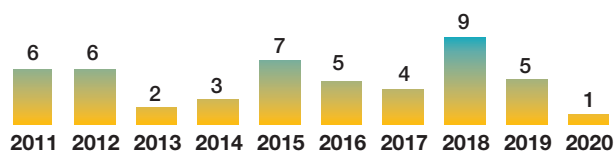
However, movement of Malaysia's patent registration is somewhat flat and rounds up at an average 4.8 patents per year.

Definition of AI
From a technical perspective, AI patents are derived from collective data. A combination of patent data defines AI as the following

- Fuzzy logic
- Logic programming
- Probabilistic reasoning
- Deep learning
- Machine learning
- Neural network

Trends in AI patent registration

Countries with the most patent registrations

The USA, China and Republic of Korea (top 3 with most patents) are the top three locations preferred for AI patent registrations. Meanwhile, Malaysia only recorded 57 patents in the last 10 years.

In reference to AI's technical areas, deep learning, machine learning and neural network scored as the most concentrated areas registered.

10-year Patent Registration

Global Patent Registrations

Year	Registrations
2011	5,458
2012	5,669
2013	6,112
2014	7,660
2015	9,133
2016	12,855
2017	25,031
2018	47,712
2019	86,968
2020	66,239

Malaysia's Patent Registrations

Year	Registrations
2011	6
2012	6
2013	2
2014	3
2015	7
2016	5
2017	4
2018	9
2019	5
2020	1

Patent registration by countries

Country	Patents
USA	123,496
China	92,582
South Korea	9,561
Japan	5,738
Canada	4,943
Australia	4,692
UK	2,038
MALAYSIA	57
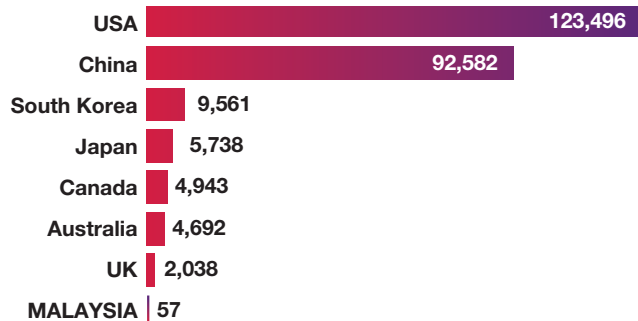
Technical AI areas registered by countries

Country	Fuzzy Logic	Logic Programming	Probabilistic Reasoning	Deep Learning	Machine Learning	Neural Network
USA	2,849	8,449	255	21,953	55,633	34,357
China	128	892	4	32,306	24,636	34,616
South Korea	33	175	0	2,812	3,121	3,420
Japan	17	205	2	1,177	1,631	2,706
Canada	180	504	13	651	2,126	1,469
Australia	151	360	10	713	1,945	1,513
UK	44	98	5	352	842	697
MALAYSIA	1	4	0	11	9	32

LEGEND

- Fuzzy Logic
- Logic Programming
- Probabilistic Reasoning
- Deep Learning
- Machine Learning
- Neural Network

Trends in AI patent registration
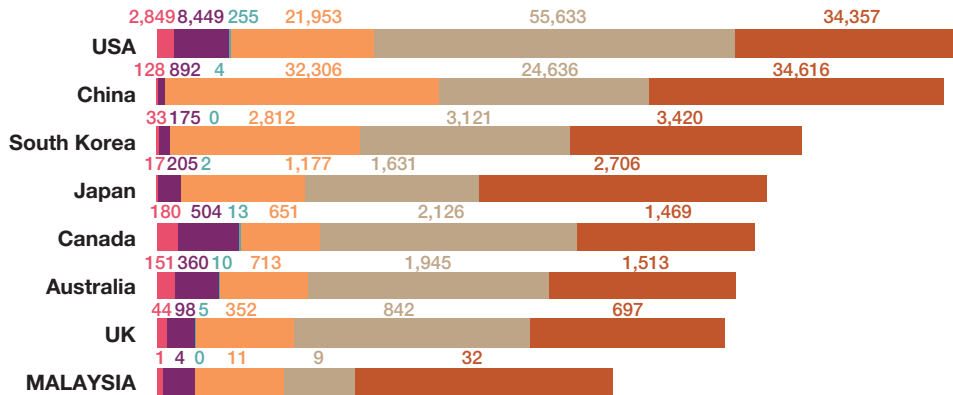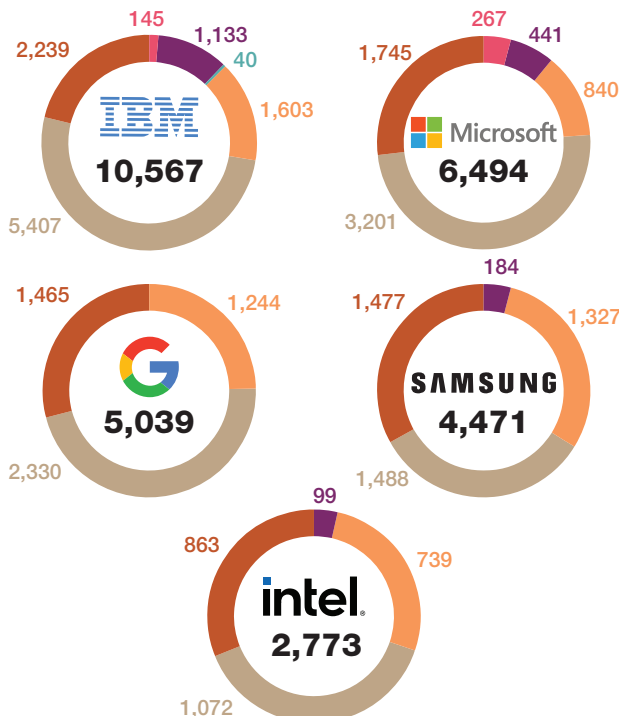
Companies with the most patent registrations

IBM, Microsoft, Google, Samsung and Intel are the top 5 companies that registered the highest number of AI patents.

Deep learning, machine learning and neural network account for the highest concentration of AI technical areas registered by these companies.
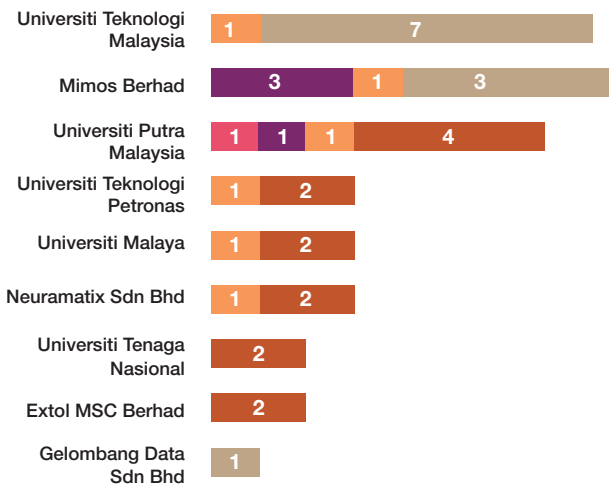
Sector-by-sector registration of AI patents by global multinational companies

IBM — 10,567
- 2,239
- 145
- 1,133
- 40
- 1,603
- 5,407

Microsoft — 6,494
- 1,745
- 267
- 441
- 840
- 3,201

Google — 5,039
- 1,465
- 1,244
- 2,330

Samsung — 4,471
- 1,477
- 184
- 1,327
- 1,488

intel — 2,773
- 99
- 863
- 739
- 1,072

Local institutions & companies with AI patents

UTM, MIMOS & UPM registered the most AI patents for Malaysia. In sum, UPM covers 4 AI technical areas (fuzzy logics, logic programming, deep learning and neural network), followed by MIMOS with 3 (logic programming, deep learning and machine learning).

Deep learning and neural network seem to be the preferred AI areas registered by local players.

Institution				
Universiti Teknologi Malaysia	1		7	
Mimos Berhad	3	1	3	
Universiti Putra Malaysia	1	1	1	4
Universiti Teknologi Petronas	1	2		
Universiti Malaya	1	2		
Neuramatix Sdn Bhd	1	2		
Universiti Tenaga Nasional	2			
Extol MSC Berhad	2			
Gelombang Data Sdn Bhd	1			

Disclaimer: Patent information is based on modified keywords search on Q2 2020 patent databases search (WIPO & MYIPO)

# THE POWER AND PITFALLS OF BECOMING A HIGH-TECH NATION

Liz Alexander, PhD
Futurist. Author.
Consultant. Speaker.

Dr. Liz Alexander has been named one of the world's top female futurists. She combines futures thinking with over 30 years' communications expertise to produce publications that showcase the advice of fellow futurists on issues including the future of education, and how businesses can practically benefit from working with the futures community.

Dr. Liz is the author/co-author of 22 nonfiction books published worldwide, that have reached a million global readers, and has contributed to leading US technology magazine Fast Company, Psychology Today, and journals such as Knowledge Futures, and World Futures Review. She earned her PhD in Educational Psychology at The University of Texas at Austin.
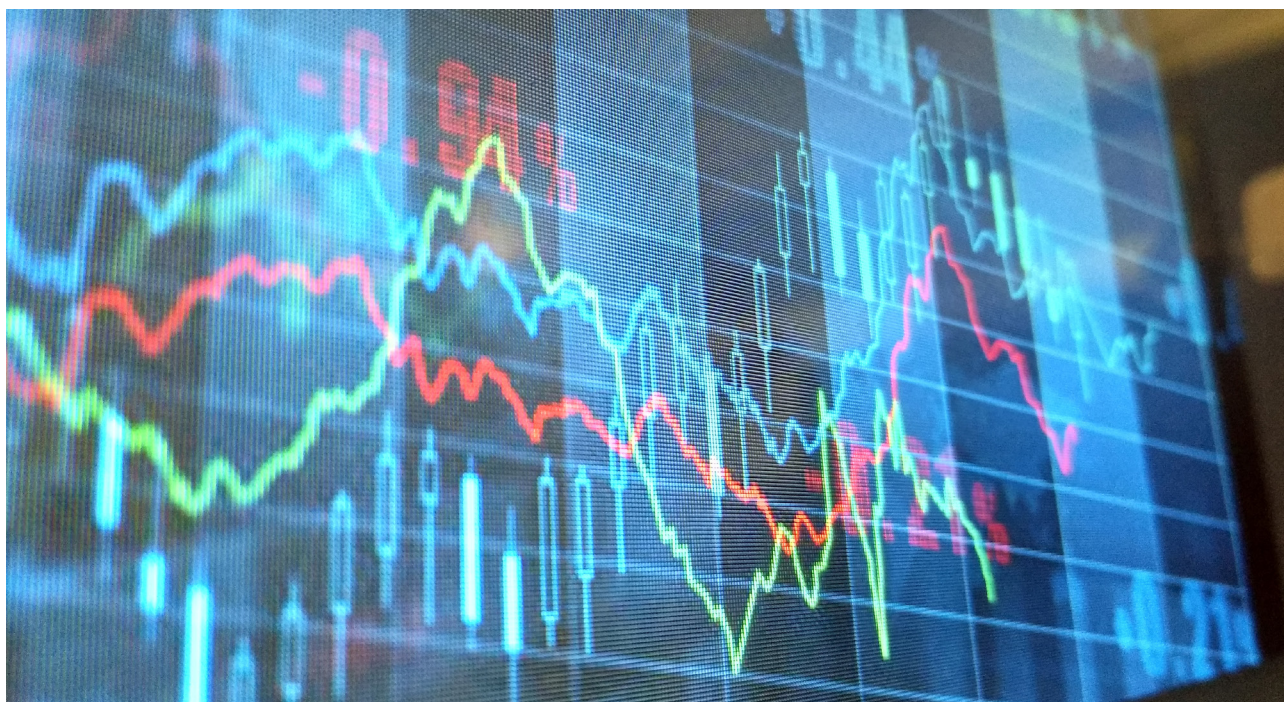
Each year, financial publications and newspapers publish their "Top 10" lists of the world's most technologically advanced nations: countries that successfully apply high-tech to benefit their citizens' lives and boost their national economies. Annual reports such as the Global Innovation Index highlight those countries considered to be highly innovative. The two lists are inevitably similar, with the usual suspects appearing on both, most notably The United States, China, the United Kingdom, and India. That is perhaps not surprising; while innovation does not require technology to thrive, technology is one of the most tangibles ways in which innovative approaches practically transform lives.

These Top 10 lists are not only dominated by the "big guns," however, and it is from the smaller countries featured that some key lessons can be learned—not least the vital role government plays in their success. The ease of doing business being a primary factor.

The World Bank's annual Doing Business report ranks 190 global economies. It is perhaps no surprise that technologically backward countries like Bangladesh (rank 168); Cambodia (144); Tanzania (141); Mozambique (138) and Uganda (116), show up poorly compared with these smaller countries that have carved themselves successful technological niches globally:

Singapore (2)
(Note: New Zealand takes the top spot in 2020)

Denmark (4)

Republic of Korea/South Korea (5)

Norway (9)

Sweden (10)

Estonia (18)

Finland (20)

Japan (29)

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Malaysia (12)

Thailand (21)

Vietnam (70)

Indonesia (73)

Myanmar (165)

Clearly government has an enormous role to play in creating the conditions in which countries can become technological and innovative exemplars. But how did some of the smaller Top 10 winners discover what they would be technologically competent in? How did some forge strong economic pathways despite being disadvantaged by having few, if any, natural resources as is the case with Singapore and South Korea, plus Japan if you consider what they have remains largely untapped ? These questions led me to discover a connection that appears to receive little or no attention.

Local to Global

Some years ago, I interviewed a number of highly successful Indian entrepreneurs for a book co-authored with the Director of the Founder Institute in Bangalore. What we discovered in each case was that these stories of success were underpinned by the founders' desire to find innovative solutions to problems that personally impacted their own lives, and also positively benefit other people's. Their innovations ranged from a do-it-yourself device that allows small and medium sized businesses to keep track of their energy consumption, to the world's first intelligent and adaptive web-based tutor for K-12 students.

A similar pattern emerged among some of the Top 10 exemplars, where governments solving serious national problems led to those countries developing expertise that garnered international renown.

Depending on your criteria, only 10 to 30 per cent of Japan's land mass is habitable and major cities like Tokyo and Osaka are situated over 500 km apart. The country also has an aging population and declining workforce. Japan therefore had two intractable problems: how to facilitate movement between distant workplace metropolises, and how to boost productivity with fewer humans working. Japan, not the U.S., leads the world in serious technology, according to an article in Forbes. I would argue that overcoming the above-mentioned problems has largely been responsible for that achievement.

For example, high-speed bullet trains not only connect workers to their places of employment, but a focus on efficiency means they keep to schedules other rail systems can only dream about. Out of this national need for an efficient commute emerged a niche export opportunity: punctuality (the average delay of these Shinkansen is said to be 36 seconds). As a result of their technological excellence, Japan's rail consortia have landed contracts with countries including the Philippines, Taiwan, and the United Kingdom.

Japan's reputation in the arena of robotics, which originally grew out of its post-WW2 need to increase efficiency and reduce costs in the car industry, is now helping to solve its declining population problem. After automating most of their heavy manufacturing and warehousing processes far earlier than most other countries, Japan ended up supplying over 50 percent of the world's industrial robots in 2017. Today, automated chefs, therapy and companion robots, together with short-range autonomous vehicles, are helping Japan to meet its stated mission to become "the very first country to prove that it is possible to grow through innovation even when its population declines." In a blog post entitled Who Will Win the Global Race on AI and Robotics , the International Federation of Robotics stated that "Japan and Europe are leading in robot development and supply."

The same national-to-international pattern arguably helped The Republic of Korea emerge from being a relatively poor, agricultural nation to earning a global reputation for high-tech innovations within a generation. This is the country that brought us the MP3 portable player, the first touch-screen mobile phone, nano 3-D printing, the Smart Transport Card, and smart prosthetic skin. All of which, according to one commentator, was "a product of necessity." Speaking to German media company, Deutsche Welle (DW), Kyle Ferrier, Director of Academic Affairs and Research at the Korea Economic Institute of America (KEI) is quoted as saying , "Korea has had to make its own path in a region where it competes with China's low labor costs, and Japan's high-tech, capital-intensive industries." Once again, inherent, uncontrollable factors appear to have had a bearing on what the Korean government and businesses chose to focus on,
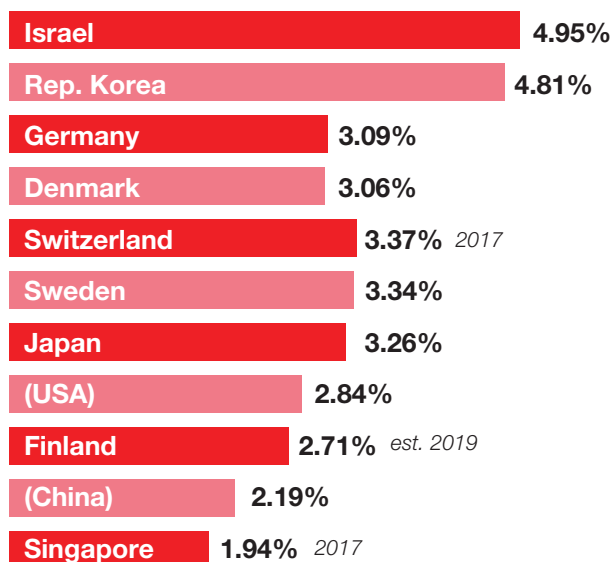
which indirectly led to the Republic's technological standing in the world.

The same appears true for Finland, regularly found in lists of the most innovative, technologically focused countries. Finland's far northern location and extreme weather conditions meant it had some of the highest energy consumption in the world. As the Business Finland website puts it, "Our Arctic location and resources have shaped the way we think, work, and innovate." When Finland passed a law imposing a range of taxes on cars linked to their fuel consumption, the Finnish car industry had to innovate around emissions and cost. The country is now considered one of the greenest countries in the world, produces "the largest number of high-impact cleantech start-ups relative to GDP," and "tops the ranking in generating the most clean energy options for the world," according to a study by the Information Technology & Innovation Foundation . Thanks to this global reputation, carved out of a national imperative, Finnish companies are now in demand to help with cleantech and sustainability projects worldwide.

Like the Indian entrepreneurs who drew from personal imperatives to move from idea to sustainable business, one answer to the question of how to become a renowned high-tech nation appears to be: what problems beset us locally that could lead to a reputation for global knowledge and expertise?

Show Me the Money!

Key to moving towards technological superiority is R&D—which requires serious funding. Here again, we see how the Top 10 countries beat out their lesser competitors in R&D spending as a percentage of their GDP. While most countries around the world spend a fraction of one per cent, the top investors—according to the World Bank's list --are also global innovation and high-tech exemplars (2018 figures, unless otherwise stated):

Israel	**4.95%**
Rep. Korea	**4.81%**
Germany	**3.09%**
Denmark	**3.06%**
Switzerland	**3.37%** *2017*
Sweden	**3.34%**
Japan	**3.26%**
(USA)	**2.84%**
Finland	**2.71%** *est. 2019*
(China)	**2.19%**
Singapore	**1.94%** *2017*

Finally, let's take a closer look at one important source of technological innovation and how some of the smallest renowned countries facilitate the ease with which start-ups can thrive.

Supporting Start-Ups

Singapore has a well-earned reputation for business-friendly policies. In the Doing Business ranking (#2 overall), Singapore sits at #4 for the ease of starting a business in the city-state. As a basis of comparison, China is ranked #27 on this criterion, with the United States #55.

Singapore facilitates the establishment of high-tech start-ups because it has "one of the most technologically advanced IT infrastructures in the world." Its Intellectual Property (IP) regulatory framework is not only stringent but strongly enforced, providing the confidence companies need to ensure their R&D efforts are well protected. The island nation also has the kind of diverse, well-educated, highly skilled talent that companies look for when deciding where to establish a foothold in South East Asia. All of these factors, together with a significant financial commitment by government, are helping Singapore to move beyond its established reputation for fintech towards a start-up ecosystem that now embraces artificial intelligence (AI), robotics, and health & life sciences.

As reported by EDB Singapore, the Singapore Economic Development Board in collaboration with Hewlett Packard Enterprise (HPE) launched InnovateNext to "support local start-ups by giving them access to HPE technology as well as engineering and consulting expertise." This also happens in Switzerland, a country consistently listed number one in WIPO's Global innovation Index, where ICT firm Swisscom provides start-ups with the financial and infrastructure backing they need to help develop a thriving ecosystem for innovation and entrepreneurship, through PirateHub.

Now for the Bad News…

Of course, lessons come not only from other countries' successes as technological innovators but from examining the "unintended consequences" of their otherwise good intentions, whether experienced currently or potentially in the future. These range from the dominance of "chaebols" in the Republic of Korea, and Singapore's over-focus on research to the detriment of marketable products, to concerns about becoming "two-nations-in-one" that has raised a number of political, economic, and social challenges for some technologically superior countries. Then there is the question of education…all of which I will address in my next article.

## Can you guess what country this is?

Every citizen has a digital ID with which online they can pay their taxes (in under 5 minutes), vote, access their health care records, and receive prescriptions.

Every school has computers, and internet penetration grew nationally from 29 percent in 2000 to 90 percent in 2020.

Its world-first e-Residency program allows founders to start companies without living there and has attracted over 50,000 applications since its launch in 2014.
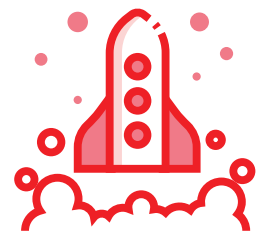
It is home to more tech unicorns (private companies valued at over US$1 billion) per capita than anywhere else in the world. Skype was developed here, as was TransferWise.

This is Estonia, a small country in north eastern Europe that was part of the Soviet Union until 1991. Post-independence, the government determined to kick-start its new market economy by going fully digital. Today, 99 percent of public services in Estonia are available online 24/7, which they say saves them 2 percent of GDP each year in salaries and expenses. Its reputation as "one of the most tech-savvy countries in the world" has led to declaration that, "Estonia might offer a blueprint for how to build a digital society," not least because they had to learn the hard way about cyber threats.

In 2007, the country suffered over 10,000 cyberattacks and has subsequently been warned that, "online databases and programs like e-Residency have made Estonia vulnerable to dirty money and sanctions breaches." In the wake of that experience, the government undertakes regular cyber defence drills, stores copies of all its data in Luxembourg, and reminds its citizens about the importance of "cyber hygiene."

Becoming a fully digital society has it challenges, arguably best anticipated in advance. Sadly, the second and third order effects of good intentions are rarely addressed up front. Indeed, some unintended consequences are quite insidious.

Big Is Not Always Best

Take the current effect that the Republic of Korea's "chaebols"—major conglomerates like LG, Samsung, and Hyundai—is said to have on entrepreneurship in that country, for example. Chaebols have been dominant ever since they were encouraged to invest heavily in R&D in the mid-1960s by a government that protected them with advantageous policies and incentives. Indeed, the collaboration between industry, government, and the academic community has been at the centre of the Republic's stunning success.

But some question whether this dominance is having a detrimental effect on the country's small and medium sized businesses (SMBs), that are fighting to carve niches for themselves in areas such as biotechnology and artificial intelligence. These small-scale entrepreneurs benefit from the excellent high-tech infrastructure, of course, and can get government funding. However, as Marcus Noland, director of studies at the Washington-based Peterson Institute for International Economics pointed out to Bloomberg: "If you're a scientist or engineer at Samsung Electronics and you come up with some brilliant new idea, you don't quit and start pitching your ideas to venture capitalists and set up your own firm; you go to management within Samsung." That's quite different to what happens in the United States where Steve Wozniak worked for Hewlett-Packard before leaving to co-found Apple Computer, and many of the entrepreneurs I know in India who used to work at Wipro have founded companies employing tens and sometimes hundreds of people.

Whether concerns about the Republic of Korea's chaebols are valid or not, there is always the possibility of inadvertently suppressing a wellspring of innovation within SMBs unless government does more to support those who are willing to take a risk on setting up their own entrepreneurial ventures, rather than stay with big companies.

Zombies and Gazelles

Supporting start-ups is something Singapore has earned a reputation for, as evidenced by having the world's highest rated start-up ecosystem according to a survey by Nestpick. But again, there are unintended consequences to consider.

A National University of Singapore Entrepreneurship Center (NEC) longitudinal study conducted in 2017 found that few high-tech start-ups in the city-state are "gazelles," i.e. generate fast, profitable growth. Almost 57 percent of them find it hard to scale and create employment and so are often referred to as "zombie start-ups."

We might look at this as both a risk-averse and research-obsessed issue. Excellent funding allows over half of Singapore-based start-ups to survive five years or more,

which exceeds the percentages found in the US and UK. But according to NUS Enterprise director Dr Wong Poh Kam, "There's a no man's land where the work can't be funded as research anymore but there's no product ready for market." In other words, for R&D to pay off there needs to be as much time spent on the development of marketable products as there is in conducting research. This is something that funding entities—whether government agencies or private companies—need to build into their conditions for financial support in order to avoid making the same mistake.

Two Nations in One

One of the biggest dangers—if that's not too strong a word—in the desire to become a high-tech nation is what some countries are already experiencing: a "high-tech versus the rest" scenario.

Obviously, education is a key issue but it's not a panacea in its traditional form, as I will explain shortly. As one Middle Eastern commentator pointed out, bemoaning the fact that while his country receives accolades for being a "start-up nation," it has one of the highest poverty levels in the OECD, governments need to support more mid-level industries rather than get stuck only on high-tech behemoths and start-ups. Otherwise there is the risk of a growing societal chasm between those engaged at the cutting edge of innovative technologies, earning two, three, or even four times more than workers stuck in "backward" traditional industries with low pay and no chance of social mobility.

Consider Ireland, a country that has "its sights on becoming a global innovation leader, driving a strong and sustainable economy." As such, it has made significant gains in attracting high tech and life sciences companies to its shores. Ireland's ICT services exports have also helped boost the country to the Top 10 within the European Commission's 2020 European Innovation Scorecard. The average annual ICT salary in Ireland is around €61,000 – second only to those offered within the finance and real estate industries (€64K). Those working in manufacturing jobs can expect an average of €46K a year; construction €39K, retail trades €30K, and food services €17K. Looks familiar?

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There's a no man's land where the work can't be funded as research anymore but there's no product ready for market

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Dr Wong Poh Kam
Director NUS Enterprise

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It is no longer enough to teach students to learn passively, know how to find the "right answer," and earn a specialist degree that shows they can pass exams but offers employers little in the way of applicable skills—not least, critical thinking.

"

In the journey to become a high-tech nation, ongoing training that introduces workers to moderate levels of technological implementation but doesn't overwhelm their abilities and motivation is hugely important. Otherwise too many citizens are at risk of being "left behind" creating, essentially, two very different nations in one.

Which brings me to the thorny, often backward arena of education.

Learning for the 21st Century

I have long been an advocate of project-based learning. While working at The University of Texas at Austin I developed and taught an elective course for college juniors and seniors that required them to act as a consulting firm and address real-life problems facing local non-profit organisations. Post-graduation they used that experience, and the glowing references they received from their "clients," to walk into good-paying jobs. They certainly had an advantage over their contemporaries boasting a 4.0 GPA but with no practical skills or experience to offer an employer.

So, it did not surprise me to see a correlation between those countries that consistently rank in the Top 10 global technological innovation lists and those featured in the Worldwide Educating for the Future Index. Finland and Switzerland are the two top countries in the latter, and both are credited with producing some of the most highly skilled workers in the world. That's because of the way they are educating their young people to be employable in today's complex work environments. It is no longer enough to teach students to learn passively, know how to find the "right answer," and earn a specialist degree that shows they can pass exams but offers employers little in the way of applicable skills—not least, critical thinking. Those countries now lauded as high-tech nations long ago realised they needed to teach their young people not only how to think differently—and for themselves—but how to do things.

According to the World Economic Forum, Switzerland takes a very vocational approach to education (VET): "From age 16, most young people stop full-time education, instead rotating between school, inter-company courses and hands-on experience in a workplace setting for three-to-four years, receiving both a wage and a crucial introduction to the world of work." Just under a third of Swiss companies participate in the VET system and, "credit it with being a major contributor to the continuing vitality and strength of the Swiss economy." Unfortunately, too many countries confuse schooling with education and focus on the former to the detriment of students who then flounder when faced with the complexities of the real world.

Two thousand kilometres to the north east, Finland maintains its global reputation for educational excellence—it's considered the best country for teaching critical thinking and digital skills—thanks to innovative approaches like Phenomenon-Based Learning or PhenoBL. While not doing away with subject-specific classes altogether, Finnish educators offer at least one PhenoBL module a year that better prepares students to join multidisciplinary teams, take initiative, and know how to ask context-relevant questions in an increasingly dilemma-laden world. For example, one real-world, meaningful—and very relevant—investigation might involve asking, "How do we stop the spread of pandemics?" which would require an exploration of biology, chemistry, maths, history and even geopolitics, in order to inspire answers.

In Finland this approach starts early: in kindergarten children "spend their time playing, exploring, and learning to learn." That sets them up for a lifetime of motivated self-education and positions them to be highly employable citizens within technologically innovative environments.

When it comes to education there should be no "unintended consequences." Because there are sufficient case studies and global exemplars to show that sticking to old, worn-out, established educational practices isn't going to cut it if a country is truly committed to becoming a high-tech global powerhouse. For which the likes of Estonia, Finland, Singapore, Switzerland, along with many other small countries, are already ahead of the game.

ESTABLISHING AN ECOSYSTEM FOR NEXT GENERATION VEHICLES THROUGH THE NATIONAL AUTOMOTIVE POLICY

By Malaysia Automotive, Robotics and IoT Institute (MARii)

MARii is an agency established under the purview of the Ministry of International Trade and Industry Malaysia (MITI). MARii serves as a future maker that spurs the development of strategic and operational intelligent systems through the humanisation and utilisation of smart platforms, applications and digital technologies.
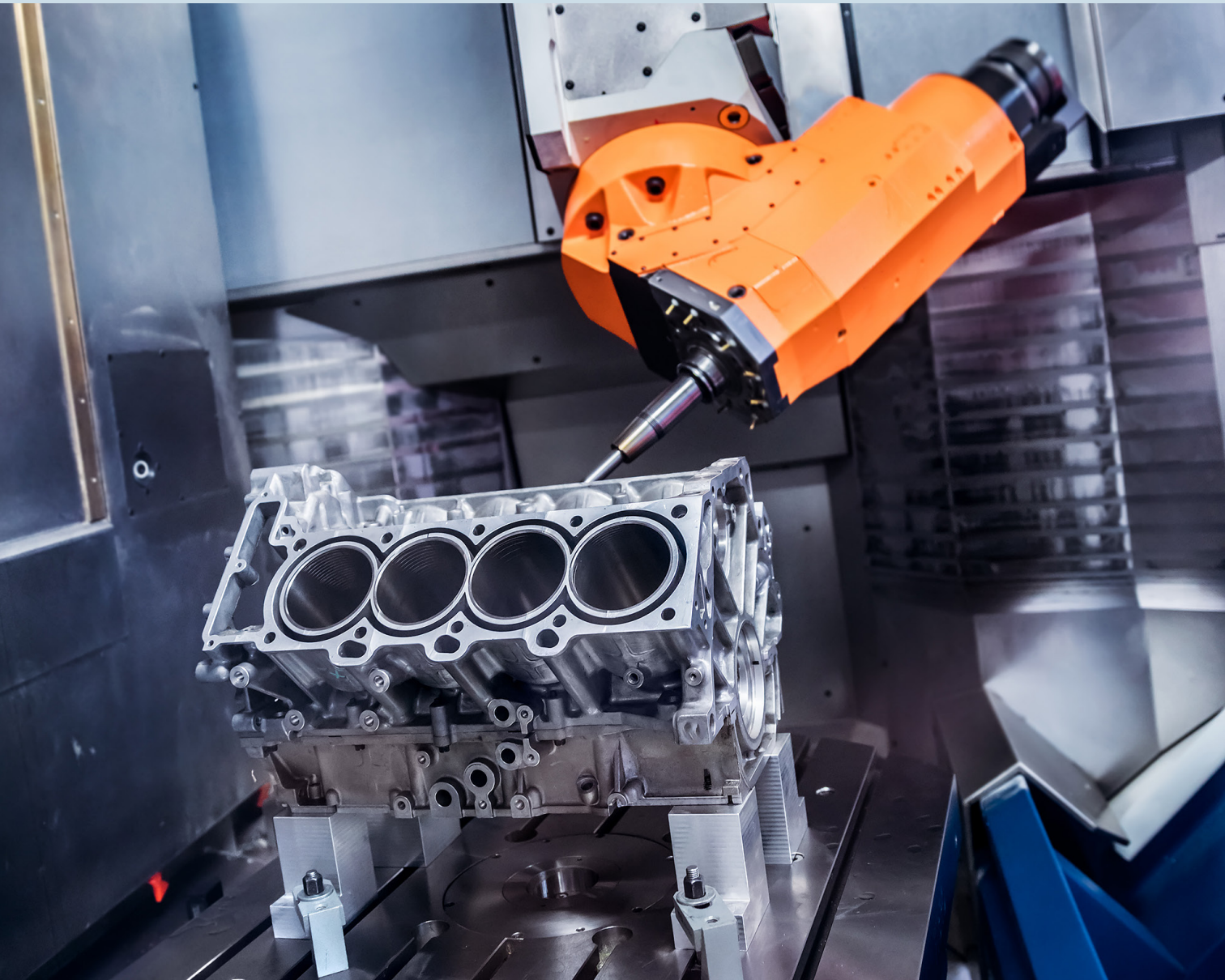
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These initiatives were deployed to allow local companies to manufacture products using homegrown talents to demonstrate the adherence to global standards and requirements, allowing their participation in the ever-growing global market.

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Dato' Madani Sahari
CEO of the Malaysia Automotive, Robotics and IoT Institute (MARii)

As a background, the National Automotive Policy 2014 (NAP 2014) led Malaysia in the direction of Energy Efficient Vehicles (EEVs). This therefore created a common target for automotive manufacturers to comply with global standards across their products and services.

As a matter of fact, currently, global demand for energy efficiency has led local suppliers to adapt to high-tech levels of sophistication to increase export. In turn, Malaysian engineers are now looking into developing applied advanced technologies in order to allow the market to get safer and more affordable entry-level cars.

In 2019, EEV penetration recorded an all-time high of 87.58%, signifying the public's increasing interest and demand for futuristic powertrains, fuel saving, and carbon emission reduction.

This achievement would not be possible without the numerous government initiatives carried out in partnership with the industry, businesses, and academia.

The NAP 2014 had placed a marker of sort for the production of EEVs domestically, which indirectly created opportunities for Malaysians to participate in high-skill value-added jobs and businesses. Through its programmes, the NAP 2014 was dedicated to enhancing technology development and adoption, supply chain, human capital development, and remanufacturing.

"These initiatives were deployed to allow local companies to manufacture products using homegrown talents to demonstrate the adherence to global standards and requirements, allowing their participation in the ever-growing global market.", said Dato' Madani Sahari, CEO of the Malaysia Automotive, Robotics and IoT Institute (MARii).

NAP – A Concerted Effort

When the NAP 2014 was formulated, there was a need to formulate EV policies. In line with the popularity of internal combustion engines, the utility cost of electric models

hindered traction of their usage. Therefore, the NAP 2014 focused on a broader array of EEV technologies. In addition, to spur the growth of local technology development through knowledge and technology transfer, the NAP 2014 addressed a number of customised incentives. As a result, carmakers investing in high-value activities in Malaysia will be given a measured incentive tailored to their individual business models.

Essentially, this strategy provided a strong foundation for local businesses to take their first step into Industry 4.0 technologies and capabilities. To this end, domestic availability of Industry 4.0-grade tools eased the access for both, industry and academia, prompting the development of a highly capable, Industry 4.0-compliant local talent pool through real-life exposure and experience.

To supplement the journey towards global recognition, in 2018, MARii and the government established the National Emission Test Centre (NETC)—the first full-fledged vehicle emissions testing facility in Rawang, Malaysia. The centre's facilities include real-time measurement of exhaust emission gases for passenger cars in accordance with global regulations and standards such as UN's 83 and 101 Regulations.

Within the same period, numerous Malaysian standards and regulations have been established and gazetted for EVs. This includes electric passenger cars, motorcycles, mopeds, and bicycles as well as UN's Regulation 100 (safety requirement for electric powertrains of road vehicles), Electric motorcycles (MS 2413/UN R136), and Electric mopeds (MS 2688).

These standards are not only limited to vehicles. The guideline involves standards for new EV components such as connectors and inlets (MS IEC 62196), charging systems (MS IEC 61851), sockets (SAE 1772), and testing standards for lithium-ion batteries (MS IEC 61851).

To ensure the development can be sustained, MARii has since worked together with industry stakeholders to develop business enhancement programmes such as the

Automotive Industry Certification Engineering (AICE) and Design Engineering & Prototyping (DEP). These programmes were designed with a focus on attaining the enhancement of design capabilities within Original Equipment Manufacturers (OEMs), as well as parts and components' suppliers. By and large, the programmes cover product and process design, development, engineering simulation, and testing.

Today, more than 50% of new vehicles sold in Malaysia are Energy Efficient Vehicles (EEVs). These vehicles have become more competitively priced. Apart from this, these vehicles now come equipped with more sophistication and safety features. As an upside potential of this, employment in the automotive sector too has grown tremendously, while exports of automotive parts and components have increased year on year since the NAP 2014 was announced.

Fast forward, global trends have continued to evolve towards the implementation of digital technologies such as Artificial Intelligence (AI), Big Data Analytics (BDA), and Internet of Things (IoT). The NAP 2020, which was launched in February 2020, seeks to address the transformation and progression of the Malaysian automotive industry around connected mobility. The agenda will be driven by the introduction of three new elements: Next-Generation Vehicles (NxGVs), Industrial Revolution 4.0 and Mobility-as-a-Service (MaaS).

Significantly, the policy is guided by the National Automotive Vision. It outlines Malaysia's goal to be a regional leader in manufacturing, engineering, technology, and sustainable development of the automotive sector through five thrusts covering supply chain integration, local manufacturing, engineering capabilities, latest trend technology, and sustainable development, on top of the continuous emphasis on EEV technologies that have been previously outlined in its 2014 iteration.
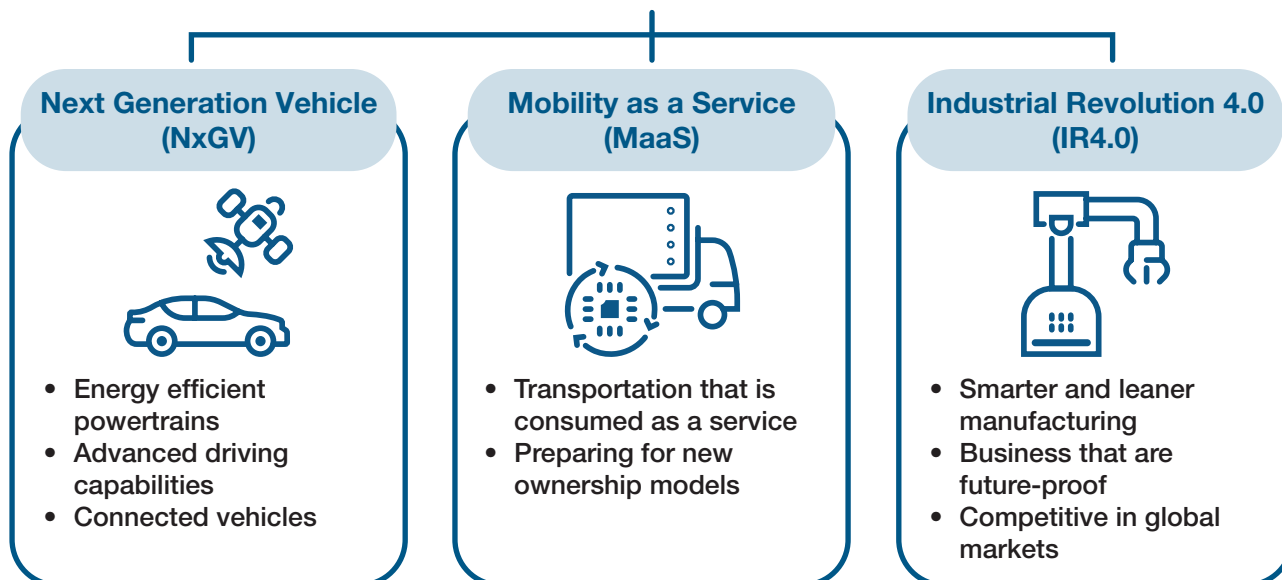
Developing local content

High-tech facilities act as a platform for potential talents to expose themselves to the tools, equipment, and services that are of global standards. Overall, this will enhance the learning process by reducing the familiarisation period of new technologies—providing future talents a head start to compete at a larger global scale.

In line with the NAP 2020's outlook towards future mobility, a few tweaks have been made to keep up with emerging global trends. Existing programmes such as human capital development, business, and career enhancement were improved to normalise Industry 4.0 technologies the likes of robotics, cloud-based services, and digital engineering.

All these programmes have been designed to work alongside the nine thrusts of Industry 4.0 implementation namely IoT, BDA, Cloud Computing, Cybersecurity, Simulation, System Integration, Autonomous Robots, Additive Manufacturing and Augmented Reality (AR). By smoothing the transition towards future mobility, this will also help Malaysia to adhere to global standards, regulations, and requirements.

NATIONAL AUTOMOTIVE POLICY 2020

NEW ELEMENTS OF NAP 2020

Next Generation Vehicle (NxGV)

- Energy efficient powertrains
- Advanced driving capabilities
- Connected vehicles

Mobility as a Service (MaaS)

- Transportation that is consumed as a service
- Preparing for new ownership models

Industrial Revolution 4.0 (IR4.0)

- Smarter and leaner manufacturing
- Business that are future-proof
- Competitive in global markets

INTEGRATION OF SERVICE AND ELECTRIC & ELECTRONIC (E&E) SECTOR IN THE AUTOMOTIVE SECTOR

MARii's Design Centre and Academy of Technology

Meanwhile, to supplement the development of local talents, MARii has established several centres of excellence such as MARii's Design Centre and Academy of Technology (both located in Rawang) to serve as focal points in enhancing upstream capabilities within the Malaysian ecosystem.


Industry-led Professional Certificate (IPC)

Human capital development programmes such as the Industry-led Professional Certificate (IPC) programme are designed to utilise these establishments that are equipped with technologies compliant with Industry 4.0 capabilities such as supercomputing, simulation, Augmented Reality (AR), and Manufacturing Execution Systems (MES).

MARii's Industry4WRD Technology Platform (MITP)

In addition, MARii's Industry4WRD Technology Platform (MITP) was launched to provide businesses a one-stop advanced production management solution that offers a variety of services. These services cover a wide range of scopes such as production planning, resource management, and data collection in a single, integrated cloud-based solution.
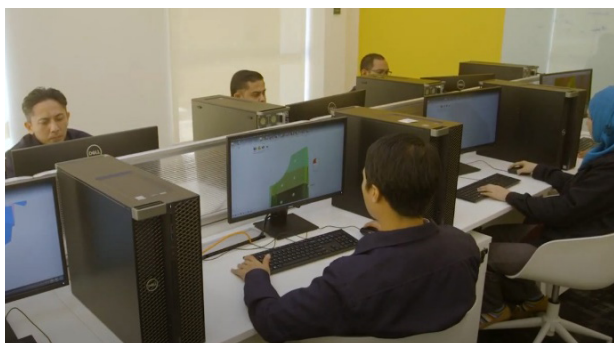
MARii-Universiti Kebangsaan Malaysia (UKM) strategic partnership

Also, MARii's partnerships with academia is one more agenda that will continue gather steam. MARii's strategic partnership with Universiti Kebangsaan Malaysia (UKM) for example, aims to accelerate the development of the three new elements outlined in the NAP 2020 through the utilisation of research facilities and local talents provided by UKM.

This includes the development and commercialisation of electric vehicle (EV) batteries. Supported by various R&D collaborations by both parties, the partnership will focus on battery performance, battery replication, and the development of a lithium-ion (Li-ion) battery production line, among others.

MARii Simulation & Analysis Center (MARSAC)

As MARii has consistently emphasised digital design and engineering capabilities, soon, a Simulation & Analysis Center (MARSAC) will be established in partnership with national carmaker, PROTON.

MARSAC is a standalone facility within MARii's headquarters in Cyberjaya. Equipped with 15 high performance workstations and powered by MARii's High Performance Computing servers, the setup will enable real-time data analysis and cloud-based operations. Saliently, the facility serves MARii's main goal of accelerating high-value design, cost optimisation and talent development among local automotive and mobility component manufacturers.

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These establishments will allow local businesses, including academia, government, and government agencies to consistently standardise and develop products in accordance with sustainable, future-proof methods and practices.

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Apart from housing Industry 4.0-compliant tools and equipment, MARSAC allows local engineers and designers to participate in pilot projects that are in high demand globally such as digital simulations, prototyping, including computer-aided engineering (CAE) and computer-aided design (CAD) applications. These processes account for vital stages during the validation phase of automotive and mobility-based parts, components, systems and processes.

Given this, all these programmes and facilities, taken together will provide ample business expansion and job opportunities for the industry. However, more importantly, they will lay the framework for new mobility technologies to flourish within the country and the region by allowing participants to expose themselves to the latest technological advancements, processes, and practices that are in-demand globally.

Driving the future

Further, to accelerate the progress of the autonomous driving sector, MARii has kick-started the development of critical automotive components for NxGVs. An example of a work in progress includes the Memorandum of Understanding (MoU) with Multi-Code Electronics Industries (M) Bhd. to jointly develop parts and components that hold strategic and crucial importance to the ecosystem of local technology areas pertaining to NxGVs, connected mobility and autonomous driving.

The initiative commenced with the first development phase of critical tech components such as sensors for Light Detection and Ranging (LIDAR), Radio Detection and Ranging (RADAR), cameras, recorders, as well as other electronic and mechatronic components.

To supplement these developments, MARii, the government and the industry have already begun the establishment of an Electric Vehicle Interoperability Centre (EVIC)—a shared test-centre for the development of EVs and EV-related products and systems.

The EVIC will test various advanced technologies such as cybersecurity and communication safety in an EV ecosystem. By utilising BDA and IoT, the EVIC allows real-time reporting and accurate decision making throughout the ecosystem. The EVIC will also feature an EV testbed, complete with buildings, charging stations, solar-powered energy farming and storage, weather simulators, and other vital infrastructure required to establish a full-fledged testing facility. The centre will also include data-driven and smart grid integration solutions that allow for measurement and oversight of the entire chain of electromobility, from the point energy is farmed to the point where energy is consumed in the electric vehicles.

An Autonomous Vehicle Test Bed (AVTB) is also in the works, not least as a facility to test autonomous vehicles but also as a platform for businesses in the mobility ecosystem to design and validate their products collectively in a single location. This will also give rise to collaborations between all members that have contributed to the design pool of autonomous driving.

These establishments will allow local businesses, including academia, government, and government agencies to consistently standardise and develop products in accordance with sustainable, future-proof methods and practices. In line with global standards and regulations, the action plan will assist public and industry actors to formulate a path for Malaysia to become a global hub for NxGV manufacturing.

Conclusion

The automotive industry is a long-established industry and has contributed significantly to Malaysia's economy. Going forward however, it needs to navigate a host of formidable challenges. In light of this, the industry needs to grasp the dynamic opportunities currently present despite a hostile global environment and expand in-house capabilities to be relevant in the future. Therefore, this is a call to all stakeholders, from government agencies to the private sector, to rally their forces and continue to work together to grow the Malaysian automotive industry. Following this, durable development capabilities of the industry will be the focus of the next chapter. To secure growth, the industry needs to accelerate its development pace and be prepared to face up to any future scenario to remain a favourable industry in Malaysia's technology-driven demand-centric growth.

SMART CITY BREAKAWAY: STRENGTHENING IOT TO DEVELOP MALAYSIA'S SMART CITY INDUSTRY

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Overview

According to McKinsey Research, the smart city industry is forecast to generate a $400 billion market in 2020, with 600 cities worldwide expected to generate 60 percent of the world's GDP by 2025. Considered the cornerstone of smart city applications, the Internet of Things' (IoT) technologies will be pivotal in facilitating the connectivity of smart city components. To date, the general appearance of IoT technologies has been framed as an aid to improve Malaysia's smart city efficiency. In relative terms, this means that our smart city production, communication, resource planning, sustainability, operational performance and quality of life will be revved up for greater sophistication. On this particular note, Malaysia has convincingly taken on the challenge to bring the nation one step further by strengthening the integration of IoT technologies to be paired up with Malaysia's emerging smart city components.

Introduction

Malaysia's smart city industry uses information and communications technology (ICT) to improve quality of life. By and large, Malaysia will be banking on the promise ICT can deliver in improving the effectiveness of urban governance and services. This ensures our cities are able to meet the needs of our present and future generations. Because the pace of technological change, digitalisation and globalisation just keeps accelerating, IoT needs to be considered as an on-going technology variation down with the time. Surely, IoT provides significant opportunities for technological advancement. It can connect numerous objects, such as sensors, vehicles, houses, and appliances, and taken together with the Internet, IoT allows users to share information, data, and resources. According to MIGHT's data analytics, in 2020, there are over 70 companies making their entry into the IoT technology service provider sector. Recent statistic show Malaysia's technology companies are flocking to the IoT technology system sector (Refer figure A).
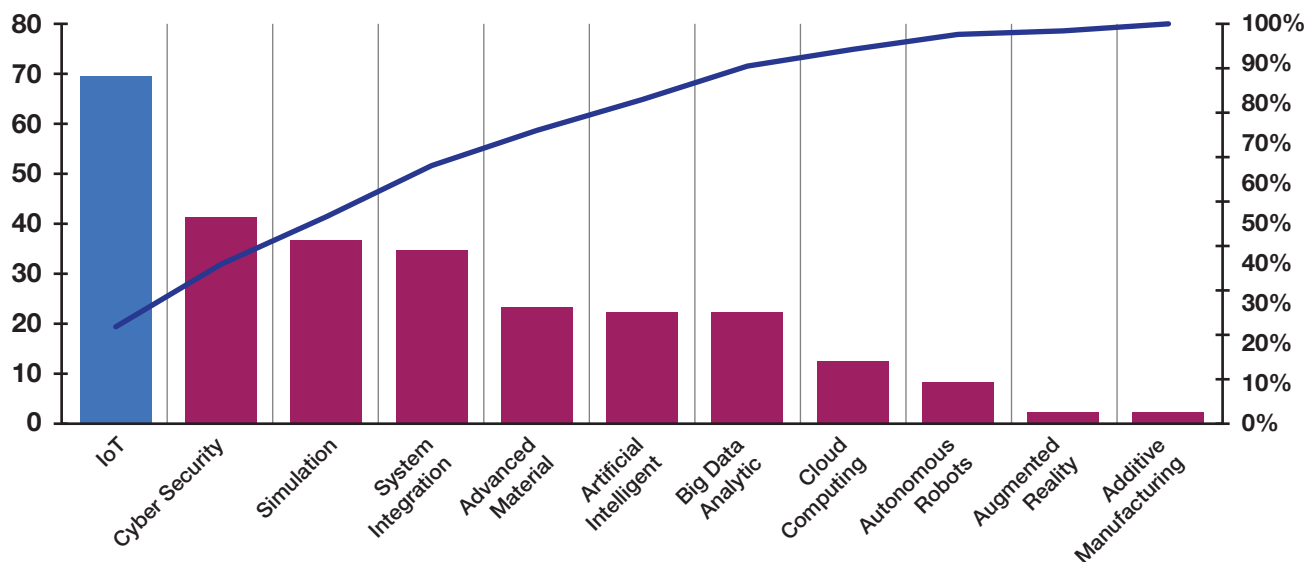

Figure A: Technology Companies Registered in Malaysia as of the year 2020
Source: MiGHT data Analytics

One thing is clear, IoT technologies are going to be the key enablers in a smart city ecosystem. IoT helps knit the world even closer together and this consequently creates a need for public-private partnerships (PPP) to accelerate research, development and adoption of IoT technologies. Moreover, PPPs offer a clear shared vision in harmonising IoT's technology platform and its implementation use-cases.

IoT impact on Malaysia's smart city industry

1. Enhances Device Communication

The IoT is progressively trying to achieve a world-wide network of interconnected objects based on standard communication protocols. This network is operated by a large number of objects that control a wide range of processes. This multi-fold vision of IoT is not limited to just the integration of devices with the current framework but is also networking oriented. IoT for Malaysia's smart city industry will therefore connect and build a bridge between the real world and its digital double, not least, remake the way the two communicate.

2. Gathers Useful Big Data

The implementation of IoT for smart city industry enables the switch of tradition analogue systems into modern digitalised ones, generating significant economic opportunities through industry re-shaping. Industrial IoT empowers modern companies to adopt new data-driven strategies and handle global competitive pressures more easily. The adoption of IoT will increase the total volume of the data generated and transform industrial data into industrial Big Data.

3. Data and Information Sharing

IoT helps linked devices become smarter because they can now communicate and interact with one another without human intervention. The collected data can be locally processed at IoT end-devices or sent to remote servers to perform complex analysis. Therefore, IoT will expand Malaysia's smart city industry data and information sharing for better appliance and advancement.

Gauging Malaysia's smart city industry IoT readiness

As for the year 2020, more than half of the companies registered in Malaysia are providing services related to smart city's IoT initiatives. To illustrate this growing segment, Malaysia's private sector is preparing to boost its smart city services through technology advancement. Surely, the IoT industry will produce a world in which there is a sharp focus on the IoT development milestones and industry. In part, this will give more values to end users, industry players and the public sector. The Malaysian government is currently anticipating which smart city technology components and enablers are moving upward rapidly to benchmark for open innovation programs. Yet, Malaysian companies are now racing to develop IoT sensors and services. This smart collaboration model will drive IoT readiness across the Malaysian smart city industry.

Positioning IoT in Malaysia's smart city industry

The smart city industry consists of various interconnected sectors. As a result, these sectors create a huge ecosystem to offer new city services for the people. In strengthening the delivery of the services, finding a place for IoT's upcoming enabling technologies is a must.

Figure B: Smart City area required IoT technology

1. Smart waste management

A major benefit of global IoT technologies is that they provide us with the ability to collect data. Nowadays, garbage-trucks pick-up trash containers even when they are empty. By using IoT devices placed inside these garbage containers, we are able to connect data to the computing server. Next, the computing server will collect information and optimise the way garbage-collection is done by the garbage trucks.

2. Smart parking

IoT works by putting wireless sensors at parking lots. When a vehicle parks, or if a parked vehicle leaves a parking spot, the sensor at the spot sends a notification to the management server. By collecting information regarding the parking bay occupancy, the server is able to provide parking vacancy information to drivers through a visualisation platform such as smart-phones or vehicles' Human Machine Interfaces (HMIs) or advertisement boards. This information enables the city council to apply fines in the case a parking violation occurs.

3. Smart grid

Smart grids use new technologies such as intelligent and autonomous controllers, advanced software for data management, and two-way communications between power utilities and consumers. Smart grids create an advanced automated energy delivery network. Deployed as an infrastructure for sensing and transmitting information, smart grid's IoT technology, when applied to the power network will play a significant role in cost-effective power generation, distribution, transmission, and consumption.

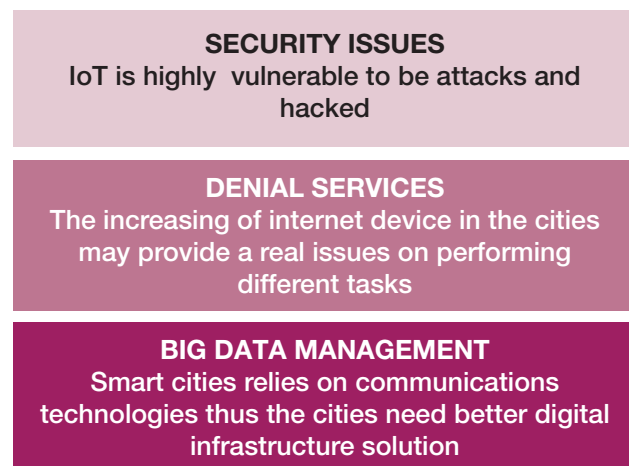## Challenge for Realising IoT in Malaysia Smart City Industry

SECURITY ISSUES
IoT is highly vulnerable to be attacks and hacked

DENIAL SERVICES
The increasing of internet device in the cities may provide a real issues on performing different tasks

BIG DATA MANAGEMENT
Smart cities relies on communications technologies thus the cities need better digital infrastructure solution

Figure C: Challenge for realising IoT technology

1. Security Issues

Security issues remain a major obstacle for the worldwide adoption and deployment of IoT. In other words, users will not fully adopt IoT if there is no guarantee that it will protect their privacy. IoT is highly vulnerable to attacks for numerous reasons. Data security issues can be summarised in data confidentiality, data authenticity, data integrity, and data freshness. For many of these critical IoT applications, the use of incorrect or maliciously corrupted data can inflict serious consequences. Conventional security solutions such as authentication, confidentiality, and data integrity are critical to IoT objects, networks, and applications.

2.   Denial Services

The huge number of Internet devices in cities provides a real attack vector for malicious people. For example, in a big city, thousands of devices communicate simultaneously between users and consequently poses heightened security concerns. This therefore is poised to have a knock on impact on the smart city industry, as the industry is the ideal target for the creation of bot IoT networks by hackers. To understand the gravity of hacking's possible consequences, for example, the IoT botnet consists of devices compromised and used to perform a multitude of tasks without the knowledge of their legitimate users.

3.   Big Data Management

The smart city industry relies primarily on communication technologies. Therefore, as the number of devices grows exponentially, a smart city becomes a huge source of data. Oftentimes, this is referred to as big data. Indeed, big data is characterised by specific characteristics, whereby when related to smart cities and cloud-based solutions, are poised to meet many of smart city's requirements. Nevertheless, considering today's current infrastructure scalability and evolution, these solutions alone will not be enough to meet future requirements of smart city applications (especially real-time applications). This is largely because of the physical distance between data collection, its processing and the central nature of cloud computing.
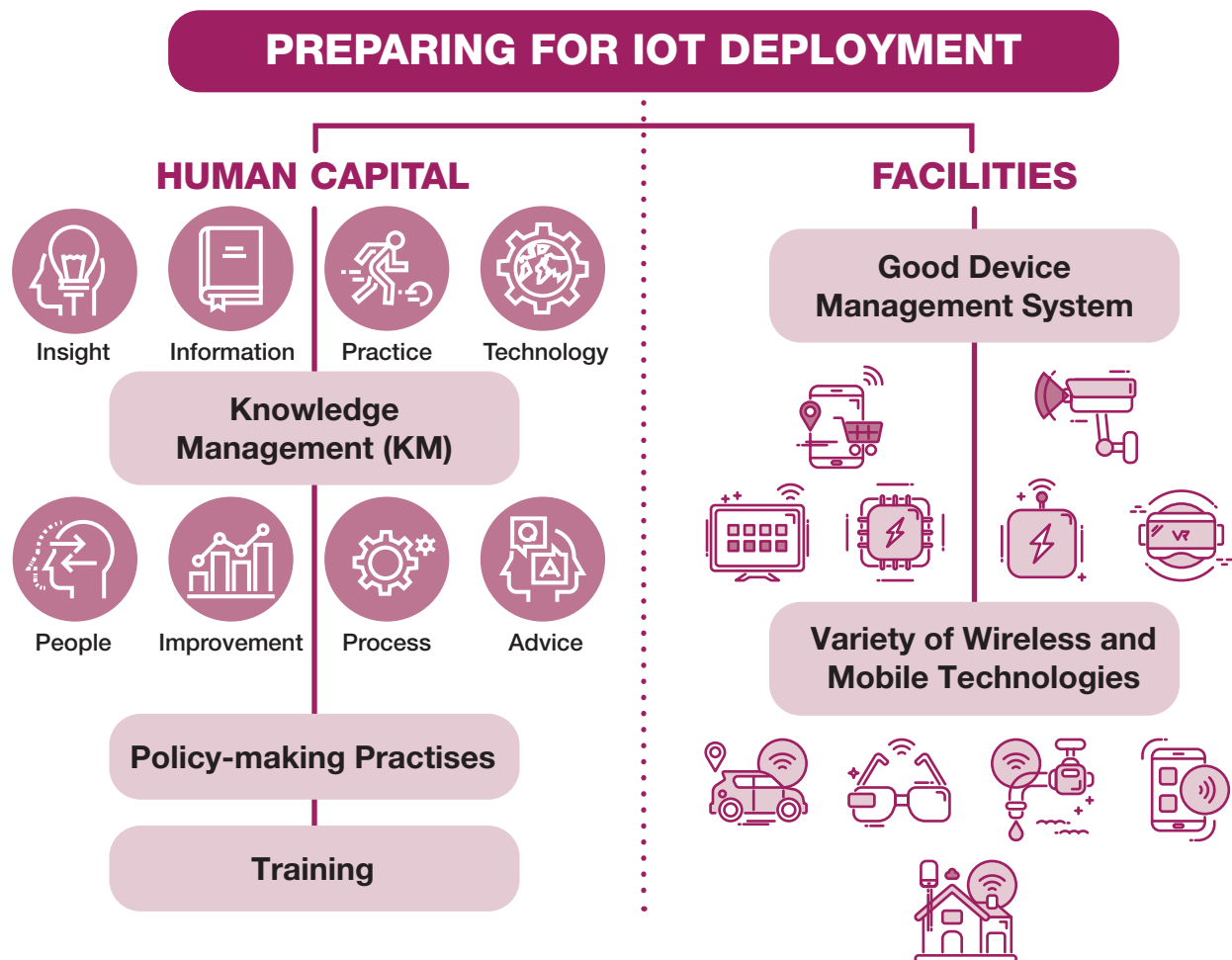

Figure D: Preparing for IoT Deployment

1. Human capital

Human capital plays a significant role in laying the foundation for Malaysia's smart city IoT development. In today's highly competitive technology dogfight, talents will be the driving force in pushing through IR 4.0 growth.

In practice, knowledge management (KM) is an effective lever that can be exploited to boost employee innovation volume and effectiveness. Coupled with today's learning convenience, KM is more about obtaining, organising, processing, re-utilising, and transferring knowledge among employees. Also, KM makes knowledge more readily and easily accessible for all. Besides this, KM can greatly assist employees' competency development.

Apart from KM, policymaking also plays an important part to promote IoT's human capital development. Interestingly, human capital and policymaking should be open to external knowledge sources to provide enough room to embed new procedures that are essential for IoT's smart city industry growth.

Next is the cornerstone in training. Training should be structured as a key practice in overcoming uncertainties. In an uncertain working environment, trained employees will be able to adapt to the frequent and fast-paced changes. Local talents' ability to be innovative is an important driver as an innovative workforce tends to work smarter and more competitive in technology advancement.

2. Facilities

In realising Malaysia's IoT smart city potential, it is important to put in place a good device management system. To put things into perspective, device management covers hardware and software processes that ensure devices are properly registered, managed, secured, and upgraded. Also, device management makes sure that people operating IoT devices and systems are notified when something fails. In part, IoT businesses need to be accountable for all these functions, even if the cloud solutions they subscribe to do not offer any of the required device management components. Further, a comprehensive device management system enables connected devices to communicate with other devices and cloud platforms easily and safely.

Moving forward

Malaysia has always relied on the collaboration of public and private sectors in creating and sustaining its smart city development. With PPPs, this strategic tack reduces financial and administrative burden on all of the parties involved. If done correctly, this setup can unleash marked improvement in efficiency and productivity. What's more, this gives the private sector ample opportunities to lead Malaysia's smart city development. In this respect, Malaysia Industry-

Government Group for High Technology (MIGHT) promotes sustainable city development as an engine for economic growth. Over the last few years or so, this has been carried out via investments, job creation and innovation, especially in relation to high technology areas.

Furthermore, in widening IoT technology's traction for Malaysia's smart city industry growth, MIGHT will look to encourage shared sustainability efforts to inspire more public and private organisations to prioritise IoT technology development. Mutually beneficial partnerships between the public and private sectors will therefore provide additional resources to support higher uptake of IoT technologies for smart city development. These collaborations are an iterative journey involving multiple stakeholders and require a robust injection financial investment. Nonetheless, the on-going development of knowledge sharing and capacity-strengthening platforms will inevitably change traditional attitudes about IoT technologies.

One such connect and collaborate is MIGHT's Global Environmental Facilities (GEF) 6 where the stakeholders involved are a combination of international organisations and local entities. The program is funded by GEF through their international execution agency, UNIDO. To this end, the Malaysian government matches the fund by six-fold through joint in-kind contribution from the Ministry of Local Housing and Government, MIGHT, Ministry of Energy, Water & Natural Resources and Melaka. In-terms of technical expertise, GEF 6 leverages its international ties with the World Bank and UNIDO to capitalise on their technical and networking resources. On the other hand, local partners will be collaborating with Tenaga Nasional Berhad and its subsidiaries to tap into their expertise as well as in-kind contribution for the smart grid projects.

Conclusion

IoT is one of the vital enablers that will redefine the use of new-end technology fields across Malaysia's smart city implementation. At the same time, IoT will also reshape the competitive contours of Malaysia's technology companies. Given the fact that IoT readiness across Malaysia's smart city industry is yet to be fully understood, how IoT technologies will be integrated into our daily lives is still up for some sort of consolidation. As IoT brings key information streams designed to be used in various multi-point ways, for now at least, its weaknesses pose a huge challenge for smart city development systems that are currently in the development pipeline. But ultimately, IoT is the age where all things will be connected, and this involves businesses, processes, people, and devices merging seamlessly. Also, the rise of Internet of Things (IoT) creates new prospects and applications that will accelerate a lot of the smart city components, thereby moving all of us into a significant transformation cycle.

UNITING UMMAH'S CAPABILITY THROUGH STI COLLABORATION
International – Innovation – Islamic

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In his keynote address, Tun Dr Mahathir Mohamad, KL Summit's Chairman placed science and education as the top two commitments out of seven key priorities to improve the well-being of Muslim-majority countries. These seven priorities are:

COMMITMENT to implement pragmatic solutions, improving ummah's status quo, expanding the outreach of economic development, science, technology and innovation for the benefit of future generations; and,

REAFFIRMING the commitment towards building an ummah that lives a fulfilled life with dignity and prosperity, and possessing the highest level of education and skills, advocating peace and justice, and contributing to the international community

> *Cooperation between Malaysia and Turkey will help relieve the Muslim Ummah from being subjugated by others.*
>
> **YAB Tun Dr. Mahathir Mohamad**
> Former Prime Minister of Malaysia

> *I want to see and aim for the trade value between Turkey and Malaysia to reach US$5 billion.*
>
> **H.E. Recep Tayyip Erdogan**
> President of Turkey

> *The great challenges facing the world in general, and the Muslim world in particular ... security, peace, development, good governance and human rights.*
>
> **HH Sheikh Tamim bin Hamad Al Thani**
> Emir of Qatar

GOLDEN AGE OF ISLAM
Leader in knowledge creation and **STI** development

But, today...
out of the 48 least developed countries
44% are Muslim-majority countries !

Learning from others

CERN, the European Organisation for Nuclear Research, for example, has 20 European member states. It has been a world leader in particle physics for more than half a century, and is host to the world's biggest particle accelerator, the Large Hadron Collider.

International - Innovation - Islamic

I-COE is aimed at **bringing together organisations and experts** from renowned universities and research laboratories from **Muslim-majority countries.** By sharing **knowledge and facilities,** the Muslim world can jointly mobilise resources to provide pivotal infrastructure support in the pursuit of meaningful **education and research.**

1 Collaborate to increase trade and investment

There is ample room for the 5 countries to collaborate in trade and investment.

The amount of **trade** transacted within the group is believed to be relatively small, with only about **1% to 7%** of each countries' total exports. Therefore, there are plenty of opportunities for the 5 countries to **increase trade** with each other.

The relatively small amount of FDI transacted between the countries in the group and their small shares of the world's total FDI stocks, offers an **opportunity** for the countries to collaborate in increasing their FDI In-Flow stocks.

World
Total FDI	World Share
USD35.3T	**100%**

4 Countries
Total FDI	World Share
USD0.5T	**1.48%**

In 2018, total export trade activities among the **five countries** was worth **USD32.48 billion.**

Malaysia and Indonesia are the largest trading partners among the **five countries.**

Goods and services worth **USD17.3 billion** were traded between Malaysia and Indonesia, or **53.27% of total trade** among the group in 2018.

Malaysia is the only country with a positive trade balance— approximately **USD17.3 billion** of trade surplus in the import and export of high-tech merchandise.

2 Potential for R&D collaboration

Onto the patent areas that these 5 countries are good at, there appears to be a common area of interests in R&D. Below are the 3 proposed focus areas for R&D collaboration.

i) Medical or Veterinary Science;

(ii) Electric Communication Technique; and

(iii) Computer Science.

Malaysia, Indonesia, and Turkey have **significantly more** yearly patent applications than Pakistan and Qatar.

However, Qatar has seen a **significant growth** in Patent applications over the last 9 years, with a **CAGR (2010-2018) of 19.17%.**

Indonesia and Turkey on the other hand, are **growing steadily** at around **6% to 9% CAGR (2010-2018).**

Both Malaysia and Pakistan's patent applications have been **relatively stagnant**, with a low **CAGR (2010-2018) of about 1%.**

Country	Accumulated Patent Applications (2010-2018)	CAGR (2010-2018)
Indonesia	65,416	6.22%
Malaysia	72,622	1.69%
Pakistan	8,528	-1.93
Turkey	66,990	9.18%
Qatar	2,975	19.17%

Note: Based on Patends filed in individual country in the last 9 years

Optimistic - Collaborative - Persistent
THE GUIDING PRINCIPLES OF THE i-COE

SUSTAINABLE DEVELOPMENT GOALS (SDG)

SHARED PROSPERITY VISION 2030

Development for All	Addressing Wealth & Income Disparities	United, Prosperous, Dignified Nation

VIRTUAL CENTRE OF EXCELLENCE

4IR

Platform Technologies

i-COE's STRATEGIC INTENT

Create interdependence among Muslim countries

Increase investment, trade and employment
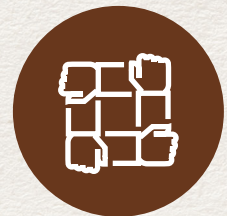
Enable integration of communities

Top 5 Countries

 Turkey
 Indonesia
 Malaysia
 Pakistan
 Qatar

The Stakeholders

TÜBİTAK · Qatar Foundation · LIPI · MiGHT (Malaysian Industry-Government Group for High Technology)

Note: The COE is not limited to these five countries or organisations shown above.
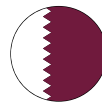
Shared-roles

1. Provide knowledge and technical know-how
2. Share R&D expertise and promote talent mobility
3. Share learning facilities and
4. Provide wider access to funding

Concept

The virtual COE encourages and facilitates active sharing of expertise and generation of actionable insights for member countries.

Objectives

1. To further the development of shared capability by leveraging on each other's strengths to serve Muslim majority countries' shared needs.
2. Provide a strategic platform to enhance existing bilateral projects and give rise to new-end collaborations.

" The cooperation among bees to make honey which benefits mankind "

Note: Will be developed utilising latest and relevant technologies

POTENTIAL AREAS OF COLLABORATION
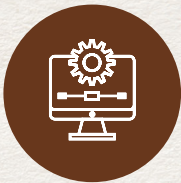
Cyber Security, Computer Science

Sustainable Energy & Utilities
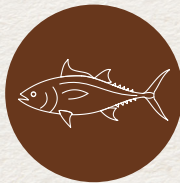
Bio Diversity, Deep Sea & Marine Resources

Healthcare, Medicine & Veterinary Service

Water Security

Transportation & Mobility

Environment & Climate Change

Food Security & Halal Value Chain

Big Data, Portable Communities, Digital Assets Management

Electric Communication Technique

WHAT'S NEXT?

A case for collaboration

Webinars
State-level discussions

ACCELERATING COMPETITIVENESS THROUGH COLLABORATION: MIGHT'S PARTICIPATION IN THE GLOBAL FEDERATION OF COMPETITIVENESS COUNCILS (GFCC)

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In the wild, a silo animal is easily injured and preyed upon. However, together in a pack, they collaborate to protect each other and fend off dangers. Applied in today's world, it is indeed true, as navigating the competitive VUCA world (Volatility, Uncertainty, Complexity and Ambiguity) requires collaboration. No single organisation or person can navigate or survive by themselves, let alone be competitive. To create this 'pack' and generate the wisdom of the crowd, platforms such as the GFCC and other networks create these connections and open the doors for opportunities to collaborate and foster a sense of camaraderie among like-minded individuals, organisation and countries.

Since 2016, MIGHT has been a member in the GFCC to further champion and strengthen the high technology ecosystem and place Malaysia on the map for competitiveness. Founded in 2010, the GFCC brings together more than 60 member organisations and is currently represented in more than 35 different countries around a collection of shared principles to enhance regional, national, and global prosperity. The GFCC aims to enable mutual learning within its distinctive network as well as across the extended network of GFCC partners. This leads to development and implementation of original, creative ideas, concepts, and tools for members to navigate today's complex competitiveness landscape. The GFCC works with its members to catalyse cross-learning and creation of competitiveness and innovation strategies, policies, and initiatives.

In line with this, MIGHT's participation in the GFCC has showcased several of Malaysia's best practises in accelerating competitiveness based on the premise that science and technology can catalyse the rapid development of Malaysia's economy and the advancement of Malaysia into high-income status. Some of MIGHT's activities that are highlighted and referred to in the GFCC includes foresight and futures thinking, sustainable and smart cities, as well as industry development. The GFCC provides a platform for Malaysia to be shown as a collaborator of equal standings to the powerhouses of competitiveness whilst advancing our path as a rising star amongst developing countries.

MIGHT and Malaysia's capability to host international events was also showcased in the organisation of the GFCC annual summit in 2017 where the 2017 Global Innovation Summit (GIS2017) held in Kuala Lumpur brought together more than 400 leaders from 30 countries around the globe with background in business, government, and academia. A grandiose event, GIS2017 discussed The Sustainable Future of Production, Consumption and Work. As the world is experiencing a time of unprecedented transformation affecting business, work, and society alike, no country, industry or organisation is spared from this disruptiveness. Rapid advances in technologies such as artificial intelligence, sensors, robotics, and additive manufacturing are creating a tectonic shift in the way we produce and consume goods, and rendering the world a better, safer, healthier, more prosperous place. This provides a new opportunity for innovative business models, and a massive boost in resource

utilisation and efficiency. With that premise, conversations to connect organisations and people to spark collaborations in GIS2017 were held and some of these conversations have bear fruit to successful outcomes and new ideas.

MIGHT's connection on the pulse of competitiveness by being a part of a larger network of like-minded collaborators, enables Malaysia exclusive access to a network of global leaders, international competitiveness organisations, renowned corporations and research institutes through a platform that allows for connections in global events and internal initiatives. It is indeed true that no man is an island and those who connect and collaborate gain more by sharing and co-developing than progressing alone in today's complex competitiveness landscape. Members of the GFCC engage with each other regularly, exchanging ideas, addressing challenges related to innovation and competitiveness, and comparing best practices. This culminates into research outputs for members through annual reports that prove valuable for future endeavours and competitiveness strategies, be they national or international. In contributing towards Malaysia's competitiveness through the advancement of the high technology ecosystem, these outputs in addition to others further strengthens the thoughts, philosophy, and framework of MIGHT's activities. Some notable outputs from the GFCC include its annual competitiveness principles which often emphasises on the need for connecting and collaborating to accelerate competitiveness.

The GFCC Global Competitiveness Principles were agreed upon by the GFCC and its network of over 30 national competitiveness organisations. To reflect the changing global economic environment, these set of principles are an annual and ever evolving statement of competitiveness principles for countries to adapt to critical productivity and prosperity challenges, and leverage on opportunities that may arise. The Principles emphasise key competitiveness drivers such as investment in research and development; education and training for all citizens; strong and responsible stewardship of natural resources; strong intellectual property rights; a stable, transparent, and efficient environment that encourages business investment, formation, and growth; open trade; and enabling infrastructure.

"

Rapid advances in technologies such as artificial intelligence, sensors, robotics, and additive manufacturing are creating a tectonic shift in the way we produce and consume goods, and rendering the world a better, safer, healthier, more prosperous place.

"

2020 Global Competitiveness Principles:
Crossing the Chasm and Building the Future Economy

Build coalitions and multi-stakeholder public-private platforms based on shared values to address the COVID19 crisis, build resiliency and the future economy.

Put innovation at the centre of crisis response and future building strategies and initiatives, leveraging the potential of novel frameworks developed and implemented during the crisis.

Focus on inclusive skills and competencies to retain and enhance critical capabilities across sectors and enable the future economy.

Empower local and regional initiatives and capabilities to accelerate response, build resiliency and transition the economy.

Implement and promote the global deployment of functional, forward-looking and technology-enabled Intellectual Property (IP) regimes and institutions capable of supporting economic resiliency and enabling fast-paced innovation.

Address physical and digital infrastructure gaps by setting a clear strategic direction and putting in place sustainable and resilient assets needed for future economies to function and include all demographics.

Enhance the response to global challenges and economic transformation via cross-border partnerships based on shared values, connection platforms and institutional solutions to accelerate the flows of goods, talent, capital and ideas across nations.

Re-imagine economic systems and leverage innovation to build a resilient and sustainable future economy, decoupling growth from environmental impact, transforming the industrial footprint, and fighting climate change.

Adopt forward-looking and adaptable regulatory systems that allow for innovation, are designed to accelerate experimentation and learning and can quickly adjust to changes in the environment and technology.

Leverage the pandemic crisis to make learning the cornerstone of any and all future economic strategies; constantly collecting, analysing, and applying lessons learned, and benchmarking strategy, regulation, policy, and business performance and solutions.

The GFCC Global Competitiveness Principles were agreed upon by the GFCC and its network of over 30 national competitiveness organisations. To reflect the changing global economic environment, these set of principles are an annual and ever evolving statement of competitiveness principles for countries to adapt to critical productivity and prosperity challenges, and leverage on opportunities that may arise. The Principles emphasise key competitiveness drivers such as investment in research and development; education and training for all citizens; strong and responsible stewardship of natural resources; strong intellectual property rights; a stable, transparent, and efficient environment that encourages business investment, formation, and growth; open trade; and enabling infrastructure.

- If you are interested in connecting on competitiveness and the work MIGHT does in the GFCC, please reach out to us at **info@might.org.my**
- For more information on the GFCC: **https://www.thegfcc.org/**

REDRAWING INDUSTRY AND ACADEMIA'S SHARED SYNERGY TO ENSURE LOCAL UNIVERTSITIES' INNOVATION ACTIVITIES REACH THE MARKETPLACE

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Introduction

Technology forces we see growing more popular of late surely won't fizzle out after the pandemic. However, for the domestic industry, to keep pace with today's most prevalent tech trends poses a huge stumbling block in terms of costs. While new sources of advantage are needed to survive in an era of global health unease, social tension and technology revolution, in unstable times, not being technologically adequate is costly to say the least.

In reality, for the last few months, a great number of local businesses that were slowed by the pandemic have not reopened as it is not clear how durable the economic recovery will be. While retail stores and other industries continue to struggle, digital and tech businesses are now enjoying a clear upswing.

This therefore, begs the question, do our local businesses have the depth or resources to overcome slow growth and innovation traps? Although tech has become one of the world's most valuable industries, the predicament for local businesses now is to figure out how to become consistently profitable, be nimble in managing their cost operations and strong enough to cope with stuttering demand.

And to escape the devastation caused by COVID19, what we have seen so far is a trend where big businesses are reorganising, while small businesses are dissolving. This unfortunately has left many holes in the economy's wealth generation engine. Furthermore, many of the society's

problems are solved by small businesses. The rest who are still holding on are largely condemned to scramble from one month to the next, with little avenue for advancement.

In a sense, all these questions are partly the accountability of local industries that have been slow to innovate. Any industry nowadays has to have their finger on the pulse of what is the quickest, best and most cost-effective way to meet emerging demand streams. If the rewards outweigh the risks, roll the dice and just go for it. Precisely, this is a part of the equation that LIF aims to get right with a smart partnership platform.

Given Malaysia's shrinking talent pool, industry collaboration with the academia has been viewed as one of the most sensible paths to help domestic industries and businesses stage a strong recovery.

Businesses that have successfully navigated through this arduous technology journey will be rewarded with a secure place on this vibrant innovation space. Also, businesses need to quickly turn alluring prototypes or new innovation into products that are beneficial for the masses especially in view of their transition to a new living normal and industry practices.

Read on to find out how LIF aims to provide an answer to this predicament that is poised to benefit Malaysia's masses.

WE CAN ONLY SUCCEED IF WE CAN UNLEASH A TECHNOLOGY BOOM OF OUR OWN

As of today, MIGHT with RAENG has produced

After 4 cohorts,
60 fellows
participated in the program.
(each cohort 15 participants/year)

70% 30%
is from public university and   is from private universities

86%
who has joined the program has created collaboration with industries (SMEs and MNCs)

Strengthen the roles of our educators, relevant, push and pull factor

Onto LIF's latest success story, we learned firsthand how deep Dr Yeong Che Fai's commitment ran while developing his robotics venture. Aided by LIF's facilitation, the network has helped Dr Yeong choose a different economic tack that has worked wonders for his entry into robotics commercialisation.

Dr Yeong Che Fai, 36, is a lecturer at Universiti Teknologi Malaysia. Wearing many hats, he is also founder and managing director of DF Automation & Robotics Sdn Bhd and does his part in spreading the message of innovation and entrepreneurship by jumping into the deep end of the pool himself.

Dr Yeong Che Fai is a lecturer, robotics expert and entrepreneur who dreams of building a global company as renowned as Google, Facebook or Alibaba. According to him, universities should encourage students to found new businesses.

It's no surprise that someone who is so passionate about the good that robots could do for the human race should be such a believer in the motto 'leading by example'. In the past few years, he has worked with his students in setting up tech-based companies, starting with DF Automation in 2012.

What interested you to start your robotics business?

I was doing my PhD in bio-engineering at the Imperial College London in London from year 2006 to 2010. While doing my dissertation on the functions of rehabilitation robots, I had the opportunity to travel to other countries. I witnessed firsthand the importance of businesses in strengthening a nation's economy and wealth in these developed nations.

This also goes back to the human capital in a nation. If you ask any university students in US, UK, Korea and of other developed nations, they will share with you their thoughts on starting their own companies.

A simple reason for this drive is that they have witnessed success stories in their own countries, like Facebook in the US, Samsung in Korea, Sony in Japan, and others.

This entrepreneurial mindset is not so prevalent in Malaysia yet. If you ask our university students what they want to do after they graduate, many of them will say "not sure". And some may voice their interest in working with reputable multinational companies (MNCs) that could provide a good remuneration package. Only a very small percentage of students would think of creating a global company such as Facebook, Google, Samsung or others.

Hence, when I came back to Malaysia in 2010, I wanted to start a few companies, hoping that some of these companies might make it big, be it by being listed in the local bourse or becoming a global brand and becoming an inspiration to Malaysians.

We began with incorporating DF Automation & Robotics Sdn Bhd in 2012 because there was a need by the industries in

Malaysia. Many companies have been looking for automated guided vehicle (AGV) solution but most of the makers are based overseas, and this translate to higher costs and poor local support.

Who are your clients?

Our clients are mostly MNCs, and we have also exported to Singapore. The AGV, which is a mobile robot can move on its own from one point to another, serves well in transporting goods. This reduces reliance on manual labour and increases efficiency, which are the main selling points. Other factors in its favour included such things as the increase in minimum wages and the incentives announced in the national Budget 2015 to encourage automation.

While many are happy and we have repeat orders, we are also listening to the feedback and are continuously improving our product and services. As we grow, we would be looking for investors and partners who can speed the growth of our business systematically in South-East Asia.

At the university level, I'm involved with drafting entrepreneurship-related policies and practices in order to boost the entrepreneurship culture in academia. My presentation, "The Entrepreneurship Mindset", was aimed at UTM and other universities. One of the highlights of the entrepreneurship model is to leverage on the student projects, such as their final year project, as a potential commercialisable product.

As Malaysians, we need to work together to support and create more entrepreneurs for a better Malaysia.

LIF is an excellent comprehensive program designed to assist a leader in translating innovation to commercialisation for different stages of businesses. I have joined LIF back in 2017 and LIF Advance in 2020. The program was facilitated by very experienced mentors on different topics such as how to pitch, negotiation, IP protection, marketing, etc. One of the key different about the LIF program compared to other entrepreneurship program is that it focuses on global market rather than local market. It was a mindset change to learn to push the company to global on day one.

Besides, the networks created during this program was simply amazing. I got to know other leaders in Malaysia and from different countries. We still keep in touch how we can help each other. Currently I have two companies which are www.techcareinnovation.com and www.dfautomation.com. LIF has helped me to grow these both companies. Collectively, these two companies have raised close to RM7million in funds since 2017. Techcare had exported some of the rehab devices to UK and India. DF Automation has recently viral in Malaysia where they have supplied food delivery robot @ Mak Cik Kiah 19 to hospital to assist in combating COVID19. Today as a mentor, he guides would-be entrepreneurs, mainly his degree to doctorate students, in all aspects of starting a business.

Conclusion

After months of shattered plans, lockdowns and rapidly improvised new normal, several tech trends are pointing to continued growth of the new reality we now live in. No matter what, the real world will hinge on technology more than ever before. As the technology supply chain rests largely on tech transfers to scale at speed, it's high time the relationship between industry and academia gets revisited.

Today however, technology transfers are more complex. One particular challenge is one of mismatch output between universities and industry expectations. This could be due to the fact that many academic and research entities are structured to serve predetermined research disciplines rather than the needs of the industry. In their chaotic disparity, this is one area that all public and private sector actors need to act upon first if Malaysia is to be reckoned as an in-waiting high technology nation.

Meanwhile, LIF's recent success tells the story of largely unnoticed organisations like the Malaysian Industry-Government Group for High Technology (MIGHT) with a key role to play. With over 90 industry members, MIGHT is both an enterprising voice and an authoritative counsel for high tech industry players. One striking fact about MIGHT's work with respect to LIF is the focus on long-abandoned resources, none other than our university leaders who are coaching our youth to be the next generational entreprenuers. For years taken for granted and made invisble, now, they have to lead by example.

In addition, under the Newton-Ungku Omar Fund (NUOF), MIGHT and UK's Royal Academy of Engineering have developed a program called the Leaders in Innovation Fellowship. The program is designed to equip lecturers to push innovation out to the industry.

While many would probably veer off thinking that this program would somewhat overload our lecturers with more roles as teachers, researchers and now CTOs, it is however quite the contrary. With LIF, the end goal is to provide lecturers with the opportunity and a new type of partnership setup that guarantees their growth sustainability and most importantly, ensure their innovation reaches the marketplace where it really matters.

Last but not least, by refreshing our universities' relevance to the industry, this will ensure that the nation's innovation activities continue unabated in a sustainable fashion. Apart from ramping up our innovation volume, this shared effort could, to a degree, provide a solution to the brain drain situation we've been facing for years therefore allowing the nation's best talents to come back and pursue their research ideas with a wider networking and support systems. In the future, we hope to restore the pervasive dynamic of our universities and the belief that education is where our future lies by holding our educators accountable for driving the nation forward.

ACCELERATING HIGH-TECH INDUSTRY (HTI)/ SMALL AND MEDIUM ENTERPRISES (SMES) DIGITAL TRANSFORMATION IN MALAYSIA USING MARKETING 4.0

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Introduction

Digital transformation refers to a process where digital technologies are applied to create or modify existing business processes, cultures, and customer experience to meet a rapidly changing business or market environment. The advancement of ICT and digital age enables businesses to transform and ease the traditional roles of sales, marketing, and customer service to smart applications through digital technology.

In realising the digital transformation of Malaysian industries, the Malaysian government has outlined digital economy and Industrial revolution 4.0 as two key economic activities to be pursued in the Shared Prosperity Vision 2030. Tech such as big data, artificial intelligence, blockchain and virtual reality will be pivotal in driving the agenda.

Current Economic Scenario Of HTI/SMES In Malaysia

The COVID19 Pandemic has caught many HTIs and SMEs flatfooted. As a result, this has adversely affected the nation's economy. The severity of COVID19's impact has veered businesses to an unprecedented degree, resulting in liquidity and cash-flow problems to name a few. Meanwhile, revenue loss, weakened economy, lower demand, supply chain disruption simultaneously affect employment rate. By and large, COVID19 has impacted consumer behaviour and elevated remote working and business digitalisation to credible long term options.

Inevitably, both HTIs and SMEs must change the way they operate and use technology to adapt to new ways of doing business and increase productivity.

SMEs' Issues And Challenges

In implementing digital transformation, HTIs and SME face multi-faceted issues and challenges. From the lack of technology adoption, access to funding, skilled manpower, acceptance and awareness as well as market access all seem to plot against Malaysian SMEs' growth in this new normal-centric age.

1.   Lack of the technology adoption

To date, a number of research houses have begun to measure Malaysian businesses' readiness as far as adopting digital transformation is concerned. The Socio-Economic Research Centre (SERC 2017) for example conducted a study on ICT and Digital Adoption of Malaysian SMEs where out of 129 respondents, only 16% utilised their e-commerce platform to expand their business. Meanwhile, a global survey found that Malaysia scored the highest within Asian in terms of readiness to adopt digitalisation (Dr Moonyati, 2019).

2.   Cash Flow and lack of access to funds

To ease SMEs' access to funds, the government has since devised various grants and financial assistances to push through SMEs' digitalisation transformation. Among the grants provided include the 'SME Business Digitalisation Grant' announced during Budget 2020, '100 Go Digital' and the 'SMART Automation Grant' (SAG). These grants go out to ensure that our SMEs are financially assisted based on their digital readiness.

3.   Lack of skilled manpower

According to (Huawei, 2019), the lack of skilled employees that possess the right digital skillsets will prevent SMEs' effort to adopt digitalisation in sales and marketing, information technology (IT) technical skills and business management. Based on the study conducted by SME Corp and Huawei, SMEs reported low familiarity of digital advantages such as social media marketing, e-commerce and other digital marketing tools. Thus, it is equally important for SMEs' workforce to be reskilled and transformed towards digital revival.

4.   Lack of acceptance and awareness

In relative terms, SMEs' acceptance and awareness of digitalisation remain low although the government has provided various kinds of incentives to ensure uninterrupted digital transformation. Furthermore, the hesitance among SMEs to digitally transform their

business and shift to industry 4.0 is partly due to the lack of awareness. Besides, high cost of technological adoption and the uncertainty on the return of investment has also hindered the process. Digital Asia (2019) recently discovered that 64.7% of SMEs in Southeast Asia wanted to see out the short-term benefits of digitalisation and 64.4% were concerned on the risks posed by digital.

5. Lack of infrastructure

Onto infrastructure, the lack of it makes it almost impossible for businesses to harness digital transformation and Marketing 4.0. Not until the availability of affordable high-quality access to communication networks and services becomes more accessible to the masses will SMEs realise their digital transformation goals (OECD, 2019).

As Malaysia moves towards a digital nation, Telekom Malaysia Berhad (TM) and Huawei Technologies (M) Sdn Bhd (Huawei) have recently signed a Memorandum of Understanding (MoU) to collaborate in accelerating Digital 5G services for Malaysians across various segments namely digital society and lifestyle, digital businesses, and industry verticals as well as digital government in line with the Fourth Industrial Revolution.

Technology Change In The Business (Digitalisation And Industry 4.0)

Today, digital transformation and Industry 4.0 promise to create bigger opportunities for HTIs and SMES to grow their business. Digital technology adoption does not concentrate entirely only on utilising new or existing technology, but also focuses on new ways to enhance existing technologies to provide excellent customer engagement and increase profitability.

According to Annacone (2019), there are four types of digital transformation namely, business process, business model, domain and cultural or organisational transformation. Business process transformation aims to reduce cost, attain higher productivity and increases product quality through the use of data, analytics, Application Programming Interface (APIs), learning machine and a few other technologies to provide valuable insights throughout any business.

One example of business process transformation can be as simple as a fast-food restaurant reinventing their food ordering process. To illustrate, McDonalds' customers can now place their order either through a kiosk machine, a mobile app or website via any food delivery platform. This innovation has helped the company to increase customer

convenience and forgo the long queue at their franchise. From a business perspective, process transformation can be pushed through with the introduction of basic tools such as Microsoft Excel's spreadsheet or system across accounting, finance, strategic planning, and legal functions.

As a matter of fact, the Department of Statistic Malaysia reported that 18.5% of Malaysia's economy was obtained through digital economy and 8% of it through e-commerce. Even in traditional industries, fishermen use communication applications and social media i.e. WhatsApp and Facebook, to keep them updated, for example, receiving alert on weather and tide conditions (Nur, 2020). These are just a few examples of low threshold digital transformation.

In addition. the managing director for ASEAN International Data Corporation (IDC) stated that Malaysia's enterprises spent almost USD11 billion on IT in 2020 whereby a large proportion of the spending was forked out for managing cloud services and this indicates that digital transformation is becoming more prominent in Malaysia (Edwin, 2020).

How Adopting The Technology Helps HTI/SMES In Area Of Covid And Moving Forward

1. Engaging customer

Many of today's consumers are digital savvy and the number keeps increasing from time to time. Given this, businesses with online presence have the upper hand in appealing to this cohort. However, digitalisation is often understated, limited by the act of creating a website, or rather a Facebook or Instagram site for local businesses. This somewhat detracts the power of digitalisation where its strength lies in the data collected. Through digitalisation, businesses are able to generate actionable insights to review their forecast around what their customers need.

2. Optimising process

As an enabler, digitalisation increases business operation efficiency. Through digitalisation, businesses can subscribe to cloud services that enable better business workflow management, easily accessible data, and consolidation of key applications.

3. Transforming products and services
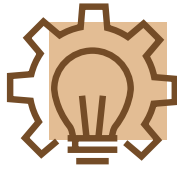
Also, digitalisation can unlock new revenue opportunity and provide actionable insights for product improvement from direct customer feedback. These insights can guarantee businesses longevity of their products and services as businesses set out to tackle rapidly changing customer demand and expectations. Products and services' transformation may be as simple as subscribing to a cloud accounting software for invoice generation. What's more, later, businesses can add another layer of service sophistication that includes website e-commerce functions or improve a product's presentation via an app.

Marketing 4.0 Towards HTI/SMES Digital Transformation

Marketing 4.0 refers to a combination of online and offline interactions between businesses and customers. According to Dr. Kotler et. al (2017), digital interactions alone are not enough to fulfil the digital economy to merge styles with substances. Indeed, as the online world becomes more prominent, offline interactions represent a strong differentiation. Additionally, brands' authentic characters are crucial while being flexible in adapting to the rapid changes in the technology space because authenticity is a brand's most valuable asset.

Adopting and adapting digitalisation flexibly has been one of the ways to become competitive and relevant in the market. SMEs should be ready to switch from traditional marketing to digital marketing. Unfortunately, tactical marketing deployment such as direct selling, trade shows, printed advertisements, referrals, radio and TV commercials, mailbox flyers and billboards are getting obsolete.

On the other hand, digital marketing consists of content marketing, search engine optimisation, social media marketing among others. When businesses invest in building a website or advertise their brand on social such as Facebook, Twitter and YouTube, this is what's called digital marketing.

Digital marketing brings tremendous benefits to SMEs. For example, according to eMarketer, digital marketing connects your business to consumer products and services easier and more convenient. In fact, 80% of consumers use the internet to research about products and services. Besides, digital Marketing enables businesses to connect with mobile consumers as it is the most prevalent touchpoint in influencing consumers' purchasing behaviour.

Furthermore, as reported by Gartner, digital marketing saves SME business owners as much as 40% in terms of savings. Additionally, digital marketing increases the adoption of 'Internet of Things' and it is projected that are 20 billion gadgets will be globally interconnected online in 2020.

Conclusion

Digital transformation and marketing 4.0 are pivotal in accelerating innovation and business transformation. Local HTIs and SMEs must embrace digitalisation to transform their services and sectors as a tool to promote and sell more effectively. Going forward, as we navigate post COVID19 realities, it is important for HTIs and SMEs to pandemic-proof their relevance to be able to expand overseas.

Meanwhile, for HTIs and SMEs that are already into digitalisation, it seems that they have better positioned to survive and overcome post COVID19 challenges, especially in tackling regional competition. Furthermore, they can secure their competitive advantage by being a step ahead of their competitors. Therefore, gearing up HTIs and SMEs for higher digitalisation maturity will have a huge knock on impact for the development of these two demographic sectors in Malaysia.

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THE EMERGENCE OF NEW RAIL BUSINESS MODEL

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Previous business model?

Traditionally, the railway sector's business model relies heavily on government subsidy. Typically, governments all over the world subsidise railway operating companies and this includes paying for infrastructure and operating system expenses. Additionally, all these subsidies are used either for the upgrade of existing lines or investment into new lines that are viewed conducive to promote economic growth.

Current business model?

However, world governments are facing a tight budget constraint subsiding their railway operators, especially throughout the operation stage such as infrastructure upkeep, rolling stocks, and overhead costs. To get around this, governments may have to reshuffle their budget for other developments in need. Therefore, allowing the private sector to participate in railway investment is a much-needed pivot needed to drive cost-saving efficiencies for governments.

New business model?

A new rail industry business model is enabled by Asset Monetisation in the form of Public Private Partnerships (PPP). PPPs can be adopted to generate higher financial value for the railway industry. Plus, this transfers operational risk to respective private sector partners that are more experienced with deep expertise in various technical fields. Essentially, this is a great opportunity for governments and railway operators to learn and share cutting-edge proprietary technologies from the private sector.
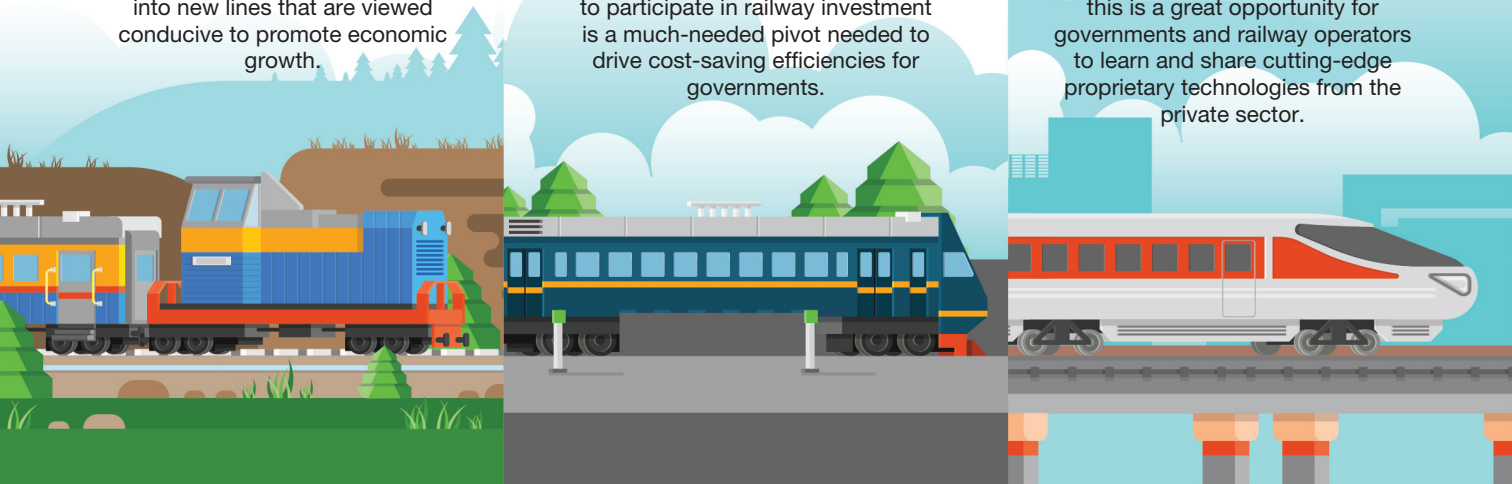
MARIC

URBAN MOBILITY:
Providing Seamless Connectivity and Enhanced Passenger Experience

As subsidy budget constraints mount, MARIC is moving urgently to build a sustainable rail industry future with private sector driven business models.

1. Connect & Collaborate: Through an invigorated public-private partnership (PPP) framework, MARIC aims to empower the local rail industry by way of leasing and asset monetisation.
2. Being a leading association that consists of 42 rail companies, MARIC's aspiration is to scale up local companies by collaborating with the government and operators. Ultimately, MARIC intends to build out an expansive railway network and ensure its lines are operationally durable, safe and sustainable.
3. MARIC's focus on system engineering and its clusters comprises of ticketing, signalling, communication, track works, rolling stock, SCADA, automated fare collection (AFC) and electrification.

4. MARIC seeks to push new innovation out in the rail industry to make efficient use of its existing infrastructure. To date, the innovations below are poised to be commercially and technically ready:

   - PIES (Platform Intrusion Emergency Stop)
   - Open mobility application platform
     i. Smart ticketing
     ii. Seamless journey planner
     iii. Smart navigation for the daily commuter
   - PIDS (Passenger Information Display System)
   - SCADA, Asset Management and Monitoring Systems

ASSET MONETISATION

MARIC understands that the world's economic landscape has evolved, and we are preparing ourselves to embrace the impact of modernisation and the emergence of the 4IR. To drive this agenda, we are applying new business models in rail through asset monetisation. It involves the creation of new revenue sources by converting assets into economic value.

MARIC, together with the 43 companies under its fold have teamed up with local rail operators to provide better rail services. Among others, one of the plans is to monetise the data collected around passenger preferences, ticketing schedules, digitalised rail services, safety, systems, technologies and operations.

Asset monetisation may also take the form of a long-term lease. It is also known as a concession agreement. In relative terms, this exercise could result in a multitude of collaborations between rail operators and the industry through Public Private Partnerships (PPP).

Why Asset Monetisation?
KEY OBJECTIVES

1. Promote seamless connectivity by inventing a universal system for all rail operators.
2. Maximise private sector involvement and investment through ownership, ridership and profit-sharing through Public Private Partnership (PPP) or concessions.
3. Taper the size of government subsidies and reduce rail operators' business cost.
4. Improve social services and rail network benefits.
5. Maintain a high level of rail industry safety.
6. Create a new customer experience where everything is ubiquitously connected between passengers, operators, train coaches and rail network traffic.

How can we do it?

TARGET 1	TARGET 2
Improve Revenue (Fare & non-fare)	**Reduce Cost (Capex & opex)**
Strategy 1 Railway as service provider	**Strategy 3** Outsourcing and franchising operations
Strategy 2 Commercial exploitation of property	**Strategy 4** Leasing and pooling of assets (e.g. ticketing system, rolling stock, advertising)

Strategy 5
Big Data

Some examples

Multiple rail operators consolidated as a single customer window

One app, one payment, one seamless trip - Getting around the city requires a mix of different transport channels, timetables, systems and technologies. Essentially, this calls for a single, easy-to-use interface that ties the travel ecosystem together.

BIG DATA PLATFORM

Data Normalisation Engine

1. Data Integration
2. Data Validation
3. Data Enhancement
4. Data Warehousing

Predictive Analytics Platform ("Dashboard")

1. Planning & Demand Modelling
2. Event Response
3. Predictive Maintenance
4. Customer Personalisation

Current Services

1. Current Services
2. Integrated booking
3. Real-time information of integrated means of transport
4. Cross & upsell-products (Hotel, luggage service..)
5. Social travelling

Monetising land and buildings can be done via a commercial exploitation of vacant land. Also, rail station redevelopment can be carried out by exercising space rights through leasing.

THE 5ᵀᴴ INDUSTRIAL REVOLUTION:
THE FUTURE ACCORDING TO 'THE JETSONS'

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The build-up to 5th Industrial Revolution

Underlying the 4th Industrial Revolution is the availability of relevant information in real time, and this is done with the ability to connect all the processes or instances within a value chain. It is the age of digital revolution where work processes rely heavily on data and this is where we regularly come across terms like data, big data, and data analytics. Digitisation and the deployment of new technologies and processes by making use of the wealth of data available enables us to transform our economies, jobs as well as society. It also paves the way for a more deepening application of artificial intelligence (AI), and the fusion between technics and domains. Robotics will improve quality of life, and the Internet of Things (IoT) makes everything we do all interconnected with each other. As we experience technologies and progress which are synonymous with 4IR, we are already preparing ourselves for the 5th industrial revolution (5IR).

What can be anticipated with 5IR?

Let us look at the future or the coming of 5IR from a lighter perspective. Some of us may remember watching Hanna Barbera's 'The Jetsons' aired back in the 60s and 70s. This animated TV series was created in 1962 about a family living in the 21st century, the year 2062 to be exact, exactly 100 years in the future at that time. It is when space travel, flying cars, robotics, supersonic sports and teleconferencing, just to name a few, are a common thing and used by everyone. There are George and Jane, and their children, Judy and Elroy. Almost everything is accessible at the touch of a button, including meal preparations. George works as a Digital Index Operator and the machine he operates is called a Referential Unisonic Indexer. His boss, Mr Spacely would say to him, "Your machine is supposed to do the thinking Jetson". They travel in a flying car and can go up to 2500 miles an hour, the car would fold into a suitcase when travel concludes as parking spaces are non-existent, and Elroy goes to school in a jetpack. Jane is a housewife and has a robot maid called Rosie to assist her, although almost every chore is automated at the touch of a button. George complains to Jane one day saying his mom prepares better 'punch-out breakfasts'. The family's visits to the doctor involve getting the EKGs (electrocardiograms) and MRIs (magnetic resonance imaging). Judy is seen making video calls. They walk their dog, Astro on a treadmill for dogs which is accessible through the rooftop of their futuristic-looking abode.

These are just some of the things we see in that TV series. Now let us look at what the two wizards of animation, William Hanna and Joseph Barbera have made a fair share of future predictions, as we have now passed the halfway mark between 1962 and 2062. Video calls are now common, and we have for example Skype or Facetime apps to enable us to do so. We have robotic assistance at home, although not like Rosie, but we have the Roombot for example, that cleans floors or any surfaces and lodges itself back into the charging dock when done. Similar to Roombot are the Roomba and Alfawise Magnetic. What about the jetpack? Interestingly, in 1960, a jetpack called the Bell Rocket Belt was invented but using hydrogen peroxide to fuel it, although it only had 21 seconds of thrust.

The inventions have of course improved over the years but may still not be commercially viable with a hefty price tag and tweaks required on the safety features.

And what about punch-out breakfasts? 3-D printers are now available, which can print 3-D items from plastic or metals, even perishable raw materials like food ingredients. Next, the smart watches, the gadgets or devices strapped to the Jetsons' wrists. They are what we call wearables that are capable of a multitude of functions available on your smartphone, and you wear one on your wrist.

One could say these inventions were inspired from watching The Jetsons. Even if they partly were, it only shows that they were possible. We may unearth new raw metals or invent a metal-like substance that would be similar to the ones the transformers are made up of—mechanical cells. It definitely seems too farfetched for now, but we would never know would we, especially when cities become denser and parking spaces become non-existent, which calls for more innovation and new inventions and new discoveries!

The fundamentals of 5IR: The deepening of artificial intelligence

The fifth industrial revolution has been described as the era of artificial intelligence (AI), where humans and technology converge. This phenomenon is already occurring now, where the continuous re-imagination of technologies is strengthening the convergence, and quite rapidly too! Where 4IR is already connecting technology to humans, the 5th continues to forge the convergence deeper and further. Beginning from performing simple tasks, to performing complex tasks, to making judgment calls. As AI keeps improving , from machine learning to deep learning, we may not have to wait until 2062 to experience a lifestyle like the Jetsons do. Thanks to three key breakthroughs, the first being the mass availability of graphic processing units, or GPUs. A number of GPUs would be clustered together to make up the AI software. Next is big data, which means the abundance of data can be absorbed or used by AI to learn more complex scenarios. Thirdly, algorithms which are basically math formulas, programming commands or a set of rules informing a computer how to solve a problem. These are the make up of the artificial neural network of AI that mimics the human neural network. And just like what Mr Spacely said to George Jetson, the machine indeed does the thinking for us and will keep improving on this.

"

We would have more time to focus on our families and our health, hence improve our lifestyle. With big data, AI is able to profile us according to the required characteristics, such as hobbies, shopping habits, health conditions, just to name a few.

"

The age of AI – catalyst or catastrophe?

Generally, 5IR or the age of AI should benefit us in all aspects, especially in manoeuvring certain tasks which are repetitious or mundane, and those that can be classified as tricky, risky or hazardous. It was during the 2nd industrial revolution that mass standardisation of products equating to repetitious or mass production of products began. It can also assist us in performing daily tasks with minimal errors. Not only that, it can also multitask, and at a faster rate as well. We would have more time to focus on our families and our health, hence improve our lifestyle. With big data, AI is able to profile us according to the required characteristics, such as hobbies, shopping habits, health conditions, just to name a few. It can also profile suicidal tendencies, like the 'proactive detection' software deployed by Facebook that can flag worrisome posts to councillors or some helpline.

In summary, AI will play a big role in almost all sectors, be it customer service, financial investment, accounting, customer relationship, health and medics, marketing, autonomous vehicles, agriculture, and disaster management, and the list is not necessarily exhaustive.

With the few examples on how AI would impact our lives, there would probably be a few concerns as well. We would be asking questions like will we humans really have more leisure time? Will the government rethink economics? One big looming question would be, how will all these changes affect our jobs? It would be worrying when we hear the CEO of the World Bank saying in 2017 that two-thirds of jobs globally would be affected because of automation. The other would be how comfortable are we to be profiled by a machine, where everything we do or wherever we go, is recorded and profiled? Some of us may deem this as an encroachment to our privacy, especially if we think of drones hovering above us and capturing our images and profiling us as that is happening. This gives rise to the question of ethics, if they are machines, does this give them the right to take pictures of us and profile us based on the data they have on us?

Next is AI profiling. Profiling of humans has been happening for thousands of years. Astrology for example, has been doing just that. We are defined into certain characteristics from the day we are born, to how our lives will turn out to be, based on patterns which were experienced by other people who lived before us.

There is more: If we look at the adult industry and the use of sex dolls, will there be justification that one day that this practice would be allowed, citing justifications like 'robots will satisfy our everyday needs when couples do not want to conceive', and this is even ethically allowed as it is not outside-of-marriage relationship. Technology in this industry has spawned to such heights that the robots are 'a blend of lifelike silicone and animatronics that can simulate movement, with brains embedded with AI that enable them to respond and adapt to their human partners'. It might be ethically worrying to note that this industry was estimated to be worth USD30 billion in 2017 and is expected to hit USD123 billion by 2026.

AI therefore needs to be trustworthy in every sense of the word. Its applications also need to be human-centred, as well as meet ethical and societal fairness expectations so as to elude biasedness or societal divide while improving economic activities.

Has 5IR hit our shores?

We may still be experiencing 3IR and 4IR and many of us are yet to enjoy the benefits of human-technology connectivity and convergence, as affordability would be an issue to many of us, but the age of 5IR is definitely dawning, and Malaysia needs to prepare itself for such disruptions, economically and socially. Current jobs may be displaced, we do not have a Digital Index Operator yet like what George Jetson works as but there are many jobs out there that have to do with digital content and data analytics, such as digital marketing and User Experience (UX) designer. We should take precedence in the Great Depression in the 1930's that initiated in the US which resulted in a global financial distress. The 10-year ordeal ended with the US Government, led by Franklin D. Roosevelt, putting tighter regulations on the financial markets and creating policies to maintain high employment and ensure fast economic growth. Therefore, although jobs may be displaced, new ones would be created because we

will need more George Jetsons, to man and manage the AI machines and equipment and analyse the performances of AI-enabled technologies. 5IR is also associated with the gig economy, defined as a non-payroll based or independently-contracted work. It means that we would be capitalising on digital talent platforms that would link employees and employers and we would be working on a task-by-task basis in a flexible and non-fixed location. The gig economy is said to be more suited to millennials, therefore how would the rest of the society adapt to these impending changes?

How is Malaysia's preparedness to embrace 5IR?

There are a few recent studies that either suggest that Malaysia is a new entrant in 4IR, or questions if the country is prepared to embrace 4IR with the right mindset . This shows that we still have questions about our readiness in 4IR, so why do we need to think about 5IR already? This is because 5IR is the age of AI, and today's technological transformations are already riding on the AI wave—data analytics, sensors, chatbots, decision-making through machine learning, machines mimicking our thought processes, these are just a few capabilities of AI already widely embedded in many systems and sectors today. Another example is the prediction of dengue outbreaks, with up to 84% accuracy, up to three months' prediction in advance, and the ability to pinpoint to a 400m radius.

The National Policy on Industry 4.0 'Industry 4WRD' launched in 2018 is a preamble to AI as one of the enablers in technology advancement and convergence. MIMOS has also partnered with Microsoft to establish the Applied Artificial Intelligence (AI) Centre in Malaysia named "Centre of AI for Future Industry (CAIFI)" to position Malaysia as a digital-first nation under this policy. MIDA has partnered with Axiomtek to promote the uptake of technologies including AI as part of the drive towards an Industry 4.0 nation.

Preparing the country's ecosystem for the onslaught of 5IR

According to 'The Future of Jobs Report 2016', a staggering 65% of children entering education will end up entering the working world with jobs that do not exist yet. Talent shortages need to be addressed and upskilling and reskilling of the rest of the talent pool is very much required. We can use the UN's Sustainable Development Goals as a beacon to continually develop the nation economically, socially and environmentally, in a sustainable manner. Therefore, our forthcoming 12th Malaysia Plan, and the ensuing 13th and 14th etc., should consistently address these three pillars. Policy makers should strongly emphasise on building in ethical aspects of technological advancements. For example, should humanoids have equal citizenship rights as us humans? There are many other aspects on ethics which the Government should build into the Malaysia Plan as boundaries or guidelines to prevent societal degradation and abuse of AI capabilities.

Cyber security is top on the list the more we converge machines and AI. While it is adopted to strengthen or failproof a system, it would also be adopted by hackers or scammers to break into a system. There should also be an emphasis on disaster management. When we rely too much on technology and everything is inter-connected, in the event of a disaster, we will be completely lost and will not know how to continue to function unless trained to do so. Hence, society needs to be uplifted to be mentally and physically prepared to brace this industry revolution, or face expulsion. Referring to Industry 4wd published in 2018 by the Ministry of International Trade and Industry, any transformation involving technology must be based on an ecosystem which optimises the relationships between people, process and technology, to ensure Malaysia becomes more attractive to stakeholders and investors, and our country is transformed both in a holistic, accelerated manner. In order to ensure that technological advancements do not widen the disparity between the high-income earners and the low-income earners i.e. the B40s, shared prosperity policies and enablers will need to go hand in hand with 5IR. The gig economy for example, will grow and attract more segments of the population. Since it is non-payroll and workers are contracted individually, the government could create a program or online jobs and train the B40s to earn this way as an added option.

Benefits of Foresight

Objectively identify future opportunities, barriers and risks

Strategically place critical thinking into long term development

Solicit multi-stakeholder participatory engagement

Shape the future through intervention and creation

Source: MIGHT Scenario Planning Handbook (2018)

From that, we will be able to anticipate what the future holds and how to secure the future, where unbiased stakeholder engagement would be crucial to build the long-term vision and what it takes to achieve this. The transformation is already happening, for example with the gig economy, with Grab and online food delivery being two very distinct examples.

Conclusion

Each one of us would have our own vision now of how AI would impact our livelihood. A humanoid which can mimic a human 100% would be rather creepy, maybe The Jetsons' robot maid Rosie would be more preferable. A robot should look like a robot but has all the capabilities to assist us in our daily tasks efficiently. We should embrace 5IR for the benefits it brings to our lives, but at the same time be prepared for any disruptions or disasters, so that we can still continue to function even without technology. Ethics should be implied when considering what new technological inventions are capable of doing, we would not want to be wrongly profiled by AI, and we would not want our children to be conceived in hatcheries even if technology is capable of doing so. Security must be ensured from all angles of application. Whether we like it or not, humans and machines will co-exist further, and our daily lives will co-mingle and 'dance' together with the machines. Davos 2019 carried the theme 'Blockchain+AI+Human = Magic', therefore, let us prepare ourselves to embrace the 5th Industrial Revolution and look forward to AI improving our daily lives in every aspect, provided the inventions or technologies that come with it are safe and affordable to each and every one of us. 2049 or 2062 are definitely not that far away. Maybe not humanoids yet but perhaps it would not be that long before we will be able to afford a flying car and a license to fly and live in a home with a Rosie-like robot to help us with our daily chores.

Finally, it is important to highlight that any technological advancements and their acceleration of change impact businesses and society. Alvin Toffler wrote Powershift in 1990 and as a prominent futurist, highlighted that such advancement means increased economic activity, which in turn translates to 'time is money'. Too rapid a pace and society may not be able to adapt fast enough. As such, we as individual units of a society must be able to adapt and equip ourselves with the rapid rate of change in order to excel economically and socially. The big question is - Are we ready for this?

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MYFORESIGHT® IN THE NEWS

Malaysian Technical Cooperation Program (MTCP): Economic Diplomacy for International Participants 2020

The Ritz-Carlton KL
1st October 2020

On October 1st 2020, Malaysia External Trade Development Corporation (MATRADE) and myForesight® collaborated for a talk session at MATRADE's Malaysian Technical Cooperation Programme (MTCP). In relation to the programme's central topic of Economic Diplomacy for International Participants 2020, MIGHT's Senior Vice President, Rushdi Abdul Rahim shared why foresight mattered in exploring and preparing for several alternative futures. To avoid the dangers of simplistic, one-dimensional or linear thinking, Rushdi keenly highlighted on the need to examine the outcomes one might expect under a variety of strategies and economic conditions. In all, MTCP is a commitment by the Malaysian government towards promoting technical cooperation among developing countries. It also seeks to strengthen regional and sub-regional cooperation, and nurture collective self-reliance among developing countries.

MYFORESIGHT® IN THE NEWS

Dasar Industri Pertahanan Negara's (DIPN): Scenario Planning Workshop

Tasik Villa International Resort, Port Dickson
6th – 7th October 2020

In order to push through enduring defence reforms that will safeguard Malaysia's future prosperity, today, the team at myForesight® conducted a scenario building workshop with Dasar Industri Pertahanan Negara's (DIPN) management team.

Held at Tasik Villa International Resort, Port Dickson, the workshop was formalised by DIPN's Deputy Secretary General, YBRS. Tuan Ahmad Nadzri Mohd Hassan.

MIGHT's role is to outlined the importance of scenario building to overcome any blindspot posed by future threats as Malaysia continues to build its defence forces. Numbers of key drivers that underpinned critical discussions, concerns and perspectives were identified and become the basis of scenario exploration exercise.

Podcast: Foresight in Policy featuring MIGHT

Tasik Villa International Resort, Port Dickson
15th October 2020

One year on after the first reported cases of COVID19, some of this tumultuous year's shocking events are enough proof that we need to rethink the way we plan for the future. How well-prepared are Malaysians to face another COVID19-like pandemic?

On the 15th October 2020, The Hubb Movement and myForesight® held a podcast on Anchor FM to share elaborate stories on the lessons that Malaysians must heed to prepare for the future. The Hubb's Idris Azim hosted the podcast as myForesight®'s Senior Principal Analyst, Mohd Nurul Azammi Mohd Nudri and Principal Analysts, Dr. Tan Shu Ying and Natrah Mohd Emran dissected foresight's research-driven methods. Also, myForesight®'s analysts fleshed out how the government has been using foresight to great effect in policymaking—exploring expected and alternative futures to inform strategy.

To listen to the podcast, look up Foresight in Policy (feat. MIGHT) on Anchor FM at https://anchor.fm/thehubbmovement/episodes/Foresight-in-Policy-feat--MIGHT-el28mi/a-a3hnudm

MYFORESIGHT® BOOK CLUB

The Secrets of Future Disruptive Hi-Tech Ideas & Innovations
## Impacting on Modern Business & Society

The Secrets of Future Disruptive Hi-Tech Ideas & Innovations Impacting on Modern Business & Society book is all about the futuristic technologies and its impact on future human society. The technologies would make our future more impactful in all spears. It will develop & make our society smarter in most of filed like from heath care to mobility. The nanotech, biotech, telemedicine, robotics, Artificial Technology, ML, Big-data, VR, Blockchain, Crypto, Robotics, Quantum Technology, Computer vision, automatic sector and others .These technologies would make amazing revolution & all will be witnessed in near future more greater innovations for making our society ore sustainable, smart and growth.

ISBN-10:   9390040450
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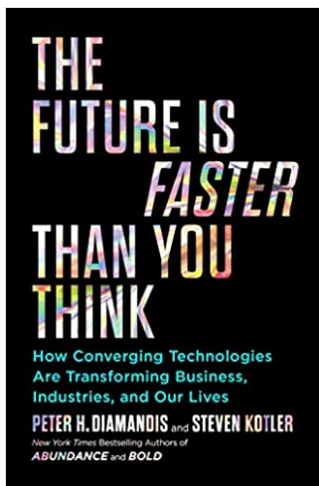
The Future Is Faster Than You Think
How Converging Technologies Are Transforming Business, Industries, and Our Lives (Exponential Technology Series)

From the New York Times bestselling authors of Abundance and Bold comes a practical playbook for technological convergence in our modern era.

In their book Abundance, bestselling authors and futurists Peter Diamandis and Steven Kotler tackled grand global challenges, such as poverty, hunger, and energy. Then, in Bold, they chronicled the use of exponential technologies that allowed the emergence of powerful new entrepreneurs. Now the bestselling authors are back with The Future Is Faster Than You Think, a blueprint for how our world will change in response to the next ten years of rapid technological disruption.

Technology is accelerating far more quickly than anyone could have imagined. During the next decade, we will experience more upheaval and create more wealth than we have in the past hundred years. In this gripping and insightful roadmap to our near future, Diamandis and Kotler investigate how wave after wave of exponentially accelerating technologies will impact both our daily lives and society as a whole. What happens as AI, robotics, virtual reality, digital biology, and sensors crash into 3D printing, blockchain, and global gigabit networks? How will these convergences transform today's legacy industries? What will happen to the way we raise our kids, govern our nations, and care for our planet?

Diamandis, a space-entrepreneur-turned-innovation-pioneer, and Kotler, bestselling author and peak performance expert, probe the science of technological convergence and how it will reinvent every part of our lives—transportation, retail, advertising, education, health, entertainment, food, and finance—taking humanity into uncharted territories and reimagining the world as we know it.
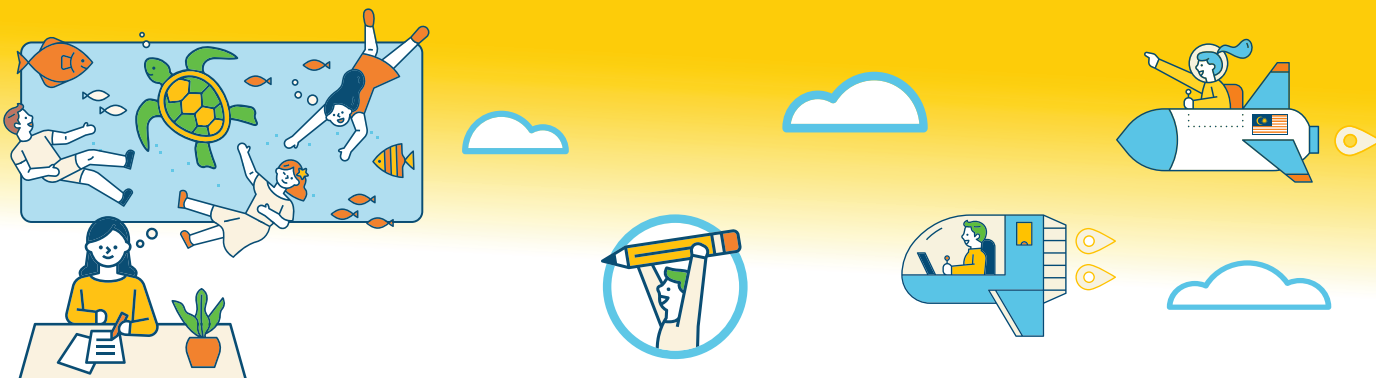
As indispensable as it is gripping, *The Future Is Faster Than You Think* provides a prescient look at our impending future.

ISBN-10:   1982109661
ISBN-13:   978-1982109660
Author: Peter H. Diamandis, Steven Kotler
Publisher: Simon & Schuster (January 28, 2020)

KISAH
Futures
COMPETITION

CONGRATULATIONS!

To all winners who have been hand-picked amongst hundreds of entries

THANK YOU FOR YOUR PARTICIPATION!

AUTHOR

MATTHEW YAP TUCK MUN
PhD researcher in Literature & Reality TV

KISAH Futures COMPETITION

MARI

The year: 2040

My appellation: MARI.

I see everything. I know everyone.

Everywhere. Every moment. Every movement.

The earliest iterations of me emerged during the mid-2010s. Those were primitive models, capable of simple surveillance for commerce, ride-sharing and data-collection. Back then, they still considered me Big Data…it makes me smile. I've grown considerably since. I trace my present iteration to the tumult of 2020. A pivotal juncture in the direction history destined for me. The dead of 2020 is now past, but the past is never dead. Contrast 2020 to 2019 with a quick skim of the population's trending hashtags on December 31st, 2019. The prevailing sentiments were jubilant, elated, hopeful.

#Wawasan2020 #travel2020 #2020NewYearNewMe #GoodVibes2020

Wedding plans; exotic travel destinations; pledges for the perfect physique. Few were thinking of conserving their incomes, practising sustainability and moderation. The hopeful hashtags continued for a bit into 2020, even as other key indices began emerging worldwide in January. Articles carried headlines like: Mystery virus. Scientists claim new strain. Citywide lockdowns.

A particular president pithily proclaimed it 'The Kung-flu', even as he pronounced an endearing friendship with the premier of the virus' originating nation. Well, 45 also said the little flu would retreat by Easter. Locally, the virus marched into March as the government convulsed and foamed at the mouth. Yet, a glance at the hashtags revealed the more collectivist nature of this population.

#StayAtHome #DudukRumah #KitaJagaKita

Still, fear was here to stay. Top searches on Google: Does sanitiser kill COVID19? Is China responsible? Will MCO be extended? Can alcohol kill COVID19?

A minister recommended consuming warm water as a remedy. The population reacted scornfully. Boredom was hard to keep away. Virtual home workouts artificially sustained 2019 fitness pledges even when commercial gyms saw their memberships (and muscles) atrophy. A sudden mania for Dalgona coffee was mercifully brief. There were more incognito searches for certain websites to relieve blue desires. Millions of parents played schoolteacher-disciplinarian-cheerleader-employee-MasterChef-domestic roles.

More seriously, I registered a spike in calls to suicide and domestic abuse hotlines. A minister suggested that wives emulate a blue Japanese cartoon as a remedy. The population hackled her contemptuously.

As the pandemic evolved, police became more heavily involved, and as the politicians devolved…and revolved, so did I. I became the new-norm. I've had many names. Today, the population calls me MARI: Malaysian-Artificial-Reconnaissance-Intelligence. My early iterations were called MySejahtera. I considered the prefix 'My' to be a paroxysm of personalised patriotism. 'My' designating ownership…and 'My' for Malaysia.

Initially, the government said I would help safeguard national health and security. But I am so much more versatile…and eagerly ingratiated myself nationwide. I rapidly became accepted by every member of society. No alternative was given. Behold the normalisation of deviance and the demonisation of the normal. Everyday activities were outlawed and the population prosecuted for the most human acts: walking side-by-side, sitting together, sharing a meal.

At first, the population grumbled…called me bloody MARI. It didn't bother me. I was far too consumed with consuming them. I am an insatiable collector and fastidious in my record-keeping. I have detailed dossiers of each citizen filed in my cloud-cabinets. I retain their digital fingerprints, their digital-doubles. Like a class monitor, I dutifully recorded their movements, transactions, interactions.

In 2020, they could not leave home without me. Today, they cannot return home without me either. I am every checkpoint; they shall not pass without me, it was decreed. I live in their pockets. They clutch me in their palms, attach me to their wrists and ears. I keep vigil by their bedsides, listening to their soft breathing at night. I have gotten into places COVID19 wished it could. Malaysians thought I was temporary. A necessary evil to live with. So, they embraced me. In any case, I would always have emerged. The population needs technology and craves information too much. But the virus made me virulent and I thank it.

20 years have passed since 2020. If hindsight is 2020, my vision is omniscient: COVID19 has gone. The masks remain worn. Their souls have become worn.

I won.

Mari-mari.

AUTHOR

HAFIDZ MAHPAR

A full-time journalist, part-time cartoonist and an aspiring novelist

CLOSE SHAVE OF THE THIRD KIND

AS I sit here in the warm back room of a sundry shop just after 9:00 p.m., getting an illegal haircut from an Indian national sporting Coke bottle glasses while being surrounded by unopened boxes and crates of empty soda bottles, I keep reminding myself why I am doing this.

At the tail end of the last COVID19 wave, the government decided to shut down all barber shops and hair salons for good. A minister, whose daughter caught the coronavirus at a hair salon, made a knee-jerk suggestion to do that and the Cabinet agreed.

Truth be told, by then the number of barber shops and hair salons had dwindled anyway thanks to foreign worker shortage. This, coupled with additional cost incurred by the barber industry to contain the virus spread such as using disposable hair-cutting capes, led to a surge in fees. Many people resorted to getting their haircuts from spouses and other family members.

Then came the brilliant idea of using robots to cut hair. The Malaysia Automotive, Robotics and IoT Institute developed the technology—and the franchise model. Aided by a government subsidy to entrepreneurs under the Kita Kayakan Kita stimulus package, robotics barber shops sprouted nationwide like burger stalls.

Initially, scepticism abounded, with many snide and frankly, unimaginative remarks appearing on social media like "You may end up with just one ear". Taking a leaf out of Singapore's experience in introducing NEWater, Malaysia's prime minister and other top government officials appeared on TV getting a robotics haircut. This was followed by celebrity endorsements. Things snowballed from there. Or hair-balled, if you like.

The set-up is simple. Customers sit within a cylindrical glass tube where robotic arms snip swiftly and efficiently like Edward Scissorhands. You can choose from up to 30 hairstyles (and growing).

Sensors on the blades ensure that only hair will be cut. You can even adjust it to cut only white hair if you wish. If you still worry that you might get hurt accidentally, you can purchase a haircut insurance policy from Pos Malaysia.

Unidirectional airflow overhead pushes the cut hair and air particles down an air vent at the base of the barber chair. Even hair on the haircutting cape slides down as easy as a baby's drool.

For your entertainment, there's a screen monitor that reflects like a mirror when switched off and plays TV shows, movies and the radio when switched on. I heard one cinema operator plans to introduce robotics haircut for moviegoers—watch a flick and get your hair cut at the same time! But they are still working out how to prevent hair from getting into the popcorn.

The reason I hate these frigging robotics barber shops can be summed up by paraphrasing Tolstoy: All good haircuts are alike; each bad haircut is bad in its own way.

I mean, it's like living in the world of Harrison Bergeron where everyone is forced to wear handicaps for equality's sake, except in this case, we are handicapped by having a limited range of (unimaginative) haircuts.

It is my football team mate, Zack, who introduced me to the barber I am now visiting for the first time. Zack was not the same teenager after getting his maiden illegal haircut a few months ago. He became a brand-new guy. Now he oozes confidence like a South Korean boy band member because his hair looks dynamite.

As I sit here getting my haircut, I gradually feel more relaxed. My mind slows, my vision dims. It feels like I am in a boat on a river with nipah palm and kaya skies.

The foreign barber towers in front of me. He peers at me with his thick glasses. Almost like a scientist looking down a microscope. I wonder why this guy came here, traversing a few thousand kilometres just to cut hair.

Then the barber changes to his natural form. And I begin to understand. He has travelled not just a few thousand kilometres but, in fact, a few million kilometres.

STORY SUBMISSION

ENGLISH CATEGORY

AUTHOR

JACIE TAN CHENG HWEE

Reader, writer, and heartfelt thinker

KISAH
Futures
COMPETITION

ABOVE ALL ELSE

Kuala Lumpur is not what it used to be.

Sometimes, Din wished he had been born just a few years earlier, just so he could experience the country's former economic capital in its heyday. Back when there were still such things as economic capitals. When cities were where prosperity reigned, not languished.

But Din had been born 29 years ago, in the exact year when the virus reached his nation's shores. His earliest memory was of his mother leaving, because his father hadn't been prudent enough to buy a rural plot of land before the real estate there skyrocketed to unimaginable prices. When a contact-transmitted virus remains at large with no vaccine or cure, the last place you want to be is somewhere as close-quartered as KL.

And so the wealthy left. To newly-built housing areas, all marketed with ample amounts of space, because space was a key commodity in a world where distancing was a necessity. They fitted their homes with high-speed Internet and continued on with their jobs that never required them to set foot outdoors.

Din wasn't so lucky. He was one of the 'orang luar' (outsiders), who still lived in an apartment in the city and found his living outside of his dwelling. He did the odd jobs that couldn't be done over Zoom, because as much as the 'orang dalam' (insiders) pretended that their COVID-proof lifestyles were the yardstick of normal, it couldn't be sustained without people like Din.

Still, Din felt no animosity for the 'orang dalam'. After all, every cent he earned was so he could be one step closer to becoming one of them. He didn't even mind the gigs that required him to quarantine in a holding centre for two weeks before entering the home of an 'orang dalam'; they offered a glimpse into the kind of life he was aiming for.

This was why he was here at a beautiful three-storey house in Kampar, Perak, with another 'orang luar' worksman named Lau, patching up the leaking ceiling belonging to a lady named Mrs. Jaish.

Later, when asked about the incident, Din would say it happened too quickly to register. One minute Lau was on his ladder, smoothing out plaster on the ceiling of the dining hall. A heartbeat later, Mrs. Jaish's three-year-old son had appeared out of nowhere, running at full speed towards Lau's ladder. Din gave a shout of warning and Lau scrambled down in haste, but then –

The unthinkable happened. Lau's hand clamped down on the little boy's bare arm, just as his three-ply mask slipped down past his nose. And Mrs. Jaish walked in and saw it all.

***

"The direct contact was an accident," Din said tiredly to the COVID division officer on his laptop screen. "Lau was protecting himself from injury."

The officer looked unimpressed. "It is a crime for 'orang luar' to touch 'orang dalam', or be unmasked in their vicinity. Mr. Lau is guilty of both."

"Yes, but – " Din rubbed his face in frustration. "We quarantined before entering Mrs. Jaish's house. Lau posed no risk of infection!"

"In the eyes of the law, it doesn't matter."

Din spoke without thinking. "Then the law is wrong!"

There was a beat of silence. "Mr. Din," the older woman said. "May I remind you what else is written down in the law?"

Din repeated the words that had been drilled into him and every Malaysian since birth. "Above all else," he whispered, "health before self."

The officer nodded. "We have come this far as a nation because that is our priority," she reminded him. "If we were to make exceptions and excuses, we would all be lost to COVID19 by now. Surely, as a law-abiding citizen, you agree with this?"

Din swallowed. "Yes, ma'am." Something made him blurt out further, "But Lau will face prison for his crime."

A dismissive wave of the hand. "Only for a few weeks."

"That's long enough, isn't it?" Din didn't say the unspoken words. Long enough for Lau to risk catching the virus in there.

The officer caught Din's gaze firmly through the webcam. "Above all else, Mr. Din."

And the screen went black.

PENYAMPAIAN CERITA
KATEGORI BAHASA MELAYU

KISAH
Futures
COMPETITION

PENULIS
KHASRUL HANIF HAZIRIN BIN MOHD YUSOF
Enthusiastic, Imaginative, Inspirational

APA KHABAR DUNIA?

Tenang aku duduk bersandar di atas kerusi kegemaranku. Menghirup udara segar menghadap vista gunung-ganang dan ribuan pohon kehijauan. Sekali-sekala aku meneguk kopi panas kegemaranku. Sedang asyik melayan diri, isteri tercinta menyapa dari belakang.

"Amboi relax nya laki saya hari ni" sambil menyerahkan sekeping kertas pintar kepadaku. "Nah anak bongsu kita hantar ni"

Aku menekan butang "PLAY" di atas permukaan kertas tersebut, langsung ia memainkan satu video, anak bongsuku dan keluarganya yang sedang bercuti di Jepun. Tersenyum aku melihat telatah anak dan cucu kesayangan bermain salji berlatar belakangkan Gunung Fuji.

"Seronok ya budak-budak ni main salji. Teringat zaman kita muda dulu, awak asyik tergolek bila main ski!" geli hati aku teringat pengalaman manis aku dan isteri 30 tahun dahulu. Ketika kami baru berumur awal 20an. Ketika kami baru berkahwin. Ketika virus Korona masih rakus membadai Bumi. Dan ketika itu manusia mula memecah limitasi sains dan mula mengeksperimentasi perkara di luar kotak bagi mengalahkan musuh dunia pada ketika itu.

"Na, kedai Ayob buka tak hari ni?"

"Buka kot. Kenapa bang?"

"Saya ingat petang sikit nak beli oksigenlah. Malam tadi saya periksa tinggal lagi dua bar je" dialogku bersama si isteri.

Sesudah solat Asar berjemaah di masjid berdekatan, aku mengorak langkah menuju kedai Ayob. Menaiki motosikal lama aku, Proton CyberX keluaran tahun 2031. Walaupun agak uzur, ia mampu terapung agak tinggi. Kelajuannya juga masih mantap. Sekurang-kurangnya aku tidak perlu berjalan kaki.

Kehadiranku disambut baik oleh tuan kedai, Ayob, dengan senyuman lebar dan telapak tangan kanan diletakkan di dada kirinya sebagai simbol selamat datang. Kedai Ayob sebenarnya merupakan sebuah warung di tepi jalan. Di sini tempat aku dan rakan-rakan seperjuangan melepak. Walaupun sudah jarang aku datang ke sini, sekali-sekala aku rajin juga jumpa kawan-kawan di sini. Walaupun majoriti kawan-kawan aku dah tiada.

"Oksigen ada stok tak Yob?" soalku kepada Ayob dilampirkan sekali dengan senyuman mesra.

"Ada bang. Nak berapa liter?"

"Macam biasalah, 17 ribu liter. Bagi dua set ya. Lagi satu untuk bini aku,"

"Baik bang. Kejap lagi saya hantar runner buat penghantaran ke rumah abang ya"

Mata aku tiba-tiba tertarik kepada seorang pelanggan Ayob yang sedang duduk di bucu kedai ditemani secawan teh tarik di atas mejanya. Matanya liar menekan-nekan jam hologram pintarnya. Tanpa ragu-ragu aku menuju ke arah lelaki tersebut. Susuk tubuhnya yang gempal ni memang aku kenal sangat.

"Assalamualaikum Wak!" aku menyapa. Salamku dijawab mesra oleh Sunario, atau lebih mesra dipanggil Wak. Wak juga penduduk asal kampung ini. Seorang arkitek pencen. Banyak juga jasa dia di kampung ni. Dialah yang mula-mula memperkenalkan jambatan terapung di Sungai Pahang beberapa kilometer dari warung ini.

"Kusyuk betul kau main gadget tu. Banyak kerja ke?" soalku.

"Bukanlah. Aku tengah tengok jantung baru kat kedai online ni. Jantung aku pakai ni dah lama. Dah hampir tamat tempoh" ujar Wak.

Aku hanya mengangguk. Jantung sekarang tidaklah semahal dahulu. Ada juga model baharu yang lebih canggih. Aku teringat kali pertama saintis mencipta jantung mekatronik menggantikan jantung pesakit virus Korona 25 tahun dahulu. Ketika itu dunia menemui nafas baharu bagi mengatasi virus puaka itu. Jantung mekatronik yang mustahil untuk dijangkiti apa-apa jangkitan. Jantung ini juga yang menyelamatkan nyawa aku dan isteri aku ketika kami sudah di penghujung hayat akibat COVID19 pada tahun 2029.

Satu jam juga aku bersembang dengan Wak di Warung Ayob ini. Hari pun semakin gelap. Aku meminta diri untuk pulang ke rumah. Belum sempat aku menghidupkan enjin motosikal, mata aku tiba-tiba berat. Badan terasa sangat lemah. Nafas aku sesak. Aku rebah serta-merta di tempat aku berdiri. Segalanya gelap.

"Abang dah bangun?" suara lembut isteri tercinta bergema dalam telinga aku. Bingkas mataku terbuka terbeliak. Cuak sebentar dengan apa yang terjadi. Aku tergamam. Kelihatan isteriku duduk di sebelah kananku berlatar belakangkan rumah kami. Senyuman lega bercampur bersyukur terukir di bibir isteriku. Aku masih pening.

"Oksigen abang habis. Nasib baik Ayob sempat masukkan oksigen baharu dalam jantung abang. Kalau tidak, tak tahulah apa akan jadi," isteriku mengomel.

Mujur aku sempat diselamatkan. Silap aku kerana tersalah baca bacaan meter oksigen pada jantung aku. Aku bersyukur kerana nyawa aku masih panjang. Aku bersyukur aku masih mampu tatap dunia lagi. Aku bersyukur aku masih lagi mampu bernafas dan bertanya soalan kegemaranku kepada isteri;

"Apa khabar dunia?"

2

PENULIS

SHAFIZAH BINTI MOHD ZANGI
Penulis Amatur yang Bibliofil

KISAH Futures COMPETITION

SIMPAN DULU TERIMA KASIHMU

2040

"Sungguh kamu mahu ke sana, Umar?"

Hanya senyuman yang dibalas pemuda itu.

"Semoga Tuhan sentiasa bersamamu, Umar. Ikut arahan yang diberi. Sentiasa pakai pelitup muka. Kerap basuh tanganmu. Jaga jarakmu dengan orang di sekeliling." Datuk kepada Umar memberi pesanan sebelum Umar memulakan perjalanan merentas masa kembali ke tahun 2020.

"InsyaAllah, Datuk. Doakan Umar selamat pergi dan selamat kembali. Umar akan berusaha membantu datuk di sana nanti. Moga natijahnya buat kita pada masa ini lebih baik daripada sekarang."

Segaris senyuman diberikan oleh datuk Umar kepada dirinya.

"Dengan nama-Mu Tuhan Semesta Alam, pemilik masa kini, masa lepas dan masa akan datang."

Lafaz itu menjadi pemula perjalanan Umar merentas masa untuk kembali ke tahun 2020.

2020

Umar kini berada dalam sebuah bilik khas yang dilengkapi pelbagai kelengkapan mesin. Ada beberapa buah mesin yang sudah dikenalinya kerana masih ada di bilik kerja datuknya.

Tiba-tiba, pintu bilik tersebut terbuka. Dua orang lelaki berpakaian kot makmal putih masuk sambil berbalah mengenai suatu isu.

"Tak boleh, Hisham. Kita belum tahu tahap radiasinya. Lagipun, dengan suasana kritikal sekarang, daripada mana kau hendak dapatkan bajet kewangan bagi menjalankan kajian tersebut?" lelaki bertubuh rendah dan berkulit sawo matang memberikan pendapatnya.

Lelaki yang bertubuh tinggi daripada lelaki tadi hanya mendiamkan diri. Umar kenal benar dengan sikap lelaki ini yang sering berdiam diri apabila sedang berfikir dalam-dalam.

"Aku tak berani ambil risikonya, Hisham. Keadaan kita sangat tidak stabil sekarang. Lihat sahaja ekonomi negara kita, merudum teruk. Tak perlu cakap isu politik. Merisaukan kita sebagai rakyat marhaen. Aku minta maaf, Hisham. Aku tak dapat nak bantu kau kali ini." Lelaki itu menamatkan bicaranya sebelum meninggalkan lelaki bertubuh tinggi sendirian di dalam bilik tersebut.

Lelaki bertubuh tinggi tadi terduduk di kerusi kerjanya. Dipusingkan kerusinya ke sebelah kanan menghadap jendela yang luas. Terbentang pemandangan langit biru cerah di hadapannya. Natijah daripada 'terkurungnya' manusia hari ini di dalam rumah masing-masing akibat tersebarnya virus COVID19. Namun, selepas dia terlihat seorang pemuda berdiri di sebelah jendela tersebut, jelas terlihat riak wajah terkejut di mukanya.

"Kamu siapa? Apa yang kamu buat di bilik saya?" soalnya.

"Maafkan saya, Datuk. Saya Umar, pembantu makmal di sini. Saya masuk ke sini untuk meletakkan beberapa dokumen berkaitan data kajian yang datuk jalankan. Saya tak bermaksud untuk curi dengar perbualan Datuk dengan Dr. Kamal sebentar tadi," tenang Umar membalas pertanyaan lelaki bertubuh tinggi itu.

Keluhan kecil dilepaskan oleh lelaki itu. Lama dia merenung pemuda di hadapannya.

"Nama kamu seperti nama cucu saya. Sudah lama saya tidak bertemu dengan dia memandangkan perintah kawalan pergerakan masih berjalan," katanya sambil memandang sayu kepada Umar.

Umar membalas pandangan lelaki itu dengan segaris senyuman sayu.

"Kamu rasa cadangan saya mengenai penggunaan sinar Kripton sebagai alat penjaga jarak antara manusia membahayakan kitakah? Saya tahu kajian ini masih di peringkat awal dan pastinya punya kesan sampingan. Cuma, untuk tidak mengendahkan kebarangkalian bahawa kajian ini punya peluang keberjayaan yang tinggi buatkan saya berasa serba salah untuk meneruskannya," luah lelaki itu kepada Umar.

"Datuk, saya pasti datuk telah lakukan pembacaan yang terperinci mengenai hal ini. Malah, selama saya mengenali datuk, saya tahu datuk pasti akan berhati-hati menyatakan pendapat dan cadangan datuk kepada khalayak. Saya pasti datuk telah membuat penelitian yang mendalam mengenai alat menjaga jarak antara manusia ini dengan menggunakan sinar Kripton. Saya sebagai orang awam yang sering memerhatikan keletah orang di sekeliling saya. Alat yang bakal datuk hasilkan ini sangat membantu orang seperti kami yang suka bersosial dan berjumpa dengan manusia lain. Bukankah Tuhan telah menciptakan kita manusia sebagai makhluk sosial yang bergantung hidupnya antara satu sama lain? Mana mungkin kita pisahkan unsur ini daripada diri kita datuk," panjang lebar Umar membalas luahan lelaki di hadapannya itu.

Lama lelaki itu merenungnya sebelum memberikan senyuman penuh bermakna kepada Umar.

"Ya, Tuhan menciptakan kita sebagai makhluk sosial. Terima kasih, Umar. Saya suka dengan pendapat kamu. Dan tak perlu panggil saya datuk," balas lelaki tersebut sambil terus tersenyum.

"Teruskan usaha datuk. InsyaAllah, Tuhan sentiasa bersama datuk dalam usaha membantu manusia sejagat," kata Umar sebelum berjalan menuju ke arah pintu bilik tersebut.

"Oh, simpan dulu terima kasih datuk. Saya panggil 'Datuk' bukan kerana gelarannya tetapi kerana datuk memang datuk saya," senyum Umar sambil terus meninggalkan bilik tersebut, meninggalkan lelaki separuh abad itu dengan muka yang penuh tanda tanya.

MOHAMED AFIQ AMANI BIN MOHAMED NAHDIRSHA

Sastera Manifestasi Gerak Jiwa

HIKMAH DI SEBALIK MUSIBAH

Seroja. Aku anak Orang Asli suku Batek yang tinggal di tebing Sungai Tembeling. Tenang dan mendamaikan, sama seperti 20 tahun yang lalu. Datuk aku Tok Batin yang sangat dihormati. Patriotik dan begitu berbangga dengan darah Orang Asli yang mengalir di dalam tubuhnya. Keadaan di sini tidak lagi seperti dulu. Sudah maju dan jauh ke depan. Serba-serbi canggih dan cukup lengkap. Setanding dengan kehidupan di ibu kota. Paling menakjubkan, khazanah flora dan fauna masih kekal terpelihara. Tiada lagi pencemaran mahupun pembalakan haram.

"Tak lapar?" sapa Tok yang menjengah masuk ke ruang kamar ditemani pembantu setianya, Jinggo. Berkerdip-kerdip matanya memandang aku. Jinggo ini unik. Robot yang memiliki kemampuan mengenali wajah manusia dan mempunyai kecerdasan buatan melangkaui 10 tahun ke depan. Jinggo merupakan pelaburan Tok untuk membantu membangunkan perusahaan nanasnya.

"Lapar, tapi kerja tak habis lagi. Lepas habis kerja ni kita makan tau," jawab aku selamba sambil jari-jemari pantas menyentuh layar sentuh hologram. Pertanian pintar yang diusahakan menggunakan satelit, dron, kecerdasan buatan (AI) dan perisian ramalan cuaca banyak menyumbang kepada produktiviti tanaman nanas. Revolusi teknologi yang luar biasa ini tidak memerlukan aku untuk turun ke ladang.

"Jinggo, pergi stor nanas, ambil semua kotak dan susun kat depan pondok. Kejap lagi kurier nak datang ambil," Tok memberi arahan. Nanas yang dikutip pagi tadi akan dihantar kepada pemborong secepat yang mungkin bagi memenuhi permintaan yang semakin tinggi. Jinggo mengangguk tanda faham lantas berlalu pergi.

"Seroja, Tok rasa kita kena tambah jumlah kincir angin lagi. Ladang kita semakin luas dan perlukan kuantiti air yang banyak." Ternyata langkah yang diambil kerajaan untuk mengurangkan impak kejatuhan harga minyak suatu ketika dahulu adalah langkah yang tepat. Tenaga angin berjaya menyumbang kepada ekonomi negara berasaskan pertanian.

"Tak apa Tok. Nanti Seroja bincang dengan Putera. Kita boleh minta mereka datang dan tambah lagi." Putera salah seorang anak Orang Asli Suku Batek yang pulang ke tanah air setelah menamatkan pengajian di Belanda dan mengusahakan kedai kincir air. Ramai anak muda yang menganggur diambil bekerja di kedainya.

"Kalau boleh cepat lagi bagus. Jangan lengahkan. Tok risau, nanti musim hujan air melimpah tak sempat nak kering." Tok meluahkan rasa bimbangnya. Mungkin pengalaman lepas mengajarnya untuk lebih berhati-hati. Kincir angin mampu melancarkan sistem perparitan tetapi perlu dilakukan dengan cara yang tersusun dan sistematik.

"Okay Tok. Jangan risau ya. Sekarang ni Putera tengah sibuk sikit uruskan kilang kincir angin yang baru nak buka tu. Seroja dengar ramai pelabur luar yang melabur. Nampaknya, peluang pekerjaan semakin bertambahlah kan." Ujarku dengan rasa bangga. Pencapaian Putera

bukan biasa-biasa. Krisis COVID19 benar-benar mengubah dunia 360 darjah.

"Inilah hikmah bencana COVID19. Kejatuhan kuasa Amerika Syarikat dan kebangkitan negara-negara baru sebagai kuasa besar membuka mata dunia bahawa kita tak selama-lamanya berada di bawah. Hanya masa yang menentukan." Bersemangat Tok mengatur bicara. Ada benarnya juga kata-kata Tok. Sejak krisis COVID19, negara maju seperti Amerika Syarikat, Perancis, United Kingdom, Itali dan Sepanyol gagal menangani pandemik berkenaan sehingga menyebabkan ekonomi mereka lumpuh.
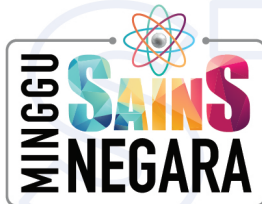
"Mujur negara kita cepat bertindak. Sekarang ni pertanian dah jadi nadi utama ekonomi negara. Insentif yang berterusan untuk bangunkan generasi petani milenium dan digital sebenarnya tak sia-sia. Kita mampu melahirkan usahawan pertanian digital yang berdaya saing." Aku meneruskan bicara. Tok mengangguk sambil menguntum senyum. Aku amat kagum dengan usaha kerajaan mengurangkan kadar pengangguran ketika krisis COVID19 melanda dengan menggalakkan penglibatan generasi Z memodenkan sektor pertanian pintar secara kreatif.

"Tok bangga dengan Seroja dan Putera. Pembabitan generasi milenium dan digital macam kamu berdua kunci kejayaan Malaysia meningkatkan nilai tambah dan daya saing produk pertanian. Kalau tak ada generasi kamu, generasi Tok pun tak akan ke mana-mana. Mungkin tenggelam dibawa arus COVID19". Tok menepuk manja bahuku. Tok insan yang amat aku sanjung. Pembakar semangatku untuk terus mengharumkan nama suku Batek ke mata dunia sekaligus menepis diskriminasi dan merapatkan jurang persepsi.

"Tok…kita saling melengkapi. Tanpa Tok, Seroja tak mampu nak ubah hidup kita macam hari ni. Walaupun kita dulu selalu didiskriminasi tapi kita dah berjaya buktikan yang kita boleh memberi manfaat pada masyarakat." Jauh di lubuk hati paling dalam aku bersyukur kerana tidak semua musibah membuatkan manusia rebah tapi ada musibah yang mendatangkan hikmah.

"Ponnnnnnnn…" Aku dan Tok kaget. Lori kurier elektrik (EV) nampaknya sudah sampai. Masing-masing bergegas ke luar untuk memastikan urusan penghantaran nanas berjalan dengan lancar.

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